



CONSTRUCTION PROJECT

INVITATION TO BID (ITB) NO. 1005-0-2021LD

MARTIN COUNTY SCHOOL DISTRICT (MCSD) ENHANCED SECURITY PROJECT

**PURCHASING DEPARTMENT
2845 SE DIXIE HWY
STUART, FLORIDA, 34997
TELEPHONE (772) 219-1255
EMAIL bids@martinschools.org**

**NOTICE OF
INVITATION TO BID**

Bid documents must be submitted electronically through www.DemandStar.com or bids@martinschools.org by responding no later than the designated deadline date and time. A Bidder's failure to submit as required before the deadline shall cause their bid to be disqualified. Under no circumstances shall bids delivered to or received by the District or Demandstar after the Due Date and Time be accepted or considered. Late bids will be retained unopened.

Solicitation Documents may be obtained by registering with www.DemandStar.com or from the Purchasing Website: <https://www.martinschools.org/Page/945>.

Bidders who obtain solicitation documents from any other source are cautioned that the solicitation package may be incomplete. Furthermore, all addenda issued will be posted and disseminated by DemandStar to planholders/members.

The following meeting dates are subject to change according to the needs of the District.

ITB Number:	1005-0-2021LD
ITB Name:	MCSD Enhanced Security Project
ITB Advertising/Publish Dates:	5/20/21, 5/27/21 and 6/3/21
Mandatory Prebid Meeting:	6/10/21, at 10:00am
Site Visit:	6/16/21, at 10:00am
Questions Deadline:	6/23/21 at 2:00pm
ITB Closing Date/Time:	6/30/21 By No Later Than 2:00pm
Anticipated Award Date	7/20/21
Contact Information:	Email: bids@martinschools.org
Email Notifications:	Start all email subject lines with the ITB number for faster recognition.
Submittal Requirements:	Submit bid by completing and returning all required documents. All submittals are required to be electronic and be contained in one (1) file. Hard copies, mailed, or facsimile responses shall not be accepted. Under no circumstances shall bids delivered to or received by the District or Demandstar after the Due Date and Time be accepted or considered. Late proposals will be retained unopened. It is the sole responsibility of the Bidder to assure that their submittal is uploaded to DemandStar or bids@martinschools.org on or before the Due Date and Time. The District shall in no way whatsoever be responsible for any delays caused by any power outages or internet failures. No exceptions will be made.
Submit Bid to::	Bidder shall submit their bid indicating Bidder's name and Project Name, ITB Number, and time and date of the ITB opening. Bids shall be submitted electronically through www.DemandStar.com or bids@martinschools.org .
ITB Scope of Work:	The Martin County School District (hereinafter referred to as "MCSD") is soliciting a Licensed General Contractor to submit bids to install new enhanced security systems in the entry vestibules within the existing lobby of the administration area at four (4) schools: Indiantown Middle School, Citrus Grove Elementary School, JD Parker Elementary School, and Warfield Elementary School, in accordance with the Architect's Construction Documents, Project Manual specifications, and drawings. Estimate of Probable Cost is \$1,215,000.00.

Bidders may not withdraw their bid submittal for a period of ninety (90) calendar days after the day set for the opening of bids.

The District reserves the right to waive any informalities or irregularities, reject any and all bids that are incomplete, conditional, non-responsive, or which contain additions not allowed for; to reject any or all bids in whole or in part with or without cause; to award in whole or in part to one or more Bidders, and to accept the bid which best serves the District.

ADVERTISEMENT PUBLICATION

Martin County School Board
2845 S.E. Dixie Highway
Stuart, FL 34997

ITB# 1005-0-2021LD ENHANCED SECURITY PROJECT

The Martin County School District (hereinafter referred to as "MCSD") is soliciting a Licensed General Contractor to submit bids for the installation of new enhanced security systems in the entry vestibules within the existing lobbies of the administration area at four (4) Martin County Schools: Citrus Grove Elementary School, Indiantown Middle School, J.D. Parker Elementary School, and Warfield Elementary School, in accordance with the project manual specifications and plans.

Solicitation Documents may be obtained by registering via electronic bid disseminators listed on the Purchasing Website: <https://www.martinschools.org/Page/945>. The District is not responsible for the content of any submittal package received through any 3rd party service or any other source.

There will be a **Mandatory** Pre-bid Meeting, on **June 10, 2021, at 10:00AM** via Zoom. Zoom meeting information will be posted via electronic bid disseminators on the Purchasing Website: <https://www.martinschools.org/Page/945>.

A Bid Bond in an amount of five percent (5%) of the total amount bid is required and must be submitted with their bid. The Bid Surety may be in the form of a Surety Bond with a carrier duly licensed and authorized to do business in the State of Florida, Cashier's Check or Certified Check (checks made payable to School Board of Martin County, Florida).

Questions: Email bids@martinschools.org by no later than 2:00 pm eastern time on **June 23, 2021**.

Firms desiring to provide the services described shall submit one (1) complete electronic submittal, contained in one (1) file, PDF format preferred, submitted electronically through www.DemandStar.com or bids@martinschools.org containing all of the required information **no later than 2:00pm, June 30, 2021**.

Publish Date: 5/20/21, 5/27/21 and 6/3/21

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SECTION I

DEFINITIONS, ABBREVIATIONS, & ACRONYMS

Wherever used in the Contract Documents the following terms have the meanings indicated in the industry which are applicable to both the singular and plural thereof:

1.1. **Acceptance:** By the DISTRICT'S PROJECT MANAGER of the Work as being fully complete in accordance with the Contract Documents.

1.2. **Addenda:** Written or graphic instruments issued prior to the opening of Bids which clarify, correct or change the Bidding Requirements or the Contract

1.3. **Application for Payment:** The form accepted by the CONSULTANT which is to be used by CONTRACTOR to request progress payments or final payment and which is to be accompanied by such supporting documentation as is required by the Contract Documents.

1.4. **Bid:** The formal firm price offer of the BIDDER submitted on the prescribed form setting forth the prices for the WORK in response to the Invitation to Bid.

1.5. **Bidder:** Any person, firm or corporation submitting a Bid for the Work directly to the DISTRICT. As used in this Invitation to Bid, the words proposer and contractor may be used interchangeably to mean Bidder.

1.6. **Bid Documents:** Includes the Invitation to Bid, Instructions to Bidders, Bid Form, and proposed Contract Documents (including all Addenda issued prior to receipt of Bids).

1.7. **Bonds:** Bid security/guarantee, performance, and payment bonds and other instruments of security, furnished by the CONTRACTOR and his surety in accordance with the Contract Documents and in accordance with the law of the place of the project.

1.8. **Cable:** An assembly of one or more insulated conductors or optical fibers, within an enveloping sheath

1.9. **Change Order:** A written order to the CONTRACTOR executed by the DISTRICT, CONSULTANT, and CONTRACTOR authorizing an addition, deletion or revision in the Work, or an adjustment in the Contract Price or the Contract Time issued after execution of the Contract.

1.10. **Consultant/Engineer of Record:** The Architect or Engineer, also referred to as **EOR (Engineer or Record)**, firm or corporation named as such in the Contract Documents that acts as the District's authorized agent within the scope of work entrusted to them by the District.

1.11. **Consultant's Representative:** An authorized representative of the Consultant assigned to observe the work performed and materials furnished by the CONTRACTOR.

1.12. **Contract:** The written agreement between DISTRICT and CONTRACTOR covering the WORK to be performed.

1.13. **Contract Documents:** The Contract Documents establish the rights and obligations of the parties. The Notice of Tentative Award, including the contract is directed for signature as acceptance of offer by the Contractor, prior to Board approval for award. Once approved, a notice of award requesting the bonds and insurance are requested. The executed contract documents, including exhibits (solicitation/submittal), bonds, and insurance are provided to the Contractor. CONSULTANT'S written interpretations and clarifications issued on or after the Effective Date of the Contract.

Please review Section VIII, Sample Contract, and note any objections, or revisions that would be required within the submittal. Should no revisions be noted, the District will assume

and the Contractor agrees that the terms and conditions of agreement are acceptable. The proposed Agreement does not authorize the performance of any work.

Approved Shop Drawings and the reports and drawings of subsurface and physical conditions are not Contract Documents. Only printed or hard copies of the items listed in this paragraph are Contract Documents. Files in electronic media format of text, data, graphics, and the like that may be furnished by DISTRICT to CONTRACTOR are not Contract Documents.

1.14. **Contract Price:** The total monies payable by the DISTRICT to the CONTRACTOR under the terms and conditions of the Contract Document.

1.15. **Contract Time:** The number or numbers of successive days or dates stated in the Contract Documents for the completion of the WORK.

1.16. **CONTRACTOR:** The individual, partnership, corporation, joint-venture, or other legal entity with whom the DISTRICT has entered into the Contract. Can be used interchangeably with the term bidder and / or vendor.

1.17. **Day:** A calendar day of 24 hours measured from midnight to the next midnight.

1.18. **Defective Work:** WORK that is unsatisfactory, faulty, or deficient; or that does not conform to the Contract Documents; or that does not meet the requirements of any inspection, reference standard, test, or approval referred to in the Contract Documents; or WORK that has been damaged prior to the CONSULTANT'S recommendation of final payment.

1.19. **District:** The Martin District School District, Florida, a Florida school district, its authorized and legal representatives, the public entity with whom the Contractor has entered into the Contract and for whom the WORK is to be provided.

1.20. **District Representative:** The person or persons designated by the DISTRICT'S PROJECT MANAGER. The DISTRICT'S PROJECT MANAGER. This may include the CONSULTANT/EOR.

1.21. **DP:** Dead pairs: Unused copper pairs terminating within splice case, but without being splices to outgoing cable.

1.22. **Drawings:** The drawings, plans, maps, profiles, diagrams, and other graphic representations which show character, location, nature, extent and scope of the WORK, which have been prepared or approved by CONSULTANT and are included and/or referred to in the Contract Documents. Shop Drawings are not Drawings as so defined.

1.23. **Effective Date of the Contract:** The date indicated in the Contract, but if no such date is indicated it means the date on which the Contract is signed by the last of the two parties to sign the Contract.

1.24. **Field Order:** A written order issued by the DISTRICT'S PROJECT MANAGER or by the CONSULTANT which clarifies or interprets the Contract Documents in accordance with Article 9.4 or orders minor changes in the Work in accordance with Article 10.1 of Supplementary Conditions

1.25. **GEC:** Grounding electrode conductor: Conductor used to connect grounding electrode to equipment grounding conductor, or to grounded conductor of circuit at service equipment, or at source of separately derived system.



1.26. **GP:** Grounding electrode: Conductor (rod, pipe or plate or group of conductors) in direct contact with earth for purpose of providing low-impedance connection to earth.

1.27. **General Requirements:** See Special Conditions and Division 1 of the Technical Specifications.

1.28. **Handbox:** Rectangular or square underground pathway element similar to small maintenance hole, which cannot be fully entered, that allows for pulling point or splice point in power, security or communications pathway.

1.29. **Handhole:** A round underground pathway element similar to a handbox, which cannot be fully entered, that allows for a pulling point in a pathway

1.30. **ICP:** Inside Cable Plant: Part of Information Transport System running within buildings. ICP elements include workstation outlet assembly, cabling to the workstation from network rooms, backbone cabling within building, backbone cabling running between physically contiguous buildings, network racks and hardware (routers, switches, hubs, firewalls, etc.), patch panels, punch blocks, fiber distribution panels, patch cords, and cross-connect cables/wires.

1.31. **Identifier:** An item of information that links a specific element of the Information Transport System infrastructure with its corresponding record.

1.32. **Infrastructure (Information Transport System):** A collection of those Information Transport System components, excluding equipment, that together provides the basic support for the distribution of all information within a building or campus

1.33. **Irregular Bids:** Irregular Bids are defined as those containing serious omissions, unauthorized alternative Bids, incomplete Bids or unbalanced Bids.

1.34. **ITS:** Information Transport System: Copper cabling or optical fiber for transmission of information on School District property. Transmission includes data, video, voice, fire alarm, security, access control, and other low-voltage networks. Information Transport System is not limited to School District-owned cabling, but includes copper and optical fiber, and equipment owned by outside providers carrying School District's information. Pathways are not limited by School District's ownership, but include those owned by any third party. Information Transport System may be referred to as "the network" within project documents

1.35. **Laws and Regulations:** Laws, rules, codes, regulations, ordinances and/or orders promulgated by a lawfully constituted body authorized to issue such Laws and Regulations.

1.36. **Linkage:** A connection between a record and an identifier or between records.

1.37. **Maintenance (man) holes:** Underground pathway element large enough for person to fully enter work, used to provide access to underground cable to pull, splice, and maintain.

1.38. **Media (Information Transport System):** Wire, cable, or conductors used for Information Transport System.

1.39. **Notice to Proceed:** The written notice issued by the DISTRICT, or it's agents, to the CONTRACTOR authorizing the CONTRACTOR to proceed with the WORK and establishing the date of commencement of the Contract Time and the date the Contract WORK is to be completed.

1.40. **Notice of Tentative (or Intent) Award:** The official written notice by the DISTRICT to the apparent successful BIDDER giving authorization to enter into an agreement, stating that upon compliance and Board approval with the conditions precedent Section I

enumerated therein within the time specified, and receipt of accepted offer.

1.41. **OB:** Outlet box: Metallic or nonmetallic box used to hold Information Transport System outlets/connectors or transition devices

1.42. **OCP:** Outside Cable Plant: Part of Information Transport System running between buildings, from building to definable exterior point, between definable exterior points, or from non-School District source to School District building or definable exterior point. OCP includes termination punch blocks, fiber distribution panels, interior splices for outside to inside optical fiber transition, and other initial device into which outside cable attaches. OCP does not include backbone cable running between physically contiguous buildings unless cabling enters OSP pathway element (e.g. OSP conduits, maintenance holes, etc.). OCP includes underground cabling and aerial cabling.

1.43. **Outlet(Connector) (Information Transport System):** Connecting device in work area on which horizontal cable or outlet cable terminates

1.44. **Partial Utilization:** Placing a portion of the WORK in service for the purpose for which it is intended (or a related purpose) before reaching Substantial Completion for all the WORK.

1.45. **Pathway:** Facility for the placement of Information Transport System cable.

1.46. **Project:** The total construction of which the WORK to be provided under the Contract Documents may be the whole, or a part as indicated elsewhere in the Contract Documents.

1.47. **Record:** Collection of detailed information related to specific element of Information Transport System infrastructure

1.48. **Report:** Presentation of collection of information from various records.

1.49. **Resident Project Representative (RPR):** The authorized representative of the CONSULTANT who is assigned to the Site or any part thereof.

1.50. **Responsible Bidder, Offerer, Quoter, Or Respondent:** means an individual or business which has submitted a bid, offer, proposal, quotation, or response, which has the capability in all respects to perform fully the contract requirements, and the integrity and reliability which will give reasonable assurance of good faith and performance.

1.51. **Responsive Bidder, Offerer, Quoter, Or Respondent, Vendor, Contractor** means an individual or business which has submitted a bid, offer, proposal, quotation or response, which conforms in all material respects to the solicitation, including, but not limited to compliance with any M/WBE requirements contained within the solicitation.

1.52. **Shop Drawings:** All drawings, diagrams, illustrations, brochures, schedules and other data which are prepared by or for the CONTRACTOR, a Subcontractor, manufacturer, supplier or distributor and which illustrate the equipment, material or some portion of the Work and as required by the Contract Documents. Shop Drawings are not part of the Contract Documents and failure of the CONSULTANT or the COUNTY or any of his representatives to take exception to any product, material, system or installation depicted on Shop Drawings that are not in conformance with the requirements of the Contract Documents shall not constitute a Field Order or Change Order or any other Modification of the Contract Documents, and shall not relieve the CONTRACTOR from complying with any portion of the Contract Documents.



1.53. **Safety Data Sheet:** The manufacturer, importer, or distributor of a toxic substance will provide a safety data sheet with his/her offer.

1.54. **Safety Precautions:** The Contractor shall be responsible for the provision of adequate and proper safety precautions for the workmen and all persons in or around the work area.

1.55. **Space (Information Transport System):** Area used for housing installation and termination of Information Transport System equipment and cable, e.g., equipment rooms, network rooms, work areas, and maintenance holes/handboxes/handholes

1.56. **Special Conditions:** When included as a part of the Contract Documents, Special Conditions refer only to the Work under this Contract. Special Conditions take precedent over the General Conditions.

1.57. **Specifications:** Those portions of the Contract Documents consisting of written technical descriptions of materials, equipment, construction systems, standards and workmanship as applied to the WORK and certain administrative details applicable thereto.

1.58. **Splice:** Joining of conductors in splice closure, meant to be permanent.

1.59. **Splice Box:** Box, located in pathway run, intended to house cable splice.

1.60. **Splice Closure:** Device used to protect splice.

1.61. **Sub-Bidder:** One who submits a Bid to a Bidder.

1.62. **Subcontractor:** An individual, firm, or corporation having a direct contract with the CONTRACTOR or with any other Subcontractor for the performance of a part of the WORK at the Site.

1.63. **Substantial Completion:** For purposes of this Contract, and for compliance of those procedures, duties and obligations as set forth in Florida Statutes §218.70 and §218.735, the term Substantial Completion shall be as follows, in lieu of any other definition:

- A. "Substantial Completion" is defined as that point where the District is able to enjoy beneficial occupancy of the Work and where the Work has achieved that level of completion such that District is able to utilize the entire Project for its intended purposes, including but not limited to the completion of all specified systems and items relating to life safety and regulatory use, with the exception of incidental or incomplete items except where a lack of completion of such incidental or incomplete items of Work shall adversely affect the complete operation of other areas of the Work.
- B. Additional conditions (if any) needed to achieve Substantial Completion of the Work and which are project specific are as set forth in attached Technical Specifications.
- C. When the entire Project is considered to be Substantially Complete, this does not constitute Final Acceptance or Final Completion of the entire Project.

1.64. **Successful Bidder:** The lowest, qualified, responsible and responsive Bidder to whom District (on basis of District's evaluation as hereinafter provided) makes an award.

1.65. **Supplementary Conditions:** The part of the Contract Documents which amends or supplements these General Terms and Conditions.

1.66. **Supplier:** A manufacturer, fabricator, supplier, distributor, materialman or vendor.

1.67. **Surety:** The corporate body which is bound with the CONTRACTOR and which engages to be responsible for the CONTRACTOR and his acceptable performance of the Work.

1.68. **Termination position:** Discrete element of termination hardware where information Transport System conductors are terminated

1.69. **Unbalanced Bids:**

- A. **Mathematically Unbalanced Bid** means a bid containing lump sum or unit bid items which do not reflect reasonable actual costs plus a reasonable proportionate share of the bidder's anticipated profit, overhead costs, and other indirect costs.
- B. **Materially Unbalanced Bid** means a bid which generates a reasonable doubt that award to the bidder submitting a mathematically unbalanced bid will result in the lowest ultimate cost to the City; or which is so mathematically unbalanced as to result in an advance payment.

1.70. **Unit Price Work:** WORK to be paid for on the basis of unit prices.

1.71. **Utilities:** All pipelines, conduits, ducts, cables, wires, manholes, vaults, tanks, tunnels or other such facilities or attachments, and any encasements containing such facilities which have been installed underground or above ground to furnish any of the following services or materials: electricity, gases, steam, liquid petroleum products, telephone or other communications, cable television, water supply or distribution, sewage and drainage removal, traffic or other control systems.

1.72. **Work:** Any and all obligations, duties and responsibilities necessary to the successful completion of the Project assigned to or undertaken by Contractor under the Contract Documents, including all labor, materials, equipment and other incidentals, and the furnished thereof.

1.73. **Work Area (work station):** Building space where occupants interact with Information Transport System terminal equipment

1.74. **Work Change Directive:** A written directive to Contractor, issued on or after the Effective Date of the Contract and signed by the District and recommended by the Consultant/EOR, ordering an addition, deletion or revision in the WORK, or which references an emergency or unforeseen physical conditions under which the WORK is to be performed. A Work Change Directive may not change the Contract Price or the Contract Time, but is evidence that the parties expect that the change directed or documented by a Work Change Directive shall be incorporated in a subsequently issued Change Order following negotiations by the parties as to its effect, if any, on the Contract Price or Contract Time.

1.75. **Written Amendment:** A written amendment of the Contract Documents, signed by the DISTRICT and CONTRACTOR on or after the Effective Date of the Contract and normally dealing with the non-engineering or non-technical rather than strictly WORK related aspects of the Contract Documents.

1.76. **Intent of Certain Terms:**

A. Furnish, Install, Perform, Provide

- 1) The word "furnish," when used in connection with services, materials, or equipment, shall mean to supply and deliver said services, materials, or equipment to the Site (or some other specified location) ready for use or installation and in usable or operable condition.
- 2) The word "install," when used in connection with services, materials, or equipment, shall mean to put into use or place in final position said services, materials, or equipment complete and ready for intended use.



- 3) The words “perform,” or “provide,” when used in connection with services, materials, or equipment, shall mean to furnish and install said services, materials or equipment complete and ready for intended use.
- B. When “furnish,” “install,” “perform,” or “provide,” is not used in connection with services, materials, or equipment in a context clearly requiring an obligation of contractor, “provide” is implied.
- C. Unless stated otherwise in the contract documents, words or phrases which have a well-known technical or construction industry or trade meaning are used in the contract documents in accordance with such recognized meaning.

1.77. Abbreviations, Acronyms, and Symbols:

Reference, Design Standards and Abbreviations: Any reference to published specifications or standards of any organization or association or as noted in Florida Building Code, Chapter 2, and Florida Fire Prevention Code are applicable; and shall comply with the requirements of the specification or standard which is current on the date of Advertisement for Bids. In case of a conflict between the referenced specifications or standards, the one having the more stringent requirements shall govern.

Documents listed shall be standard references currently in effect at project commencement.

In case of conflict between the referenced specifications or standards and the Contract Documents, the Contract Documents shall govern.

A. ABBREVIATIONS, REFERENCE STANDARDS, AND ACRONYMS

AA	Aluminum Association
AAA	American Arbitration Association
AABC	Associated Air Balance Council
AAMA	Architectural Aluminum Manufacturers Association
AASHO	American Association of State Highway Officials
ABA	American Bar Association
ABMA	American Boiler Manufacturers Association
ABPA	Acoustical and Board Products Association
ACI	American Concrete Institute
ACPA	American Concrete Pipe Association
ACR	Attenuation-to-Crosstalk Ratio
ADA	Americans with Disabilities Act
AEIC	Association of Edison Illuminating Companies
AFBMA	Anti-Friction Bearing Manufacturers Assoc.
AFF	Above finished floor
AGA	American Gas Association
AGC	Associated General Contractors of America
AGMA	American Gear Manufacturers Association
AHA	American Hardboard Association
AI	The Asphalt Institute
AIA	American Institute of Architects
AIA	American Insurance Association
AIMA	Acoustical and Insulating Materials Association
AISC	American Institute of Steel Construction
AISI	American Iron and Steel Institute
AITC	American Institute of Timber Construction
AMCA	Air Moving and Condition Association
ANSI	American National Standard Institute
ANSI/UL263	Fire Tests of Building Construction and Materials.
ANSI/UL723	Surface Burning Characteristics of Building Materials.
ANSI/UL1479	Fire Tests of Through Penetration Firestops.
ANSI/UL2079	Tests for Fire Resistance of Building Joint Systems.

APA	American Plywood Association
API	American Petroleum Institute
APWA	American Public Works Association
AREA	American Railway Engineering Association
ARI	American Refrigeration Institute
ASA	American Standards Association (Now ANSI)
ASAHC	American Society of Architectural Hardware Consultants
ASCE	American Society of Civil Engineers
ASHRAE	American Society of Heating, Refrigerating and Air Conditioning Engineers
ASME	American Society of Mechanical Engineers
ASSCBC	American Standard Safety Code for Building Construction
ASSHTO	American Association of State Highway Transportation Officials
ASTM	American Society for Testing and Materials
ASTM/D16	Definitions of Terms Relating to Paint, Varnish, Lacquer, and Related Products for interpretation of terms used herein.
ASTM/D4442	Test Method for Moisture Content of Wood.
ASTM/E-84	Surface Burning Characteristics of Building Materials.
ASTM/E119	Fire Tests of Building Construction & Materials
ASTM/E814	Fire Tests of Through Penetration Fire Stops,
ASTM/E1966	Test Method for Fire Resistive Joint Systems.
ASTM/E1399	Test Method for Cyclic Movement & Measuring Minimum & Maximum Joint Widths of Architectural Joint Systems
AWG	American Wire Gauge
AWI	Architectural Woodwork Institute
AWPA	American Wood Preservers Association
AWPB	American Wood Preservers Bureau
AWPI	American Wood Preserves Institute
AWS	American Welding Society
AWWA	American Water Works Association
BHMA	Builders Hardware Manufacturers Association
BIA	Brick Institute of America (formerly SCPI)
BD	Building distributor (replacing main-cross connect and MDF as “building service” room identifiers).
BICSI®	Building Industry Consulting Service International, Inc.
BTU	British Thermal Unit.
CATV	Community Antenna Television (cable television).
CD	Campus distributor (replacing main-cross connect and MDF as “campus-wide service” room identifiers). Also, compact disk for storage of audio or video information.
dB	Decibel.
CDA	Copper Development Association
CFS	Cubic Feet Per Second
CMAA	Crane Manufacturers Association of America
CRSI	Concrete Reinforcing Steel Institute
CS	Commercial Standard
DHI	Door and Hardware Institute
DIPRA	Ductile Iron Pipe Association
DOT Spec	Standard Specification for Road and Bridge Construction Florida Department of Transportation, 1982
E/A	Engineer and/or Architect
EDA	Economic Development Association
EEL	Edison Electric Institute
EF	Entrance Facility
EIA	Electronic Industries Alliance
ELFEXT	Equal Level Far-End Crosstalk
EMC	Electromagnetic Compatibility.
EMI	Electromagnetic Interference.



EMT	Electrical metallic tubing.	NFPA	National Fire Protection Association
ENT	Electrical nonmetallic tubing.	NLA	National Lime Association
EPA	Environmental Protection Agency	NPC	National Plumbing Code
EPDM	Ethylene-polypropylene-diene membrane	NPT	National Pipe Threads
ER	Equipment Room. Replacing "TR"	NR	Network Room
FCC	Federal Communications Commission	NRTL	National Recognized Testing Laboratory
FCI	Fluid Control Institute	NSC	National Safety Council
FD	Floor distributor (replacing network room, intermediate and horizontal cross-connect, and telecommunications as "building service" room identifiers). Also, Floor Drain as part of building plumbing system	NSF	National Sanitation Foundation
		OD	Outside Diameter
		OSHA	U.S. Department of Labor, Occupational Safety and Health Administration
FDDI	Fiber Distribution Data Interface.	OCP	Outside Cable Plant.
FDER	Florida Department of Environmental Regulation	OTDR	Optical Time Domain Reflectometer
FDOT	Florida Department of Transportation	PCA	Portland Cement Association
Fed Spec	Federal Specification	PCI	Prestressed Concrete Institute
FEXT	Far-End Crosstalk	PR	Pair
FMC	Flexible metallic conduit	PS	United States Products Standards
FOTP	Fiber Optic Test Procedure	PSI	Pounds per Square Inch
FPL	Florida Power and Light	PSIA	Pounds per Square Inch Atmosphere
FPS	Feet Per Second	PSIG	Pounds Per Square Inch Gauge
Freq	Frequency	RCDD® :	Registered Communications Distribution Designer
FS	Federal Standards	RPM	Revolutions Per Minute
GA	Gypsum Association	RFI:	Radio Frequency Interference
GE	Grounding Equalizer	RH	Relative Humidity.
Gnd	Ground	RNC	Rigid nonmetallic conduit.
GPM	Gallons Per Minute	SAE	Society of Automotive Engineers
HB	Handbox. Also, hose bibb for water supply part of plumbing system.	SDI	Steel Decks Institute
HC	Horizontal Cross-Connect (replaced by floor distributor "FD")	SIGMA	Sealed Insulating Glass Manufacturer's Association
HH	Handhole	SJI	Steel Joists Institute
HMI	Hoist Manufacturers Institute	SMACNA	Sheet Metal and Air Conditioning Contractors' National Association
HP	Horsepower	SM	Single Mode
HSBII	Hartford Steam Boiler Inspection and Insurance Co.	SSI	Scaffolding and Shoring Institute
		SSPC	Steel Structures Painting Council
HVAC	Heating, Ventilation, and Air Conditioning	SSPC	Structural Steel Painting Council
HZ	Hertz	STA	Station (100 feet)
IC	Intermediate Cross-Connect (replaced by building distributor "BD").	TAS	Technical Aid Series
ID	Inside Diameter	TBB	Telecommunication Bonding Backbone
IDC	Insulation Displacement Connectors	TCA	Tile Council America
IEEE	Institute of Electrical and Electronic Engineers	TDH	Total Dynamic Head
		TE	Telephone Equipment (Wall Mounted Equipment Rack)
IFI	Industrial Fasteners Institute	TGB	Telecommunications Grounding Buss Bar
IMC	Intermediate metal conduit	TH	Total Head
IPCEA	Insulated Power Cable Engineers Association	TIA	Telecommunications Industry Association.
IPS	Iron Pipe Size	TMGB	Telecommunications Main Grounding Buss Bar
ISO	International Organization for Standardization	UBC	Uniform Building Code
ISP	Inside Cable Plant	UL	Underwriter's Laboratories, Inc.
LFMC	Liquidtight flexible metal conduit	UOM	Units of Measure-Weights and Measures shall be as identified by Weights and Measures Division, NIST, U. S. Department of Commerce, 100 Bureau Dr., Stop 2600, Gaithersburg, MD 20899-2600.
LFNC	Liquidtight flexible nonmetallic conduit	UPS	Uninterruptible Power Supply
Mbps	Megabits per second.	USASI	United States of American Standards Institute
MER	Main Equipment Room	WAO	Work Area Outlet
MF	Factory Mutual System		
MGD	Million Gallons Per Day		
MH	Maintenance Hole		
MHI	Materials Handling Institute		
MIL	Military Specification		
MMA	Monorail Manufacturers Association		
MHz	Megahertz		
NBFU	National Board of Fire Underwriters		
NBHA	National Builders' Hardware Association		
NBR	Acrylonitrile-butadiene rubber		
NBS	National Bureau of Standards		
NCSA	National Crushed Stone Association		
NCSPA	National Corrugated Steel Pipe Assoc		
NEC	National Electrical Code		
NECA	National Electrical Contractors' Assoc		
NEMA	National Electrical Manufacturers' Association		
NEC	National Electric Safety Code, C2-1997.		

B. ITSA/WARNOCK-HERSEY - PRODUCT DIRECTORY

- NFPA 101: Life Safety Code - National Fire Protection Association (NFPA).
- NFPA 70: National Electrical Code - National Fire Protection Association (NFPA).
- ANSI/NECA/BICSI-568-2001 "Installing Commercial Building Telecommunications Cabling".
- ANSI/TIA/EIA-568-B.1 and addenda "Commercial Building. Telecommunications Cabling Standard - Part 1: General Requirements".



ANSI/TIA/EIA-568-B.2 and addenda "Commercial Building Telecommunications Cabling Standard - Part 2: Balanced Twisted-Pair".

ANSI/TIA/EIA-568-B.3 and addenda "Commercial Building Telecommunications Cabling Standard - Part 3: Optical Fiber Cabling and Components Standard".

ANSI/TIA/EIA-569-B and Addenda "Commercial Building Standard for Telecommunications Pathways and Spaces".

ANSI/TIA/EIA-606-A and Addenda "Administration Standard for Telecommunications Infrastructure of Commercial Buildings".

ANSI-J-STD-607-A and Addenda "Commercial Building Grounding (Earthing) and Bonding Requirements for Telecommunications".

ANSI/TIA/EIA-526-7 and Addenda "Measurement of Optical Power Loss of Installed Single-Mode Fiber Cable Plant".

ANSI/TIA/EIA-526-14A and Addenda "Optical Power Loss Measurements of Installed Multimode Fiber Cable Plant".

ANSI/TIA/EIA-758 "Customer Owned Outside Plant Telecommunications Cabling Standard".

IEC/TR3 61000-5-2 - Ed. 1.0 and amendments. "Electromagnetic compatibility (EMC) - Part 5: Installation and mitigation guidelines – Section Earthing and cabling".

ANSI/NFPA 70 National Electrical Code, 2008 Edition.

BICSI Telecommunications Distribution Methods Manual (TDMM).

BICSI Telecommunications Cabling Installation Manual (TCIM).

BICSI Customer-Owned Outside Plant Design Manual, 3rd, Edition (CO-OSP).

Applicable Martin County Codes and Regulations.

Underwriters Laboratories (UL).

FCC -Federal Communications Commission.

Occupational Safety and Health Regulations (OSHA).

Florida Fire Protection Code (including NFPA 101 Life Safety Code).

Applicable Florida Statutes and Administrative Rules.

Manufacturers Training Manuals (Design and Installation).

NACE (National Association of Corrosion Engineers) - Industrial Maintenance Painting.

NPCA (National Paint and Coatings Association) - Guide to U.S. Government Paint Specifications.

PDCA (Painting and Decorating Contractors of America) - Painting - Architectural Specifications Manual.

SSPC (Steel Structures Painting Council) - Steel Structures Painting Manual.

- o SSPC-SP 1 – Solvent Cleaning.
- o SSPC-SP 2 – Hand Tool Cleaning.
- o SSPC-SP 3 – Power Tool Cleaning.
- o SSPC-SP 13 – Nace No 6 Surface Preparation for Concrete.

UL Underwriters Laboratories Fire Resistance Directory.

Note: Additional abbreviations and symbols are shown on the Drawings.



SECTION II

INSTRUCTIONS TO BIDDERS

1. **REQUIREMENTS FOR PERSONNEL ENTERING DISTRICT**

PROPERTY: Possession of firearms will not be tolerated in or near school buildings. Nor will violations of Federal or State Laws and any applicable District policy regarding Drug Free Workplace be tolerated. Violators shall be subject to immediate termination. "Firearm" means any weapon (including a starter gun or antique firearm) which will, is designed to, or may readily be converted to expel a projectile by the action of an explosive; the frame or receiver of any such weapon; any destructive device; or any machine gun.

No person who has a firearm in their vehicle may park their vehicle on District property. Furthermore, no person may possess or bring a firearm on District property.

If any employee of an awarded Proposer or subcontractor is found to have a firearm on District property, said employee shall be terminated from the project. If the awarded Proposer or subcontractor fails to ensure that said employee is restricted from the project may result in contract cancellation and/or termination.

Proposers are advised that they are responsible to ensure that no employee, agent or representative of their company who has been convicted or who is currently under investigation for a crime against children in accordance with section 435.04, Florida Statutes shall enter any school site.

Possession/use and/or being under the influence of any illegal mind-altering substances, such as, but not limited to alcohol and/or substances delineated in Chapter 893, Florida Statutes, by Contractors' employees/independent Contractors or its Subcontractors' employees/independent Contractors will not be tolerated on School Board property. If any employee/independent Contractor is found to have brought and/or used or is under the influence of any illegal mind-altering substances as described above on School Board property, said employee/independent contractor shall be removed and terminated from the project by the Contractor. If a Subcontractor fails to terminate said employee/independent Contractor, the Contractor shall terminate its agreement with the Subcontractor for the project. If the Contractor fails to terminate said employee/independent Contractor or fails to terminate the agreement with the Subcontractor who fails to terminate said employee/independent Contractor, this Contract may be terminated by the School Board.

2. **FINGERPRINTING, JESSICA LUNSFORD ACT:** Contractor, his subcontractors, vendors and suppliers who are to be permitted access to school grounds while students are present, or have direct contact with students or have access to or control of school funds shall obtain Level 2 background screening in accord with Florida Statute FS1012.465 – Jessica Lunsford Act.

2.1 Level 2 screening excludes personnel working on school district property where students are present who have criminal records that include sexual offender, sexual misconduct with developmentally disabled or mental health patients, terrorism, murder, kidnapping, lewd, lascivious or indecent acts or exposure, incest, child abuse or neglect.

2.2 Persons screened as noted above with other types of criminal history may be allowed on school grounds provided under following conditions:

2.3 Contractor, subcontractors, vendors and suppliers shall be under continuous direct supervision of school district employee or Level 2 screened and cleared employee as noted above.

2.4 Contractor, subcontractors, vendors and suppliers may be allowed on student occupied site if area of construction is isolated from students by continuous six foot high chain link fence separating work area and school.

2.5 Persons with current Level 2 clearance who are subsequently arrested for disqualifying offenses shall be

disqualified from access to school sites and shall immediately surrender their Photo ID Badge to their employer who shall be responsible for returning badge to Martin County School District's Department of Human Resources within 48 hours of arrest or notice of arrest or criminal offense.

2.6 Persons failing to notify their employer and Martin County School District's Department of Human Resources within 48 hours of arrest will be charged with 3rd degree felony, punishable by up to five years imprisonment and \$1,000 fine.

2.7 Employers of persons having been arrested for disqualifying offenses who subsequently allows said employee to continue working on school property may also be charged with 3rd degree felony, punishable by up to five years imprisonment and \$1,000 fine.

2.8 Contractor, his subcontractors, vendors and suppliers working on school board sites shall be fingerprinted and obtain work badges.

2.9 Questions regarding fingerprinting or identification badge processing may be directed to District Personnel Department at (772)219-1255, Ext. 30296.

2.10 The fingerprint screening must be completed in advance of the awarded Bidder providing any services. The awarded Proposer shall bear the cost of acquiring the background screening required by Fla. Stat. 1012.32, and any fee imposed by the Florida Department of Law Enforcement to maintain the fingerprints provided with respect to the awarded Bidder and its employees. Awarded Bidder shall provide District with a list of its employees. Awarded Bidder shall update these lists in the event that any new employees are added and awarded Bidder agrees that new employees shall be fingerprinted. Awarded Bidder agrees that in the event any employee is convicted of a criminal offense, the awarded Bidder shall notify the District within forty-eight (48) hours.

2.11 The parties agree in the event that the awarded Bidder fails to perform any of the duties described in the above paragraph, this shall constitute a breach of the contract entitling the District to terminate immediately with no further responsibility to make payment or perform any other duties under this contract. Awarded Bidder agrees to indemnify and hold harmless the District, its officers and employees from any liability whatsoever resulting from awarded Bidder's failure to comply with the requirements of this paragraph or Fla. Stat. 1012.32 and 1012.465.

3. **QUALIFICATIONS OF BIDDERS:** To demonstrate qualifications to perform the Work, each Bidder must be prepared to submit within five (5) calendar days of District's request written evidence acceptable to the District documentary evidence demonstrating, financial data/fiscal responsibilities, previous experience, present commitments and other such data as may be called for to meet all of the Bidder's obligations set forth in the Bid documents. Each Bid must contain evidence of Bidder's qualifications to do business in the State of Florida or obtain such qualification prior to award of the contract.

The District reserves the right to contact any of the firms listed by Bidders in any sections as references or any additional firms or individuals to review Bidder's qualifications. Bids that do not comply with these requirements may be rejected at the option of the District.

The project shall be constructed by a firm with the primary qualifying agent licensed as a Contractor pursuant to and as defined by Florida Statute 489, and shall have been employed full time by the construction firm for at least one year prior to this project's bid date.



4. **ANNUAL APPROPRIATION:** This Bid is conditional upon the District having funding to implement the Contract.

5. **DEFINED TERMS:** Terms used in these Instructions to Bidders, have the meanings assigned to them in the Industry involved in the subject matter of the Bid, in the Martin County School District, Standard General Conditions of the Construction Contract.

6. **COST OF BID:** Costs, either direct or indirect, incurred by the Bidder in the preparation, presentation, demonstration, delivery or for any other reason associated with the submittal of this bid is solely the responsibility of the Bidder and not the District, and are not to be charged to the District.

7. **BACKGROUND INVESTIGATION:** As a part of the Bid evaluation process, the District may conduct a background investigation, including a criminal record check of Bidder's officers and/or employees, by the Sheriff's Office to establish the competency, responsibility, qualifications and financial ability of the Bidders, proposed subcontractors and other persons and organizations to do the work in accordance with the Contract Documents to the District's satisfaction within the prescribed time. The Board reserves the right to reject the Bid of any Bidder who does not pass any such evaluation to the District's satisfaction.

The Bidder's signature on the Bid Form constitutes acknowledgement of and consent to such investigation. The District shall be the sole judge in determining the Bidder's qualifications.

8. **FACILITIES:** The District reserves the right to inspect the Bidder's facilities at any reasonable time, prior to award of the Bid, during normal working hours, with prior notice to determine that it has a bona fide place of business, and is a responsible Bidder.

The District also reserves the right to inspect all facilities of any subcontractor in order to make determination as to the foregoing. The subcontractor shall be equally responsible for meeting all requirements specified in the Invitation to Bid.

9. **INQUIRIES/AVAILABILITY:** Inquiries concerning this ITB should be made in writing. The District will respond to written inquiries, if received at least seven (7) calendar days prior to the date scheduled for opening the bids. The District shall record its responses to inquiries and any supplemental instructions in the form of a written addendum. If addenda are issued, the District **shall make every attempt to issue such** addenda at least seven (7) calendar days before the date fixed for receiving the proposals. **Written addenda shall be disseminated via** the Purchasing Website: <https://www.martinschools.org/Page/945> to Vendor Registry and DemandStar. No interpretation shall be considered binding unless provided in writing to the Martin County School District Purchasing Department. **It is the sole responsibility of the Bidder to ensure all addenda are received.**

CONTACT WITH MARTIN COUNTY SCHOOL DISTRICT PERSONNEL OTHER THAN PURCHASING STAFF OR A DESIGNATED REPRESENTATIVE REGARDING THIS INVITATION TO BID SHALL BE GROUNDS FOR ELIMINATION FROM THE PROCESS.

10. **INTERPRETATIONS AND ADDENDA:** All Bidders shall carefully examine the Bid Documents. Any ambiguities or inconsistencies should be brought to the attention of the Purchasing Department through written communication prior to opening of the bids. Failure to do so on the part of the Bidder shall constitute an acceptance by the Bidder of any subsequent decision by the District. MCSD will receive written requests for clarification concerning the meaning or interpretation of this ITB by issuance of addenda via DemandStar and Vendor Registry, until (7) days prior to the bid opening date. Questions shall be emailed to bids@martinschools.org with reference to the ITB number in the

subject for faster recognition only questions answered by formal written Addenda issued by the MCSD Purchasing Department shall be binding. Oral and other interpretations or clarifications shall be without legal effect.

It is the sole responsibility of the Bidder to ascertain whether any addenda to this Invitation to Bid has been issued, and to submit all such addenda properly acknowledged with the Bid response.

The District may delay scheduled due dates if it is to the advantage of the District. The District shall notify Bidders of all changes in scheduled due dates by written addenda.

11. **BID DOCUMENTS:** Solicitation Documents may be obtained by registering with DemandStar in order to receive all required documents and notification of addenda. Register for FREE at <http://www.demandstar.com/subscriptions> "FREE AGENCY", toll-free 1-800-711-1712, or from Vendor Registry at the Purchasing Website: <https://www.martinschools.org/Page/945>. Bidders who obtain solicitation documents from any other source are cautioned that the solicitation package may be incomplete.

Complete sets of Bid Documents shall be used in preparing Bids. Neither District nor EOR assumes and each disclaims any responsibility for errors or misinterpretations resulting from the use of incomplete sets of Bid Documents.

District and EOR in making copies of Bid Documents available on the above terms do so only for the purpose of obtaining bids on the Work and do not confer a license or grant for any other use.

12. **UNIT PRICES:** Where a discrepancy between unit price and total price is indicated on a Bidder's submitted Schedule of ITB Prices or Bid Form, the unit prices shall prevail.

13. **IRREGULARITIES:** Bids not meeting stated minimum terms and qualifications may be rejected by the District as non-responsive or irregular. However, the District reserves the right to waive any irregularities, technicalities or informalities in any bid. The District reserves the right to allow for the clarification of questionable entries and for the correction of typographical and mathematical errors.

14. **BID SUBMISSION:** Bidder should submit their bid indicating their name and Project Name, ITB Number, and time and date of the ITB opening. The submission of bids shall be submitted electronically through www.DemandStar.com or bids@martinschools.org by Bidders responding to this ITB no later than the designated deadline date and time. A Bidder's failure to submit as required before the deadline shall cause their bid submittal to be disqualified. Late bids will be retained unopened.

14.1 All submittals must be compatible with Microsoft Office or Portable Document Format (PDF). The Bidder can only view/submit their Electronic Submittal and will not have access to any other Bidder's submittals. The Bidder's Electronic Submittal may be changed at the Bidder's discretion until the ITB Due Date and Time is reached. The Bidder will no longer be allowed to change or have access to the electronic submittal after the ITB Due Date and Time as the District will open all bids on said date. Any Bidder who is submitting an Electronic Submittal for the first time is strongly encouraged to contact DemandStar by e-mailing questions to demandstar@demandstar.com.

14.2 Submit the entire Bid Package by completing and returning all required documents. All submittals are required to be electronic and be contained in one (1) file. No hard copies will be accepted.

14.3 Bids, once opened, become the property of the District and shall not be returned to the Bidders. Upon opening, bids become "public records" and shall be subject to public disclosure in accordance with Chapter 119, Florida Statutes.

14.4 Offers by facsimile, telegram, or telephone are **not** acceptable. All Bidders and their representatives are invited



- to attend. Bid tabulations are posted online at www.demandstar.com or Vendor Registry at the Purchasing Website: <https://www.martinschools.org/Page/945>.
- 14.5 Bids will be opened and read aloud publicly at the time and place indicated in the Invitation to Bid. Submittal of a Bid in response to this Invitation to Bid constitutes an offer by the Bidder
- 14.6 Should there be a tie on either the unit price (if awarded on a per item basis), sections of the solicitation (i.e.: building contracts, or solicitations awarded by section) or the whole solicitation ("all or none" solicitations or service solicitations), the deadlock will be decided upon using the following order:
- Companies who certify they are a drug-free workplace.
 - Companies located in Martin County, Florida.
 - Companies located in Florida.
 - The company receiving the larger dollar award on other items within the solicitation.
 - All else being equal, a coin toss will be made to decide the award.
- This does not preclude the possibility of splitting an order if it is in the best interest of the School Board.
- 14.7 All Bids shall remain subject to acceptance for ninety (90) calendar days after the day of the Bid opening, but the District may, at the sole discretion of the District, release any Bid and return the Bid Security prior to that date.
- 14.8 It is the sole responsibility of the Bidder to assure that his or her submittal is uploaded to DemandStar or bids@martinschools.org on or before the ITB Due Date and Time. The District shall in no way whatsoever be responsible for any delays caused by any power outages or internet failures. No exceptions will be made.
15. **MODIFICATION OF BIDS:** Bids may only be modified, by an appropriate document duly executed, prior to the solicitation closing date and time. The Bidder must present certification to assure that they are indeed an authorized representative of the Bidder's firm at the time modification to the Bid is presented.
16. **BID FORM:** Bids must be submitted on the prescribed form; all blank spaces must be filled in as noted, in ink or typed with amounts extended and totaled. Where indicated on the Bid Form, items shall be stated in numbers. Bidders are required to bid all items to be considered. Bidder should not reference the words "No charge, N/A, included, etc." on any of the line items. Vendor must identify a monetary amount for each line item. If vendor is not providing a bid price for an item, zero (0) must be designated on that line item. Failure to identify a monetary amount for each item may cause Bidder's bid response to be considered non-responsive and rejected.
- The District reserves the right to accept any Bid or combination of Bid alternates, reject any and all Bids, waive any and all informalities, minor irregularities, to accept any item or group of items unless qualified by Bidder; to acquire additional quantities at prices quoted on the Invitation to Bid unless additional quantities are not acceptable, in which case the bid sheets must be noted "BID IS FOR SPECIFIED QUANTITY ONLY, and the right to disregard all nonconforming, non-responsive, unbalanced or conditional Bids or counter-proposals. In addition, the District reserves the right to make a multiple award if it is in the best interest of the District.
- Failure to provide all of the information required to accompany the Bid, Bid Form and Specifications shall be considered a serious omission, which may result in the bid being rejected as non-conforming. The Bid shall contain acknowledgment of receipt of all addenda (copies of which shall be attached to the Bid Form).
17. **BID TABULATION:** Bid tabulations shall be posted on www.DemandStar.com and Vendor Registry within ten (10) days after the bid opening.

18. **EVALUATION FACTORS:** The District reserves the right to reject the Bid of a non-responsible Bidder that the District determines is of doubtful financial ability or fails to meet any other pertinent standard or criteria established by the District. Further, A Bidder must be, at the time of the Bid opening, a fully authorized agent or representative of the product or service Bid, and capable of producing, providing or installing the items Bid, and so certify upon request.

The District shall consider the firms qualifications, compliance of requirements, and time of completion as evaluation factors. In addition, the District may require the apparent successful Bidder to submit a Schedule of Values priced in line item format including time frames (not dated) for staff to review prior to staff's actual award recommendation being submitted to the District Board.

Any inconsistencies shall be brought to the attention of the intended awardee for adjustment prior to award and acceptance of said schedule. An unbalanced Schedule of Values may result in rejection of the bid as non-responsive. Failure to produce said Schedule of Values within four (4) business days of the District's request may result in the bid being rejected as non-responsive.

The District may consider the qualifications and experience of subcontractors and other persons and organizations (including those who are to furnish the principal items or material, services, or equipment) proposed for those portions of the work as to which the identity of subcontractors and other persons and organizations must be submitted.

The District may also consider the operating costs, maintenance requirements, performance data and guarantees of major items of materials and equipment proposed for incorporation in the Work when such data is required to be submitted prior to the Notice of Tentative Award.

19. **AWARD OF CONTRACT:** The District reserves the right to award item by item, and/or group by group or on an all or none basis to the lowest responsive, responsible Bidder that provides the best value to the District.

NO AWARD RECOMMENDATION SHALL BE BROUGHT BEFORE THE BOARD FOR CONSIDERATION TO AWARD UNTIL THE CONTRACTOR/BIDDER HAS PRESENTED A SIGNED ORIGINAL OF THE CONTRACT OR PURCHASE ORDER ALONG WITH ANY OTHER REQUIRED DOCUMENTS TO THE PURCHASING DEPARTMENT.

NO AWARD SHALL BE DEEMED FINAL AND SHALL BE DEEMED CONDITIONAL, UNTIL THE PARTIES HAVE FULLY EXECUTED THE AGREEMENT(S) OR A PURCHASE ORDER HAS BEEN ISSUED BY THE BOARD TO THE BIDDER. THE BOARD RESERVES THE RIGHT TO REVOKE ANY AWARD MADE HEREUNDER, WITHOUT PENALTY, PREMIUM OR OBLIGATION, AT ANY TIME PRIOR TO THE DELIVERY OF THE FULLY EXECUTED AGREEMENT(S) OR PURCHASE ORDER. NO BIDDER SHALL BE ENTITLED TO RELY ON ANY ANNOUNCEMENT OF AN AWARD, AND THE BOARD SHALL IN NO WAY BE ESTOPED IN THE REVOCATION OF AN AWARD PREVIOUSLY GRANTED.

Section 119.071(1)(b)2., F.S., provides an exemption for "sealed bids, proposals, or replies received by an agency pursuant to a competitive solicitation" until such time as the agency provides notice of an intended decision or until 30 days after opening "the bids, proposals, or final replies," whichever is earlier.

20. **DIRECT MATERIAL PURCHASES:** The District reserves the right to issue purchase orders for materials to either the Contractor's or the District's suppliers for construction related materials.
21. **CONTRACTUAL AGREEMENT:** The submission of your Bid constitutes a firm offer by the Bidder. Upon acceptance by the Board, the Purchasing Department shall issue a notice of award



and purchase order(s) and/ or contract for any supplies, equipment and/or services as a result of this bid. The Invitation to Bid and the corresponding purchase order(s) and /or contract shall constitute the complete agreement between the successful Bidder and the Board. Unless otherwise stipulated in the bid documents or agreed to in writing by both parties, no other contract documents shall be issued or accepted.

The District may attach as a part of this solicitation, a Sample Contract document. Bidders shall be responsible for complying with all of the terms and conditions of the Sample Contract document, except where variant or conflicting language may be included in any Special Conditions contained herein. Bidders shall note any deviation or variance with the Sample Contract document at the time of bid submission. Should no revisions be noted, the District will assume and the Contractor agrees that the terms and conditions of agreement are acceptable.

22. **CONTRACT TERMS:**

- a. A contract resulting from this document shall be governed in all respects as to validity, construction, capacity, performance, or otherwise by the laws of the State of Florida.
- b. Contractors providing service under this contract assure the School Board that they are conforming to and otherwise complying with the following, as applicable:
 - The Civil Rights Act of 1964, as amended.
 - Clean Air and Water Pollution Acts, 42 U.S.C. 7401-7671q.
 - Federal Water Pollution Control Act, 33 U.S.C. 1251-1387.
 - Executive Order 11738.
 - EPA Regulation, 40 CFR Part 15, which prohibits the use under non-exempt federal contracts, grants or loans of facilities included on the EPA list of violating facilities.
 - Federal, state and local laws and regulations, including the Davis-Bacon Act, pertaining to wages, hours and conditions of employment and 2CFR 200.317 – 200.326, if applicable.
 - Energy Policy and Conservation Act, 42 U.S.C. 6201.
 - Funding Agreement (Rights to Inventions) 37 CFR Part 401.
 - Recovered Materials Section 6002 of Environmental Protection Agency (EPA) at 40 CFR Part 247.
 - Equal Employment Opportunity, 41 CFR Part 60.
 - Copeland "Anti-Kickback" Act, 40 U.S.C. 3145, as supplemented by the Department of Labor Regulations (29 CFR Part 3, "Contractors and Subcontractors on Public Building or Public Work Financed in Whole or in Part by loans or grants from the United States".)
 - Contract Work Hours and Safety Standards Act, 40 USC 3702 and 3704, as supplemented by Department of Labor Regulations (29 CFR Part 5), as applicable.

23. **SIGNING OF CONTRACT:** The Notice of Intent to Award and the agreement will be presented to the Successful Bidder. The Successful Bidder shall sign and return the agreement as acceptance of the offer. Upon Board approval, the District shall request the required bonds and insurance certificates. The aforementioned documents must be submitted to the District prior to any WORK being performed. After receipt of requested documents, the executed contract, purchase order, and notice to proceed will be presented to the Awarded Bidder. Each counterpart is to be accompanied by a complete set of the Drawings. By signing this contract, the Contractor certifies that it is in compliance with, and/or will comply with, the aforementioned terms specifically mentioned, as well as all other municipal, county, state and federal requirements and regulations.

24. **CONTRACT DEFAULT:** In the event the Contractor fails to enter into a contract with the School Board on the basis of the submittal, such action shall constitute a default of this agreement. Further default may be declared by the School Board if the Contractor violates the terms of the submitted document in any manner. Upon default of this agreement and/or any agreement resulting from this agreement, the School Board shall be entitled to pursue all remedies available at law and/or in equity, including, but not limited to, the recovery of damages equaling the difference of the submitted price and the price the School Board subsequently pays to secure performance from other sources. Damages may be assessed and deducted against any funds due and owing to the Contractor.

In the event any litigation occurs between the parties as a result of the contract, the prevailing party shall be entitled to recover reasonable attorney's fees and court costs for any such action.

At the discretion of the School Board, any Contractor found in default of this agreement and/or any agreement resulting from this agreement, shall be removed from the Contractor list for a period of up to three (3) years from the date of said default. Default under this agreement and/or any other agreement(s) in which the School Board has contracted with the Contractor, may also, at the discretion of the School Board, result in termination of any other such agreement(s).

25. **TERMINATION OF CONTRACT:** This contract may be terminated without liability to the School Board in whole or in part when it is deemed to be in the best interest of the School Board to so act. Notification of termination must be in writing and issued by the Director of Materials Management or designee. This contract may be terminated upon 30 days written notice. Further, at the discretion of the School Board, the contract may be terminated in a period of less than 30 days in the event of poor performance or violation of these terms. The Contractor shall have a period of time, as determined by the School Board, to remedy any noncompliance to offered terms and specifications. The School Board, upon termination, shall exercise its discretion to complete the balance of the contract consistent with the best interest of the School Board. The School Board delegates the authority to terminate the contract to the Superintendent or designee. At the discretion of the School Board, the Contractor may be removed from future solicitation opportunities for a period up to three (3) years.
26. **REJECTION / DISQUALIFICATION OF BIDDER:** The Board, at its sole discretion, reserves the right to reject any and all bids, accept any bid or any combination of bids or waive any minor irregularity or technicality in bids received, when in its sole judgment, it shall best serve public interest. The right is reserved to reject any and all Bids or to accept the one deemed by the DISTRICT to be the most advantageous. Contractor's bid shall be rejected as non-responsive if any of the following exist (this list is not all inclusive):
- More than one Bid from an individual, firm, partnership, corporation, or association under the same or different names shall not be considered.
 - The District reserves the right to reject the bid of any Bidder in arrears or in default upon any debt or contract to the District or who have failed to perform faithfully any previous contract with the District or with other governmental jurisdictions.
 - If there is reason to believe that collusion exists between Bidders.
 - Bids that are judged to be mathematically or materially unbalanced shall be rejected.
 - The Bid Package is found to have concealed or contained false and/or misleading information.



- Executed requested Attachments/Affidavits are not completed or submitted.
- Incomplete execution of documents, Bidder signature page, and Bid submittal form.
- Not licensed to perform the required work or provide the required product.
- Not eligible to bid due to violations listed under, Public Entity Crimes.
- Submission of an irregular bids. Failure to fill out forms completely, indicating compliance or deviation for each item may be used as reason for rejection.
- Non-compliance with applicable laws or contains any unauthorized additions or deletions or contains irregularities of any kind is considered incomplete, indefinite, or ambiguous as to its meaning.

27. **EXECUTION OF BID:** Bidders shall submit their bid response electronically as described above. For this purpose, all references herein to signing requirements or other required acknowledgments hereby include either a manual signature in blue ink or by electronic digital signature by an authorized officer of the proposing firm who is legally authorized to enter into a contractual relationship in the name of the Bidder. Bid must be typed or legibly printed in ink. Use of erasable ink is not permitted. All corrections made by Bidder to any part of the Bid document must be initialed in ink. The respondent agrees that the action of electronically submitting its response constitutes the following:

- An electronic signature on the responses.
- An electronic signature on any form or section specifically calling for a signature and
- An affirmative agreement to any statement contained in the solicitation that requires a definite confirmation or acknowledgement.
- Compliance to electronic signatures as specified in F.S. Chapter 668.

The bid submittal of a Statement of Bid by the Bidder shall be considered by the District as constituting an Offer by the Bidder to perform the required services.

Bids by corporations must be executed in the corporate name by the President or Vice President (or other corporate officer accompanied by evidence of authority to sign) and the corporate seal shall be affixed and attested by the Secretary or Assistant Secretary. The corporate address and State of Incorporation shall be shown below the signature.

Bids by partnership must be executed in the partnership name and signed by a general partner, his title must appear under his signature and the official address of the partnership must be shown below the signature.

All names of persons signing documents must be typed or printed below the signature.

28. **NO BID:** If not submitting a Bid, please respond no later than the Bid opening date and time, by returning the acknowledgment, noting the reason for declining. An addendum may be issued to remedy providing the circumstances are determined reasonable.

29. **WITHDRAWAL OF BIDS:** All Bids shall be irrevocable unless the Bid is withdrawn as provided herein. All Bids may be withdrawn only by written communication delivered to the Purchasing Department prior to the solicitation closing date and time. The Bidder must present certification to assure that they are indeed an authorized representative of the Bidder's firm at the time such communication to withdraw the Bid is presented. A District representative shall verify this information prior to return of the Bid and Bid Security.

However, within twenty-four (24) hours after Bids are opened, any Bidder files a duly signed written notice with the District and successfully demonstrates that there was a material and substantial mistake in the preparation of its Bid, that Bidder may withdraw its Bid, and the Bid Security will be returned. Bidder shall be disqualified from further bidding on the WORK to be provided under the Bid Documents.

30. **CONFLICT OF INTEREST:** All Bidders must disclose with their Bid the name of each of its employees, agents, or relatives who are employees of the DISTRICT. The Bidder represents and warrants to the District the following:

- No officer, employee, or agent of the District has any interest, either directly or indirectly, in the business of the Bidder to be conducted hereunder.
- Bidder has not employed or retained any company or person, other than a bona fide employee working solely for the Bidder, to solicit or secure this contract, and that it has not paid, or agreed to pay any person, company, corporation, individual, or firm, other than bona fide Personnel working solely for the Bidder any fee, commission, percentage, gift or other consideration, contingent upon, or resulting from the award or making of this contract.
- Bidder acknowledges that it has not agreed as an expressed or implied condition for obtaining this contract, to employ or retain the services of any person, company, individual or firm in connection with carrying out this contract.
- Bidder represents that it presently has no interest, either direct or indirect, while performing the services required by this contract, which would conflict in any manner with Florida Statutes.
- Bidder represents that no person having any such interest shall be employed during the term of this contract, including any officer, employee or agent of the District.
- Bidder represents and warrants that it has no current contracts with any entity that would create any conflict of interest in the Bidder's ability to perform the services required by this contract. Further, the Contractor represents and warrants that throughout the term of this contract, it will not undertake any work that would create such a conflict in interest.

It is understood and agreed by the Bidder that, upon the breach or violation of this Section, the District shall have the right to terminate the contract without liability and at its sole discretion, and to deduct from the contract price, or to otherwise recover, the full amount of such fee, commission, percentage, gift or consideration paid by the Bidder.

The Bidder shall promptly notify the District in writing by certified mail or electronic mail of all potential conflicts of interest for any prospective business association, interest or other circumstance that may influence or appear to influence the Bidder's judgment or quality of services being provided hereunder. Such written notification shall identify the prospective business association, interest or circumstance, the nature of work that the Bidder may undertake and request an opinion of the District as to whether the association, interest or circumstance would, in the opinion of the District, constitute a conflict of interest if entered into by the Bidder. If, in the opinion of the District, the prospective business association, interest or circumstance would not constitute a conflict of interest by the Bidder, the District shall so state in the notification and the Bidder shall, at its option, enter into such association, interest or circumstance and it shall be deemed not in conflict of interest with respect to services provided to the District by the Bidder under the terms of this Contract.



31. **NON-COLLUSION:** By submitting a bid, the Bidder certifies that it has not divulged discussed or compared its Bid with other Bidders and has not colluded with any other Bidder or parties to a Bid whatsoever. No employee of the School Board has or shall benefit financially or materially from such solicitation or subsequent contract. Any contract issued as a result of this solicitation may be terminated at such time as it is determined that gratuities of any kind were either offered or received by any of the aforementioned persons. (Note: Premiums, rebates or gratuities are not permitted with, prior to, or after any delivery of material.) Any such violation shall result in the cancellation and/or return of materials (as applicable) as being non-conforming.

32. **PUBLIC ENTITY CRIMES:** The Bidder certifies that neither it nor its principals is presently debarred, suspended, proposed for debarment, declared ineligible or voluntarily excluded from participation in this transaction by the State of Florida or Federal Government. Further, Bidder certifies that it has divulged, in its bid response information regarding any of these actions or proposed actions with other governmental agencies

Pursuant to Section F.S. 287.133, FS as amended: a person or affiliate who has been placed on the convicted vendor list following a conviction for a public entity crime may not submit a Bid on a Contract to provide any goods or services to a public entity, may not submit a Bid on a Contract with a public entity for the construction or repair of a public building or public work, may not submit Bids on leases of real property to a public entity, may not be awarded or perform work as a Vendor, supplier, subvendor, or consultant under a Contract with any public entity, and may not transact business with any public entity in excess of the threshold amount provided in F.S. 287.017 for CATEGORY TWO or higher for a period of 36 months from the date of being placed on the convicted vendor list.

The awarded Bidder or any subcontractor shall not employ any persons with multiple felonies and / or crimes against children. The awarded Bidder must provide documented proof of efforts to comply with this requirement. The Owner may declare any non-compliance or lack of diligent effort by the awarded Bidder to comply as a breach of contract and immediately terminate the services of the awarded Bidder.

Any employees involved in any F.S. Chapter 435, Florida Statutes offenses are precluded from continuing to work on a project and must be replaced. Failure to comply may result in the immediate termination of the awarded Bidder's contract at the sole discretion of the District. Lack of knowledge by the Bidder shall in no way be a cause for relief from responsibility.

33. **PUBLIC RECORDS:** Any material submitted in response to this Invitation to Bid shall become a public document pursuant to Section 119.07, FS. This includes material that the responding BIDDER might consider to be confidential or a trade secret. Any claim of confidentiality is waived upon submission, effective after opening of Bids pursuant to Section 119.07, FS.

If the contractor has questions regarding the application of chapter 119, Florida statutes, to the contractor's duty to provide public records relating to this contract, contact the custodian of public records, staff attorney's office at 772. 219.1255, ext. 30241, 1939 SE Federal Highway, Stuart,

Florida 34994, email publicrecords@martinschools.org.

In compliance with F.S. 119.0701 the Contractor shall:

- Keep and maintain public records required by the public agency to perform the service.
- Upon request from the public agency's custodian of public records, provide the public agency with a copy of the requested records or allow the records to be inspected or copied within a reasonable time at a cost that does not exceed the cost provided in this chapter or as otherwise provided by law.
- Ensure that public records that are exempt or confidential and exempt from public records disclosure requirements are not disclosed except as authorized by law for the duration of the contract term and following completion of the contract if the contractor does not transfer the records to the public agency.
- Upon completion of the contract, transfer, at no cost, to the public agency all public records in possession of the contractor or keep and maintain public records required by the public agency to perform the service. If the contractor transfers all public records to the public agency upon completion of the contract, the contractor shall destroy any duplicate public records that are exempt or confidential and exempt from public records disclosure requirements. If the contractor keeps and maintains public records upon completion of the contract, the contractor shall meet all applicable requirements for retaining public records. All records stored electronically must be provided to the public agency, upon request from the public agency's custodian of public records, in a format that is compatible with the information technology systems of the public agency.
- A request to inspect or copy public records relating to a public agency's contract for services must be made directly to the public agency. If the public agency does not possess the requested records, the public agency shall immediately notify the contractor of the request, and the contractor must provide the records to the public agency or allow the records to be inspected or copied within a reasonable time.
- If a contractor does not comply with the public agency's request for records, the public agency shall enforce the contract provisions in accordance with the contract.
- A contractor who fails to provide the public records to the public agency within a reasonable time may be subject to penalties under F.S. 119.10.
- If a civil action is filed against a contractor to compel production of public records relating to a public agency's contract for services, the court shall assess and award against the contractor the reasonable costs of enforcement, including reasonable attorney fees, if:
 1. The court determines that the contractor unlawfully refused to comply with the public records request within a reasonable time; and
 2. At least eight (8) business days before filing the action, the plaintiff provided written notice of the public records request, including a statement that the contractor has not complied with the request, to the public agency and to the contractor.
- A notice complies with subparagraph 2 above, if it is sent to the public agency's custodian of public records and to the contractor at the contractor's address listed on its contract with the public agency or to the contractor's registered



agent. Such notices must be sent by common carrier delivery service or by registered, Global Express Guaranteed, or certified mail, with postage or shipping paid by the sender and with evidence of delivery, which may be in an electronic format.

- A Contractor who complies with a public records request within eight (8) business days after the notice is sent is not liable for the reasonable costs of enforcement.

- 34 **LICENSES:** Bidders, both corporate and individual, must be fully licensed and certified for the type of work to be performed in the State of Florida at the time of receipt. The submittal of any bid from a Contractor that is not fully licensed and/or certified shall be rejected.
- 35 **PERMITS:** The Bidder(s) shall be responsible for obtaining any necessary permits and shall comply with laws, rules, and regulations whether state or federal and with all local codes and ordinances without additional cost to the District.
- 36 **SUNBIZ:** Bidders, both corporate and individual, must provide proof that their firm is registered with the Division of Corporations for the State of Florida.
- 37 **BUSINESS TAX RECEIPT:** Bidder shall comply with Business Tax Receipt requirements for their business location, if applicable.. A copy of the business tax receipt or proof of exemption must be included with the submittal package, if applicable.
- 38 **BIDDER MAILING ADDRESS:** It is the responsibility of every Bidder to register and maintain their current registration information. Bidders that have received the ITB from DemandStar.com must maintain their information on the DemandStar database. Bidders that have received the ITB documents from Vendor Registry must maintain their information on their database. The information used by the Purchasing Department is maintained at <http://www.demandstar.com>. DemandStar shall be used to make notice of ITBs and other information to Bidders.
- 39 **ANTI-DISCRIMINATION:** The Bidder certifies that they are in compliance with the non-discrimination clause contained in Section 202, Executive Order 11246, as amended by Executive Order 11375 relative to equal employment opportunity for all persons without regard to race, color, religion, sex or national origin. The provisions of the ADA Act of 1990 pertaining to employment shall also be applicable.
- The Bidder shall not discriminate on the basis of race, gender, gender identity or expression, religion, national origin, ethnicity, sexual orientation, age or disability in the solicitation, selection, hiring, or treatment of sub-contractors, vendors, suppliers, or commercial customers. Bidder shall provide equal opportunity for sub-contractors to participate in all of its public sector and private sector sub-contracting opportunities. Bidder understands and agrees that violation of this clause is a material breach of the contract and may result in contract termination, debarment, or other sanctions.
- 40 **MINORITY BUSINESS PARTICIPATION:** The District strongly encourages the use of Minority/Woman owned business enterprises for participation as associates, joint ventures, prime Contractors, and subcontractors in contracting opportunities.
- 41 **JOINT BIDS:** In the event multiple proposers submit a joint Bid in response to the BID, a single proposer shall be identified as the Prime Vendor. If offering a joint Bid, Prime Vendor must include the name and address of all parties of the joint Bid. Prime Vendor shall provide all bonding and insurance requirements, execute any Contract, complete the **REQUIRED RESPONSE FORM** shown herein, and have overall and complete accountability to

resolve any dispute arising within this contract. Only a single contract with one proposer shall be acceptable. Prime Vendor responsibilities shall include, but not be limited to, performing of overall contract administration, preside over other proposers participating or present at District meetings, oversee preparation of reports and presentations, and file any notice of protest and final protest as described herein. The Prime Vendor shall also prepare and present a consolidated invoice(s) for services performed. The District shall issue only one check for each consolidated invoice to the Prime Vendor for services performed. The Prime Vendor shall remain responsible for performing services associated with response to this BID.

- 42 **LOBBYING:** Contractors are hereby advised that they are not to lobby with any district personnel or board members related to or involved with this solicitation. Lobbying is defined as any action taken by an individual, firm, association, joint venture, partnership, syndicate, corporation, and all other groups who seek to influence the governmental decision of a board member or district personnel after advertisement and prior to the posted recommendation on the award of the Contract.

Bidders are hereby advised that they are not to lobby with any District personnel or board members related to or involved with this bid until recommendation for award. All oral or written inquiries must be directed through the Purchasing Department.

Any Bidder or any individuals that lobby on behalf of Bidder during the time specified shall result in rejection / disqualification of said bid.

43. **BYRD ANTI-LOBBYING AMENDMENT:** Contractors that apply or propose for an award of \$100,000 or more must file the required certifications. Each tier certifies to the tier above that it will not and has not used Federal appropriated funds to pay any person or organization for influencing or attempting to influence an officer or employee of any agency, a member of Congress, officer or employee of Congress, or an employee of a member of Congress with or an employee of a member of Congress in connection with obtaining any Federal contract, grant or any other award covered by 31 U.S.C. 1352. Each tier must also disclose any lobbying with non-Federal funds that takes place in connection with obtaining any Federal award. Such disclosures are forwarded from tier to tier, up to the non-Federal award.
44. **KICKBACKS:** Any Contractor giving or offering to any employee and/or official of the School Board, either directly or indirectly, any rebate, percentage of contract, money or other things of value as an inducement or intended inducement, in the procurement of this or any other solicitation, shall be deemed in violation of this agreement, in addition to being in violation of any other municipal, county, state and federal laws and/or ordinances.
- 45 **CONE OF SILENCE:** A cone of silence is hereby established for all competitive selection processes for the provision of goods and services. The cone of silence is designed to protect the integrity of the procurement process by shielding it from undue influences prior to the recommendation of contract award. This cone of silence shall be imposed on these procurements after advertisement of same.
- The cone of silence prohibits any communication regarding a competitive solicitation process. The cone of silence commences after the advertisement of the competitive solicitations. Competitive procurements are advertised on the purchasing department's web page or in a newspaper of general circulation.
- The cone of silence terminates at the time the School Board acts on a written recommendation from the purchasing department or planning and construction department regarding contract award; provided, however, that communications are permitted when the School Board receives public comment at the meeting when the recommendation is presented.



Section 119.071(1)(b)2., F.S., provides an exemption for “sealed bids, proposals, or replies received by an agency pursuant to a competitive solicitation” until such time as the agency provides notice of an intended decision or until 30 days after opening “the bids, proposals, or final replies,” whichever is earlier.

The purchasing department and planning and construction department shall ensure that all solicitations include provisions describing the requirements and prohibitions of the cone of silence, including how a potential vendor, service provider, Bidder, lobbyist, or consultant may communicate with District personnel.

Any person, whether employed by the District or not, who knowingly violates a provision of this policy shall be prohibited from serving on a District competitive selection committee.

Violation of this policy by a particular Bidder, proposer, respondent, and/or representative may, at the discretion of the District, result in rejection of said Bidder, proposer, respondent, and/or representative's bid, proposal, or offer and may render any contract award to said Bidder, proposer, or respondent voidable.

In addition to any other penalty provided by law, violation of this policy by a District employee shall subject said employee to disciplinary action up to and including dismissal from service.

- 46. **ASSIGNMENT:** The successful Bidder shall not assign, transfer, convey, sublet, or otherwise dispose of the contract, or of any or all of its rights, title, or interest therein, or its power to execute such contract to any person, firm, or corporation without prior written consent of the District.
- 47. **SUBCONTRACTING:** If an awarded Bidder intends to subcontract any portion of the Contract for any reason, the name and address of the subcontracting firm must be submitted along with the Bidder's bid or prior to work for approval. The Purchasing Department reserves the right to reject a subcontractor who previously failed in the proper performance of a contract or failed to deliver on-time contracts of a similar nature, or who, the DISTRICT has determined in its sole discretion, is not in the position to perform the contract due to the subcontractor's size, experience, or resources.

In addition, the awarded Bidder's subcontractors shall comply with all requirements of Fla. Stat. 1012.32 and 1012.465 by completing the fingerprint screening required of the awarded Bidder and all of its employees /subcontractors who provide services under this contract.

If requested by the District or EOR, Contractor shall provide an experience statement with pertinent information regarding similar projects and other evidence of qualification for each Subcontractor, Supplier, person or organization. If the District or EOR after due investigation has reasonable objection to any proposed Subcontractor, Supplier, other person or organization, either may, before the Notice of Tentative Award is given, request the apparent Successful Bidder to submit an acceptable substitute without an increase in Bid price.

If the apparent Successful Bidder declines to make any such substitution, the District may award the contract to the next lowest Bidder that proposes to use acceptable Subcontractors, Suppliers and other persons and organizations. The declining to make requested substitutions **shall constitute grounds** for sacrificing the Bid Security of any Bidder. Any Subcontractor, Supplier, other person or organization listed and to whom the District or EOR does not make written objection prior to the giving of the Notice of Tentative Award will be deemed acceptable to the District and EOR subject to revocation of such acceptance after the Effective Date of the Contract as provided in Section 6.5 of the Supplementary Conditions. Subcontractors shall not be changed without the approval of the District and the EOR. No acceptance by the District or EOR of any such Subcontractor,

Supplier or other person or organization shall constitute a waiver of any right of the District or EOR to reject defective Work or materials not conforming to these specifications.

In contracts where the Contract Price is on the basis of Cost-of-the-Work Plus a Fee, the apparent Successful Bidder, prior to the Notice of Tentative Award, shall identify in writing to the District those portions of the Work that such Bidder proposes to subcontract and after the Notice of Tentative Award the Successful Bidder may only subcontract other portions of the Work with the District's written consent.

No BIDDER shall be required to employ any Subcontractor, other person or organization against which Bidder has reasonable objection.

- 48. **REPRESENTATIVE:** At all times during the term of the contract, the successful Contractor shall act as an independent Contractor and at no time shall be considered an agent or partner of the District.
- 49. **BONDING GUARANTY/EVIDENCE:** The Bid submittal **must** be accompanied by a notarized letter from your firm's Surety guaranteeing that if your firm is awarded a contract, the Surety will issue a letter of credit that attests to the bonding capacity (the maximum amount of surety credit a surety company) will provide to a contractor, contingent upon a top-notch organization, strong financial presentation, and experience. The Surety shall also guarantee your firm by issuing Performance and Payment bonds as required by the District. Failure to submit the Surety Guaranty letter with your Bid shall cause your bid to be rejected as non-responsive. The District shall be the sole judge in determining Bonding Capacity.
- 50. **PROPOSAL AS PUBLIC DOMAIN:** All documents and other materials made or received in conjunction with this project will be subject to public disclosure requirements of chapter 119, Florida Statutes. This includes material that the responding Proposer might consider to be confidential or a trade secret. The proposal will become part of the public domain upon opening. **Respondents shall not submit pages marked “proprietary” or otherwise “restricted”.**



SECTION III

GENERAL TERMS AND CONDITIONS

These general terms and conditions apply to all offers made to the Martin County School District by all prospective Bidders, including but not limited to, Request for Quotes, Invitations to Bid, and Request for Proposals. As such the words "RFP", "Bid", and "Proposal" are used interchangeably in reference to all offers submitted by prospective Bidders.

Where there appears to be variances or conflicts between the General Terms and Conditions, Supplementary Conditions, and the Special Conditions and/or Detailed Specifications outlined in this ITB, Section III, General Terms and Conditions, Item #2, Order of Precedence shall prevail.

1. **ADVERTISING:** In submitting a Bid, Bidder agrees not to use the results there from as a part of any commercial advertising.
2. **ORDER OF PRECEDENCE:** In resolving conflicts resulting from errors or discrepancies in any of the ITB or Contract Documents, the order of precedence (lower number item controls) shall be as follows:
 - Amendment
 - Change Order
 - Contract/Agreement or Purchase Order
 - Addenda
 - Bid Form, if applicable
 - Technical Specifications/Attachments
 - Special Conditions
 - Supplementary Conditions
 - General Terms and Conditions
 - Instructions to Bidders
 - Invitation to Bid

3. **BID SECURITY:** When required by the Bid documents each Bid must be accompanied by a Bid security made payable to the Martin County School District in an amount of five percent (5%) of the Bidder's maximum Bid price and in the form of a certified check or cashier's check drawn upon any State or National Bank of Florida or a Bid Bond issued by a Surety that must have a "Best" rating of "A", and be authorized to do business in Florida.

Said check or Bid Bond shall be made payable to the Martin County School District and shall be given as a guarantee that Bidder, upon receipt of Notice of Tentative Award of the purchase order or contract, shall enter into the Contract or accept the purchaser order with the District, and furnish the necessary documents including, but not limited to: insurance certificates, other required Bonds, each of the said Bonds to be in the amount stated on the Invitation to Bid.

The Attorney-in-Fact who signs the bond must file with the bond a current certificate of proof of appointment as Attorney-In-Fact.

The Bid Security of the Successful Bidder shall be retained until such Bidder has been awarded a binding Contract or Purchase Order or Contract security whereupon the Bid security shall be returned. If the apparent Successful Bidder fails to execute and deliver the Purchase Order or Contract and furnish the required contract security within ten (10) calendar days after the Notice of Award, which is issued prior to the District's award of Purchase Order or Contract, the District may annul the Notice of Award, and the bid security of that Bidder shall be forfeited and retained by the District. The District may then recommend to the Board to accept the Bid of the next lowest responding Bidder, or re-advertise for bids. If the Bid of the next lowest Bidder is accepted, this acceptance shall bind such Bidder as though it was the original Successful Bidder.

There shall be no binding contract until such time as the Board or designee executes the Contract or issues the Purchase Order as the final award of the contract. The Bid Security of other Bidders whom District believes to have a reasonable chance of receiving the award may be retained by the District until the earlier of the seventh day after the effective date of the Purchase Order or Contract or the ninety-first day after the Bid opening, whereupon Bid security furnished by such Bidders shall be returned. Bid security with Bids which are not competitive or responsive shall be returned upon award of the Bid.

4. **EXAMINATION OF BID DOCUMENTS & SITE:** Pursuant to Article 4, Supplementary Conditions, Bidder must satisfy itself by personal and thorough examination of the location of the proposed Work, Bid Documents, requirements of the Work and the accuracy of the estimate of the quantities of the Work to be done; and Bidder shall not at any time after the submission of a Bid dispute or complain of such estimate nor the nature or amount of Work to be done.

By submission of its Bid, Bidder affirms that it has, at its own expense, made or obtained any additional examinations, investigations, explorations, tests, and studies and obtained any additional information and data which pertain to the physical conditions (surface, subsurface, and Underground Utilities) at or contiguous to the site or otherwise, prior to bidding which may affect cost, progress, or performance of the Work and which Bidder deems necessary to determine its Bid for performing the Work in accordance with the time, price, and other terms and conditions of the Bid Documents and/or Bidder has satisfied itself with respect to such conditions and it shall make no claims against the District or the EOR if on carrying out the Work it finds that the actual conditions do not conform to those indicated.

On request, the District will provide Bidder access to the site to conduct such investigations and tests, as Bidder deems necessary for submission of its Bid. Bidder shall schedule such access in advance with the District.

Upon completion of such additional field investigations and tests, Bidder shall completely restore disturbed areas.

5. **ADJUSTMENTS/CHANGES/DEVIATIONS:** No adjustments, changes, or deviations shall be accepted on any item unless conditions or Specifications of a Bid expressly so provide. All adjustments, changes or deviations shall require prior written approval and shall be binding **ONLY** if issued through the District's Purchasing Office.
6. **BID EXEMPT:** Purchases shall not include any items or services available at lower prices on other public entity or State of Florida Contract. The District reserves the right to Bid separately any item or service if deemed to be in the best interest of the District.



7. **PROMOTIONAL PRICING:** In addition, Bidder shall offer to the District, during the Contract period, any item(s) offered on a “promotional” basis from the manufacturer. It shall be the successful Bidder’s responsibility to monitor said item(s) and report any that are or shall be offered at lower price.

8. **CONTRACT SECURITY/INSURANCE:** When required by the specification herein, the successful Bidder shall furnish, a Performance Bond, Payment bond, and/or Warranty bond, and insurance certificates as stated on the cover page of this solicitation, on the District’s forms, within ten (10) calendar days after notification of award. Failure to furnish the required bonds within the time specified may be cause for rejection of the bid and any bid deposit may be retained by the District as liquidated damages and not as a penalty. Said sum shall be a fair estimate of the amount of damages the District would sustain due to Bidder’s failure to furnish said bonds.

9. **PRICES:** Bid prices shall be fixed and firm to the extent required under Special Conditions. In the absence of a reference in the Special Conditions, bid prices shall be fixed and firm for a period of ninety (90) calendar days. Give both unit price and extend total. Prices must be stated in units of quantity specified in the bid specifications. In case of a discrepancy in computing the amount of the bid, the UNIT PRICE quoted shall govern. All prices FOB destination, freight prepaid (unless otherwise stated in special conditions). Each item must be bid separately and no attempt is to be made to tie any item or items in with any other item or items. Payment shall be made only after receipt and acceptance of materials/services. Cash discounts may be offered for prompt payment; however, such discounts shall not be considered in determining the lowest net cost for bid evaluation.

All payments shall be governed by the *Local Government Prompt Payment Act*, F.S. Chapter 218.

10. **DELIVERY:** All items shall be delivered F.O.B. destination to a specific District address. All delivery costs and charges must be included in the bid price. The District reserves the right to cancel orders or any part thereof, without obligation if delivery is not made at the time specified in the bid.

Unless actual date of delivery is specified, show number of days required to make delivery after receipt of purchase order in space provided. Delivery time may become a basis for making an award

NOTE TO VENDORS DELIVERING TO MARTIN COUNTY SCHOOLS WAREHOUSE: Normal receiving hours are Monday through Friday (excluding holidays) 7:00 A.M. to 2:30 P.M. Summer receiving hours, typically mid June to early August, are 6:30 AM to 3:30 PM, Monday through Thursday. This warehouse is located at 2845 SE Dixie Highway, Building 7, Stuart, Florida 34997.

11. **MISTAKES:** Bidders are expected to examine the Specifications, Plans, Delivery Schedule, Bid prices, Extensions and all Instructions pertaining to supplies and services. **FAILURE TO DO SO SHALL BE AT THE BIDDER’S RISK.** In the event of extension error(s), the unit price shall prevail and the Bidder’s total offer shall be corrected accordingly. Erasures or corrections on Bids must be initialed in ink by the Bidder.

Discrepancies in the multiplication of units of Work and unit prices will be resolved in favor of the unit price. Discrepancies between the indicated sum of any column of figures and the correct sum thereof will be resolved in favor of the correct sum.

12. **INVOICING AND PAYMENT:** Payment for any and all invoice(s) that may arise as a result of a Contract or Purchase Order issued pursuant to this Bid Specification shall minimally meet the following conditions to be considered as a valid payment request. **If progress payments are applied for, all invoicing and payments shall be as stipulated under the Special Conditions section titled “Progress Payments”.**

Timely submission of a property certified invoice(s) in strict accordance with the price(s) and delivery elements as stipulated in the Contract document should be submitted to:

Martin County School District
 Attn: Accounts Payable Department
 1939 SE Federal Highway
 Stuart, FL., 34994
invoices@martinschools.org

All invoices shall be based upon and submitted with an approved Schedule of Values. Said Schedule of Values shall also contain a percentage breakdown of the supplies and services completed for which payment is requested in comparison to the total contract.

All invoices submitted shall consist of an original and one (1) copy;

- clearly referenced the subject Contract or Purchase Order number;
- provide a sufficient salient description to identify the goods or services for which payment is requested;
- contain date of delivery;
- original or legible copy of a signed delivery receipt including both manual signature and printed name of a designated District employee or authorized agent; be clearly marked as “partial”, “complete” or “final” invoice. The District shall accept partial deliveries.

The invoice shall contain the Bidder’s Federal Employer Identification number.

The District’s terms of payment, unless otherwise stated in the Contract or Purchase Order documents, are “Net 30 Days” after acceptance of goods or services and receipt of an acceptable invoice as described herein. Any other items of payment must have been previously approved by the District and appear on the Contract or Purchase Order document to be binding on the District.

Should the District return an invoice for correction, the Vendor shall resubmit a corrected invoice to the District for processing.

Payment will be made after the goods/services from the awarded Proposer have been received/completed; inspected and found to comply with negotiated contract, free of damage or defect; and a properly billed invoice is received and processed in the Accounting Services Department.

13. **ESTIMATED QUANTITIES:** The estimate of the various quantities of work or goods applicable to unit price items as shown on the Bid Form is approximate and is intended solely to provide the basis of comparison upon which the Award of Contract is made. Final payment shall be made on the basis of the actual quantities received.

The District reserves the right to reduce the quantities of Work to be done and to completely eliminate any items of the WORK listed in the Bid Form in order that the work can be completed within the amount of available funds.

14. **SUBSTITUTE or “OR EQUAL ITEMS”:** The Contract, if awarded, will be on the basis of material and equipment described in the Drawings or specified in the Specifications



without consideration of possible substitute or "or-equal" items. Whenever it is indicated in the Drawings or specified in the Specifications that a substitute or "or-equal" item of material or equipment may be furnished or used by Successful Bidder if acceptable to District, application for such acceptance must be made fifteen (15) calendar days prior to the Bid opening date, or such application will not be considered by District. The procedure for submittal of any such application, including those applications made after award of the Construction Contract by Successful Bidder for consideration by EOR, is set forth in Section 6.4 of the Supplementary Conditions which may be supplemented in the General Requirements.

15. **UNBALANCED BIDS:** Bids that are judged to be mathematically or materially unbalanced shall be cause for the bid to be rejected as non-responsive.
16. **ESTIMATED DOLLAR VALUE:** No guarantee of the dollar amount of this Bid is implied or given.
17. **INCORRECT PRICING/INVOICES:** Any pricing on invoices that are incorrect and were not included on the original Purchase Order, must be brought to the attention of the Purchasing Agent and corrected prior to the shipment(s) of goods or initiation of services. Additional costs that were not brought to the District's attention and did not receive written approval via a Change Order issued by the Purchasing Agent shall not be honored.
18. **DISTRICT PURCHASING CARD:** The School District has authorized the use of a Purchasing Card to expedite small dollar purchases for materials, supplies, and other items needed for daily operations. Awarded Bidders may be presented these credit cards by authorized School District personnel for the above mentioned purchases. Bidder (with the exception of travel). Purchase orders are strongly discouraged for purchasing materials, and supplies under \$1,000.
19. **CHANGE ORDERS:** Any addition(s) to the Statement of Work or to a Purchase Order as a result of the ITB award that adds additional costs must be brought to the School Districts attention and approved by the Purchasing Department prior to commencement of additional work, shipment of goods or the addition of unauthorized freight charges. Once approved, a Change Order shall be issued to include the additional costs and work may commence and/or shipment of goods can begin. Additional costs that were not brought to the district's attention and did not result in a Change Order approved by the Purchasing Department shall not be honored.
20. **DISPUTES:** In case of any doubt or difference of opinion as to the services to be furnished hereunder, the decision of the District shall be final and binding on both parties.
21. **BID PROTEST:** Failure to file a protest within the time prescribed in Section 120.57(3), Florida Statutes, shall constitute a waiver of proceedings under Chapter 120, Florida Statutes.
 - 21.1 Any person who is adversely affected by the agency decision or intended decision shall file with the agency a notice of protest in writing within 72 hours after the posting of the notice of decision or intended decision.
 - 21.2 With respect to a protest of the terms, conditions, and specifications contained in a solicitation, including any provisions governing the methods for ranking proposals, or replies, awarding contracts, reserving rights of further negotiation, or modifying or amending any contract, the notice of protest shall be filed in writing within 72 hours after the advertisement of the solicitation.
- 21.3 The formal written protest shall be filed within 10 days after the date the notice of protest is filed. Failure to file a notice of protest or failure to file a formal written protest shall constitute a waiver of proceedings under this chapter. The formal written protest shall state with particularity the facts and law upon which the protest is based. Saturdays, Sundays, and state holidays shall be excluded in the computation of the 72-hour time periods provided by this paragraph.
- 21.4 In order for the District to consider the protest, the protesting party shall deliver with the formal written protest to the District a "protest bond" in the amount as follows:
 - 21.4.1 Twenty-five thousand dollars (\$25,000) or 2 percent (2%) of the lowest accepted proposal, whichever is greater, for projects valued over \$500,000; and
 - 21.4.2 Five percent (5%) of the lowest accepted proposal for all other projects, conditioned upon payment of all costs and fees which may be adjudged against the protestor in the administrative hearing.
 - 21.4.3 If at the hearing the agency prevails, it shall recover all costs and attorney's fees from the protestor; if the protestor prevails, the protestor shall recover from the agency all costs and attorney's fees.
 - 21.4.4 If the protest (with respect to 21.2 above) the protest bond shall be the same as 21.4.1 and 21.4.2, except that the protest bond amount shall be calculated against the budgeted amount of the project.
22. **DEBARMENT:** The Board shall have the authority to debar a person / corporation for cause for consideration or award of future contracts. The debarment shall be for a period commensurate with the seriousness of the causes, generally not to exceed three (3) years. When the offense is willful or blatant, a longer term of debarment may be imposed, up to an indefinite period.
23. **FEDERAL DEBARMENT CERTIFICATION:** Certification regarding debarment, suspension, ineligibility and voluntary exclusion as required by Executive Order 12549, Debarment and Suspension, and implemented at 34 CFR, Part 85, as defined at 34 CFR Part 85, Sections 85.105 and 85.110-(ED80-0013).
 - a. The prospective lower tier participant certifies, by submission and signature of this submittal, that neither it nor its principals is presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from participation in this transaction by any federal department or agency.
 - b. Where the prospective lower tier participant is unable to certify to any of the statements in this certification, such prospective participant shall attach an explanation to this solicitation.
24. **DELETION/OVERSIGHT/MISSTATEMENT:** Any deletion, oversight or misstatement of the Specifications shall not release the Bidder from the responsibility of completing the project within the agreed upon time frame.
25. **SCRUTINIZED COMPANIES:** Pursuant to Sections 287.135, 215.4725, and 215.473, of the Florida Statutes which prohibits agencies from contracting with any company, principals, or owners on the Scrutinized Companies with



Activities in Sudan List, participation in the Boycott of Israel, the Scrutinized Companies with Activities in the Iran Petroleum Energy List, and is not engaged in business operations in Cuba or Syria are prohibited from contracting for goods or services in any amount at the time of submitting to this solicitation through the term of this contract, including renewals or extensions.

Acceptance of an offer certifies Contractor attests that firm is not on any list, engaged in any business operations, or participates in activities as specified in this section. If firm is found negligent, contract shall be terminated; and submission of a false certification may subject firm to civil penalties, attorney's fees, and/or costs

- 26. **DEMONSTRATIONS/SAMPLES/MOCKUPS:** The District may request a full demonstration of any product or service before the award of a contract. All demonstrations will be done at the expense of the Bidder.

When requested, samples are to be furnished free of charge to the District. If a sample is requested it must be delivered within seven (7) days of the request unless otherwise stated in the bid documents. Each sample must be marked with the following:

- The Bidder's name, the bid item and the manufacturer's number.
- Samples shall not be returned unless the Bidder requests it when samples are delivered.
- Samples must be a complete pack, box, bag, etc. of the required items(s), packaged as specified in the bid document.
- Failure to provide samples packaged as required by the bid specifications shall result in the item(s) and/ or the bid being rejected as nonconforming.
- Items may be tested for compliance with specifications under the direction of the Florida Department of Agriculture and Consumer Services, or an independent testing laboratory. Bidders shall assume full responsibility for payment for any and all charges for testing and analysis of any materials offered or delivered that **do not conform** to the minimum required specifications. Bidder's disposition of all items delivered in this category must be at no expense to the District.

The DISTRICT may request a full demonstration of any product or service before the award of a contract. All demonstrations shall be done at the expense of the BIDDER.

Mockups must be approved prior to work beginning. The mockup shall be the basis for the quality of work and the work's acceptance.

- 27. **COPYRIGHTS OR PATENT RIGHTS:** The Bidder warrants that there has been no violation of copyrights or patent rights in the manufacturing, producing or selling the goods shipped or ordered as a result of this ITB. The seller agrees to hold the District harmless from all liability, loss or expense occasioned by any such violation.
- 28. **DEFAULT:** In case of default by the Bidder, the Board may procure the articles or services from other sources and hold the Bidder responsible for any excess costs incurred released.
- 29. **EMPLOYEES:** Employees of the awarded Bidder shall at all times be under its sole direction and not an employee or

agent of the District. The Awarded Bidder shall supply competent and physically capable employees. The District may require the Awarded Bidder to remove an employee it deems careless, incompetent, insubordinate or otherwise objectionable. Awarded Bidder shall be responsible to the District for the acts and omissions of all employees working under its directions.

- 30. **NON-DISCRIMINATION & EQUAL OPPORTUNITY EMPLOYMENT:** The Bidder certifies that they are in compliance with the non-discrimination clause contained in Section 202, Executive Order 11246, as amended by Executive Order 11375 relative to equal employment opportunity for all persons without regard to race, color, religion, sex or national origin. The provisions of the ADA Act of 1990 pertaining to employment shall also be applicable.

30.1 During the performance of the Contract, the awarded Bidder shall not discriminate against any employee or applicant for employment because of race, gender, gender identity or expression, religion, national origin, ethnicity, sexual orientation, marital status, political affiliation, familial status, age or disability in the solicitation, selection, hiring, or treatment of sub-contractors, vendors, suppliers, or commercial customers

30.2 The awarded Bidder will take affirmative action to ensure that employees are treated during employment, without regard to their race, religion, color, gender or national original, or disability. Such actions must include, but not be limited to, employment, promotion; demotion or transfer; recruitment or recruitment advertising, layoff or termination; rates of pay or other forms of compensation; and selection for training, including apprenticeship.

30.3 The awarded Bidder shall agree to post in conspicuous places, available to employees and applicants for employment, notices to be provided by the contracting officer setting forth the provisions of this nondiscrimination clause.

30.4 The awarded Bidder further agrees that he/she will ensure that Subcontractors, if any, will be made aware of and will comply with this nondiscrimination clause. Bidder shall provide equal opportunity for sub-contractors to participate in all of its public sector and private sector sub-contracting opportunities.

30.5 Bidder understands and agrees that violation of this clause is a material breach of the contract and may result in contract termination, debarment, or other sanctions.

- 31. **TAXES:** The District is exempt from all Federal, State, and Local taxes. An exemption certificate will be provided.

- 32. **SALES TAX:** All materials and supplies necessary for completion of this contract are subject to Florida Sales and Use Tax in accordance with Florida Statutes and shall be included in the Contract Price stated by the Contractor.

- 33. **DIRECT MATERIAL PURCHASES:** The District reserves the right to issue purchase orders for materials to either the Contractor's or the District's suppliers for construction related materials.

- 34. **RIGHTS TO BID DOCUMENTS:** All copies and contents of any bid, attachment, and explanation thereof submitted in response to this ITB (except copyright material), shall become the property of the School District of Martin County, Florida. The School District reserves the right to use, at its discretion, and in any manner it deems appropriate, any concept, idea, technique or suggestion contained therein. All copyright and industrial/commercial proprietary, confidential and/or privileged information such as financial records, must be clearly identified, as such confidentiality is



protected until award of contract, in accordance with Chapter 119, F.S. Said material shall be returned to the Bidders prior to award of contract so as to preserve the proprietary and confidential nature of its contents.

35. **SEVERABILITY:** Indulgence by the District on any non-compliance by the Bidder does not constitute a waiver of any rights under this ITB. If any term or provision of this ITB or resulting Contract, or the application thereof to any person or circumstances shall, to any extent, be held invalid or unenforceable, the remainder of this ITB or Contract, or the application of such terms or provisions to persons or circumstances other than those as to which it is held invalid or unenforceable, shall not be affected, and every other term provision of this Bid/Contract shall be deemed valid and enforceable to the extent permitted by law.
36. **VENUE:** All contracts shall be governed by the laws of the State of Florida and venue shall be in Martin County, Florida. The venue of any legal action resulting from this Proposal shall be Martin County, Florida.
37. **EXPENSES:** Neither the DISTRICT nor its representatives shall be liable for any expenses incurred in connection with preparation of a response to this ITB. All expenses in the preparation of this ITB are the sole responsibility of the Bidder. All Submittals should be prepared to provide a straightforward and concise description of the respondents' qualifications and ability to meet the requirements of the ITB.
38. **SOVEREIGN IMMUNITY:** No Waiver of Sovereign Immunity: Nothing contained herein is intended to serve as a waiver of sovereign immunity by any agency or political subdivision to which sovereign immunity may be applicable or as a waiver of limits to liability or rights existing under Section 768.28, Florida Statutes.
39. **VERIFICATION OF EMPLOYMENT (E-VERIFY):** The District shall not intentionally award contracts to any contractor who knowingly employs unauthorized alien workers, constituting a violation of the employment provisions of the Immigration and Nationality Act ("INA"). The District shall consider the employment by the Contractor of unauthorized aliens a violation of 8 U.S.C. Section 1324a(e) [Section 274A(e) of the INA]. The Contractor agrees that such violation by the Contractor shall be grounds for the unilateral cancellation of this Contract by the District.
- a. Pursuant to Section 448.095, Florida Statutes, Contractor shall register with and use the U.S. Department of Homeland Security's E-Verify system to verify the work authorization status of all employees hired during the term of this Agreement and must, upon request, provide evidence of compliance with this provision.
 - b. Subcontractors
 - (i) Contractor shall also require all subcontractors performing work under this Agreement to use the E-Verify system for any employees they may hire during the term of this Agreement.
 - (ii) Subcontractors shall provide Contractor with an affidavit stating the subcontractor does not employ, contract with, or subcontract with an unauthorized alien, as stated in Section 448.095, Florida Statutes.
 - (iii) Contractor shall provide a copy of such affidavit to the School Board upon receipt and shall maintain a copy for the duration of the Agreement.
 - c. Failure to comply with this provision is a material breach of the Agreement, and School Board may choose to terminate the Agreement at its sole discretion. Contractor may be liable for all costs associated with School Board securing the same

services, inclusive, but not limited to, higher costs for the same services and rebidding costs (if necessary).

40. **DAVIS-BACON & LABOR STANDARDS**

If applicable refer Section V-Special Conditions, Contractor agrees to comply with the requirements of the Secretary of Labor in accordance with the Davis-Bacon Act as amended, the provisions of Contract Work Hours and Safety Standards Act (40 U.S.C. 327 et seq.) and all other applicable Federal, state and local laws and regulations pertaining to labor standards insofar as those acts apply to the performance of this project. The Contractor agrees to comply with the Copeland Anti-Kick Back Act (18 U.S.C. 874 et seq.) and its implementing regulations of the U.S. Department of Labor at 29 CFR Part 5. Contractor shall provide documentation that demonstrates compliance with hour and wage requirements of this part. Such documentation shall be made available to the District for review upon request.

41. **FLORIDA PREFERENCE:** Pursuant to Florida Statute 287.084, award recommendations shall make appropriate adjustments to pricing when considering bids from bidders having a principal place of business outside the State of Florida. If applicable, all bidders must complete and submit the Bidder's Statement of Principal Place of Business form with the response to this solicitation. Failure to comply shall render a bid non-responsive to the terms of this solicitation. This preference does not apply to purchases using Federal Funds.

42. **THE U.S. DEPARTMENT OF AGRICULTURE'S "BUY AMERICAN" PROVISION:** Section 104(d) of the William F. Goodling Child Nutrition Reauthorization Act of 1998 requires schools and institutions participating in the National School Lunch Program (NSLP) and School Breakfast

Program (SBP) in the contiguous United States to purchase, to the maximum extent practicable, domestic commodities or products for use in meals served under the programs. The legislation defines "domestic commodity or product" as one that is produced in the United States and is processed in the United States, **substantially** using agriculture commodities that are produced in the United States.

The word "substantially" is defined as over 51 percent of the final processed product consists of agricultural commodities that were grown domestically.

43. **PERSONAL INJURY AND PROPERTY DAMAGE:** The Contractor assumes any and all risk of personal injury and property damage attributable to the willful or negligent acts or omissions of the Contractor and the officers, employees, and agents thereof. The Contractor also assumes such risk with respect to the willful or negligent acts or omissions of persons subcontracting with the Contractor or otherwise acting or engaged to act at the instance of the Contractor in furtherance of this Contractor fulfilling the Contractor's obligations under this contract.
44. **TRADE-NAMED ITEMS:** When an item appearing in the solicitation document is listed by a registered trade name and the wording "no substitute", "spec only" or "only" is indicated, only that trade-named item will be considered. The district reserves the right to reject products that are listed as approved and waive formalities. Should a vendor wish to have products evaluated for future solicitation consideration, please contact in writing, the Director of Purchasing. If the wording "no substitute", "spec only" or "only" does not appear with the trade name, offerors may submit prices on their trade-named item, providing they attach a descriptive label of their product to this solicitation.



Sample merchandise offered hereunder as "offered equal" may be required to be submitted to the purchaser in advance of the solicitation award. Substitutions for items solicited, awarded and ordered are prohibited except as may be approved by the Director of Purchasing.



SECTION IV

SUPPLEMENTARY CONDITIONS

BY ARTICLES FOR

THE CONSTRUCTION CONTRACT

(ARTICLE 1- Definitions are identified and incorporated in Section I, Definitions, Abbreviations, and Acronyms)

ARTICLE 2 – PRELIMINARY MATTERS

2.1 DELIVERY OF BONDS AND INSURANCE CERTIFICATES:

2.1.1 After Board approval for award, the CONTRACTOR shall deliver to the DISTRICT such Bonds and Insurance Policies, Certificates or other documents as the CONTRACTOR may be required to furnish in accordance with the Contract Documents. The aforementioned documents must be submitted to the DISTRICT prior to any WORK being performed.

2.2 COPIES OF DOCUMENTS:

2.2.1 The DISTRICT shall furnish to CONTRACTOR ONE (1) copy (unless additional copies exist) of the Contract Documents for the execution of the WORK. CONTRACTOR shall be responsible for procuring additional copies.

2.3 NOTICE TO PROCEED:

2.3.1 The Contract Times shall commence to run on the date stated in the Notice to Proceed.

2.4 STARTING THE WORK:

2.4.1 CONTRACTOR shall begin to perform the WORK on the commencement date stated in the Notice to Proceed, but no WORK shall be done at the Site prior to said commencement date.

1.4.2 CONTRACTOR'S Review of Contract Documents: Before undertaking each part of the WORK, CONTRACTOR shall carefully study and compare the Contract Documents and check and verify pertinent figures shown thereon and all applicable field measurements. CONTRACTOR shall promptly report in writing to EOR any conflict, error, ambiguity or discrepancy which CONTRACTOR may discover and shall obtain a written interpretation or clarification from EOR before proceeding with any WORK affected thereby; however, CONTRACTOR shall not be liable to DISTRICT or EOR for failure to report any conflict, error, ambiguity or discrepancy in the Contract Documents, unless CONTRACTOR knew or reasonably should have known thereof.

2.4.3 INTERIOR INSPECTION FORM: Prior to beginning work, inspect with Owner's Representative or Architect, building interior(s). Log conditions of ceiling tiles, lights, walls and flooring materials using the Interior Inspection Form attached at the end of this Section. Confirmation of existing conditions shall be made and recorded onto a video disk.

Submit two copies of the form signed by the Contractor, Owner's Representative or Architect and one copy of video disk.

2.4.4 EXTERIOR INSPECTION FORM: Prior to beginning work, inspect with Owner's Representative or Architect, existing building exterior(s) and site conditions. Log, as required, conditions of exterior walls, building attachments, sidewalks, miscellaneous paving and landscaping using the Exterior Inspection Form attached at the end of this Section. Confirmation of existing conditions shall be recorded onto a video.

Submit two copies of form signed by the Contractor, Owner's Representative or Architect and one copy of video disk.

2.5. PRECONSTRUCTION CONFERENCE:

2.5.1 The CONTRACTOR is required to attend a preconstruction conference within twenty (20) days after award. This conference shall be attended by the DISTRICT, CONSULTANT, and others as appropriate in order to discuss the WORK.

2.5.2 The CONTRACTOR'S initial schedule for shop drawings submittals, obtaining permits and Plan of Operation and CPM Schedule shall be reviewed and finalized. As a minimum, the CONTRACTOR'S representatives should include its project manager and schedule expert. If the submittals are not finalized at the end of the meeting, additional meetings shall be held so that the submittals can be finalized prior to the submittal of the first Application for Payment. No Application for Payment shall be processed prior to receiving acceptable initial submittals from the CONTRACTOR.

2.5.3 DISTRICT shall schedule preconstruction conference.

2.5.3.1 Attendance Required: DISTRICT's Project Manager, EOR, and Contractor/CM Project Manager and Superintendent.

2.5.3.2 Agenda:

Distribution of Contract Documents.

Confirmation of prior submission (during bid process) of list of Subcontractors, list of Products, Schedule of Values, and Progress Schedule.

2.5.3.3 Designation of personnel representing the parties in Contract, and the EOR.

2.5.3.4 Procedures and processing of field decisions, submittals, substitutions, applications for payments, proposal request, Change Orders and Contract closeout procedures.

Scheduling.

2.5.3.5 Scheduling activities of a Geotechnical Engineer.

2.5.3.6 Issuance of Notice to Proceed.

2.5.3.7 Record minutes and distribute copies within two days after meeting to participants, with copies to EOR, DISTRICT, participants, and those affected by decisions made.

2.6 SITE MOBILIZATION MEETING

2.6.1 DISTRICT will schedule a meeting at the Project site prior to Contractor occupancy.

2.6.2 Attendance Required: DISTRICT, EOR, Special Consultants, and Contractor, Contractor's Superintendent, and major Subcontractors.

2.6.3 Agenda:

2.6.3.1 Use of premises by DISTRICT and Contractor.

2.6.3.2 DISTRICT's requirements and partial occupancy.

2.6.3.3 Construction facilities and controls provided by
Supplementary Conditions



DISTRICT.

- 2.6.3.4 Temporary utilities provided by DISTRICT.
- 2.6.3.5 Survey and building layout.
- 2.6.3.6 Security and housekeeping procedures.
- 2.3.3.7 Schedules.
- 2.6.3.8 Application for payment procedures.
- 2.6.3.9 Procedures for testing.
- 2.6.3.10 Procedures for maintaining record documents.
- 2.6.3.11 Requirements for start-up of equipment.
- 2.6.3.12 Inspection and acceptance of equipment put into service during construction period.
- 2.6.3.13 Record minutes and distribute copies within two days after meeting to participants, with copies to CONSULTANT, DISTRICT, participants, and those affected by decisions made.

2.7 PROGRESS MEETINGS

2.7.1 Schedule and administer meetings throughout progress of the work at maximum monthly intervals.

Make arrangements for meetings, prepare agenda with copies for participants, and preside at meetings.

2.7.2 Attendance Required: Job superintendent, major Subcontractors and suppliers, DISTRICT, EOR, as appropriate to agenda topics for each meeting.

2.7.3 Agenda:

- 2.7.3.1 Review minutes of previous meetings.
- 2.7.3.2 Review of Work progress.
- 2.7.3.3 Field observations, problems, and decisions.
- 2.7.3.4 Identification of problems that impede planned progress.
- 2.7.3.5 Review of submittals schedule and status of submittals.
- 2.7.3.6 Review of off-site fabrication and delivery schedules.
- 2.7.3.7 Maintenance of progress schedule.
- 2.7.3.8 Corrective measures to regain projected schedules.
- 2.7.3.9 Planned progress during succeeding work period.
- 2.7.3.10 Coordination of projected progress.
- 2.7.3.11 Maintenance of quality and work standards.
- 2.7.3.12 Effect of proposed changes on progress schedule and coordination.
- 2.7.3.13 Other business relating to work.
- 2.7.3.14 Record minutes and distribute copies within two days after meeting to participants, with copies to EOR, DISTRICT, participants, and those affected by decisions made.

2.8 PREINSTALLATION MEETING

2.8.1 When required in individual specification section, convene a pre-installation meeting at the site prior to commencing work of the section.

2.8.2 Require attendance of parties directly affecting, or

affected by, work of the specific section.

2.8.3 Notify DISTRICT and EOR five (5) working days in advance of meeting date.

2.8.4 Prepare agenda and preside at meeting:

2.8.5 Review conditions of installation, preparation and installation procedures.

2.8.6 Review coordination with related work.

2.8.7 Record minutes and distribute copies within two days after meeting to participants, with copies to EOR, DISTRICT, participants, and those affected by decisions made.

2.9 FINALIZING SCHEDULES:

2.9.1 Within ten (10) days of receiving the Notice to Proceed the CONTRACTOR shall submit the final schedule approved by the DISTRICT and EOR. The finalized progress schedule shall be acceptable to the DISTRICT as providing an orderly progression of the WORK to completion within the Contract Time, but such acceptance shall neither impose on the DISTRICT responsibility for the progress or scheduling of the WORK nor relieve CONTRACTOR from full responsibility thereof. The finalized schedule of Shop Drawing submissions shall be acceptable to the DISTRICT as providing a workable arrangement for processing the submissions. The finalized Schedule of Values shall be acceptable to the DISTRICT as to form and substance.

2.10 SUBMITTAL PROCEDURES

2.10.1 SCOPE OF WORK

Administrative and procedural requirements for processing of submittals during construction process. Submittals may include the following:

- Proposed Products Lists.
- Proposed Vendor List.
- Product Data.
- Shop Drawings.
- Samples.
- Design Data.
- Field Test Reporting.
- Quality Control Reporting.
- Certificates.
- Manufacturer's Installation, Handling and Storage Instructions.
- Manufacturer's Field Reports.
- Erection Drawings.
- Closeout Documents
- Warranties.
- Scheduling of Work
- Construction Progress Schedule.
- Submittals Schedule.
- Survey and Layout Data.
- Construction Progress Reporting.
- Periodic Work Observation.
- Photographic Documentation.
- Purchase Order Tracking.
- Operation and Maintenance Documentation

2.10.2 RELATED SECTIONS

- A. Payment Procedures.
- B. Project Coordination.
- C. References.
- D. Quality Control.
- E. Product Storage and Handling Requirements.
- F. Closeout Submittals.



2.10.2.1 SEE 2.10.2 RELATED SECTIONS AND SUBMITTAL SECTIONS 2.10.1 FOR INDIVIDUAL SUBMITTAL PROCEDURES.

2.10.3 SUBMITTAL PROCEDURES-GENERAL

2.10.3.1 Submittal Procedures shall be in conformance with General Conditions of the Contract and as amended by District.

2.10.3.2 Transmit each submittal with District's Standard Transmittal form.

2.10.3.3 Sequentially number each transmittal forms. Revise submittals with original number and a sequential alphabetic suffix.

2.10.3.4 Identify project, Contractor, subcontractor or supplier pertinent drawing and detail number, and specification section number, as appropriate.

2.10.3.5 Apply Contractor's stamp, signed or initialed certifying that review, approval, verification of products required, field dimensions, adjacent construction work, and coordination of information are in accord with requirements of the work and contract documents.

2.10.3.6 Schedule submittals to expedite the project, and deliver to Consultant and District at business address. Coordinate submission of related items.

2.10.3.7 For each submittal for review, allow 10 days excluding delivery time to and from the Contractor.

2.10.3.8 Identify variations from contract documents and product or system limitations, which may be detrimental to successful performance of the completed work.

2.10.3.9 Provide space for Contractor and EOR review stamps.

2.10.3.10 When revised for resubmission, identify all changes made since previous submission.

2.10.3.11 Distribute copies of reviewed submittals as appropriate. Instruct parties to promptly report any inability to comply with requirements.

2.10.3.12 Submittals not requested will not be recognized or processed.

2.10.4 PRODUCT DATA

2.10.4.1 Product Data for Review:

2.10.4.1.1 Submit to EOR for review for purpose of checking for conformance with information given and design concept expressed in Contract Documents.

2.10.4.1.2 After review, provide copies and distribute per Submittal Procedures article above and for record documents purposes described in Section 01 78 00 – Closeout Submittals.

2.10.4.2 Product Data for Information:

2.10.4.2.1 Submittal for EOR'S knowledge as contract administrator or for District.

2.10.4.3 Product Data for Project Close-out:

2.10.4.3.1 Submit for District's benefit during and after project completion.

2.10.4.4 Submit number of copies, which Contractor/CM requires, plus two copies for Consultant.

2.10.4.5 Mark each copy to identify applicable products, models, options, and other data.

2.10.4.6 Supplement manufacturers' standard data to provide information unique to project.

2.10.4.7 Indicate product utility and electrical characteristics, utility connection requirements, and location of utility outlets for service for functional equipment and appliances.

2.10.4.8 After review, distribute in accord with Submittal Procedures article above and provide copies for record documents described in Section 6.37 Closeout Submittals.

2.10.5 CONSTRUCTION SUBMITTALS

2.10.5.1 Submit one copy of Building Permit, Site Permits, Environmental Permits, or other permits required for construction of work.

2.10.5.2 Submit Payment Applications to Consultant for review for purpose of checking conformance with information given and design concept expressed in Contract Documents.

2.10.5.3 Certificates:

2.10.5.3.1 When specified, submit certification by manufacturer, installation/application subcontractor, or contractor to Consultant, in quantities specified for Product Data.

2.10.5.3.2 Indicate material or Product conforms to or exceeds specified requirements.

2.10.5.3.3 Submit supporting reference data, affidavits, and certifications as appropriate.

2.10.5.3.4 Certificates may be recent or previous test results on material or Product, but must be acceptable to Consultant.

2.10.5.4 Manufacturer's Instructions:

2.10.5.4.1 When specified, submit printed instructions for delivery, storage, assembly, installation, start-up, adjusting, and finishing, to Consultant for delivery to District in quantities specified for Product Data.

2.10.5.4.2 Indicate special procedures, perimeter conditions requiring special attention, and special environmental criteria required for application or installation.

2.10.5.4.3 Refer to Quality Control and Warranty sections for quality assurance requirements.

2.10.5.5 Manufacturer's Field Reports:

2.10.5.5.1 Submit reports to EOR and District's Project Manager.

2.10.5.5.2 Submit report within 5 days of observation to EOR.

2.10.5.5.3 Submit for information for purpose of assessing conformance with information given and design concept expressed in Documents.

2.10.5.6 Erection Drawings:

2.10.5.6.1 Submit drawings to Consultant and District's Project Manager.

2.10.5.6.2 Submit for information for purpose of assessing conformance with information given and design concept expressed in Documents.

2.10.5.6.3 Data indicating inappropriate or unacceptable work is subject to rejection by EOR or District.



ARTICLE 3 – USE OF CONTRACT DOCUMENTS

3.1 INTENT:

3.1.1 The Contract Documents comprise the entire agreement between the DISTRICT and CONTRACTOR concerning the WORK. The Contract Documents are complementary: what is called for by one is as binding as if called for by all. The Contract Documents shall be construed in accordance with the laws of the State of Florida with venue in Martin County, Florida.

3.1.2 It is the intent of the Contract Documents to describe the WORK, functionally complete, to be constructed in accordance with the Contract Documents. Any labor, documentation, services, materials or equipment that may reasonably be inferred from the Contract Documents or from prevailing custom or trade usage as being required to produce the intended result shall be provided whether or not specifically called for.

3.2 REFERENCE TO STANDARDS:

3.2.1 Reference to standard specifications, manuals or codes of any technical society, organization or association, or to the Laws or Regulations of any governmental authority, whether such reference be specific or by implication, shall mean the latest standard specification, manual, code or Laws or Regulations in effect at the time of opening of Bids, except as may be otherwise specifically stated. However, no provision of any referenced standard specification, manual or code (whether or not specifically incorporated by reference in the Contract Documents) shall be effective to change the duties or responsibilities of the DISTRICT, CONTRACTOR or EOR or any of their agents or employees from those set forth in the Contract Documents, nor shall it be effective to assign to DISTRICT, EOR OR EOR'S agents or employees, any duty or authority to supervise or direct the furnishing or performance of the WORK or any duty or authority to undertake responsibility contrary to the provisions of the Contract Documents.

3.3. REVIEW OF CONTRACT DOCUMENTS

3.3.1 The Contract Documents which comprise the Contract between the DISTRICT and the Contractor are attached hereto and made part hereof and consist of the following:

- 3.3.1.1 The Purchase Order.
- 3.3.1.2 Contractor's Bid and Bid Bonds
- 3.3.1.3 Bid Documents, consisting of:
 - 3.3.1.4 Invitation to Bid and Instructions to Bidders.
 - 3.3.1.5 General Terms & Conditions.
 - 3.3.1.6 Supplementary Conditions
 - 3.3.1.7 Special Conditions.
 - 3.3.1.8 Technical Provisions.
 - 3.3.1.9 All Plans.
 - 3.3.1.10 All Addenda.
 - 3.3.1.11 Recorded Public Construction Performance and Payment Bond in a form supplied by the DISTRICT, which shall be provided to the DISTRICT by the Contractor, along with the return of an executed Purchase Order. The Contractor shall be responsible for recording the Public Construction Bond.

3.3.1.12 Insurance Certificates which shall be provided by the Contractor, along with the return of an executed copy of this Contract.

3.3.1.13 Any Modifications, including change orders, duly delivered after execution of this Contract.

3.3.1.14 Executed Notice of Intent to Award.

3.3.1.15 Executed Notice to Proceed

3.3.2 Except for duly authorized and executed Modifications including but not limited to change orders and contract amendments, any conflict between the terms and conditions of this Contract and the terms and conditions of any of the other contract documents shall be interpreted in favor of this Contract

3.3.3 If, during the performance of the WORK, CONTRACTOR finds a conflict, error or discrepancy in the Contract Documents, CONTRACTOR shall so notify the CONSULTANT, in writing, at once and before proceeding with the WORK affected thereby shall obtain a written interpretation or clarification, except in an emergency as authorized by paragraph 6.13.

3.4 ORDER OF PRECEDENCE OF CONTRACT DOCUMENTS

3.4.1 In resolving conflicts resulting from errors or discrepancies in any of the Contract Documents, the order of precedence shall be as follows:

1. Amendment
2. Change Order
3. Construction Contract or Purchase Order
4. Addenda, with later date having greater priority
5. Bid Form
6. Special Conditions
7. Supplementary Conditions
8. Invitation to Bid
9. Instructions to Bidders
10. General Terms & Conditions
11. Technical Specifications
12. Contract Drawings

The captions or subtitles of the several articles and divisions of these Contract Documents constitute no part of the context and hereof, but are only labels to assist in locating and reading the provisions hereof.

3.4.2 With reference to the Drawings, the order of precedence is as follows:

1. Figures govern over scaled dimensions
2. Detail drawings govern over general drawings
3. Addenda/Change Order drawings govern over any other drawings
4. Drawings govern over standard drawings

3.4.3. Except as otherwise specifically stated in the Contract Documents or as may be provided by amendment or supplement thereto issued by one of the methods indicated in paragraph 3.5, (Amending of Contract Documents) the provisions of the Contract Documents shall take precedence in resolving any conflict, error, ambiguity or discrepancy between the provisions of the Contract Documents and:

1. The provisions of any such standard, specification, manual, code or instruction (whether or note specifically incorporated by reference in the Contract Documents); or
2. The provisions of any such Laws or Regulations applicable to the performance of the WORK (unless such an interpretation of the provisions of the Contract Documents would result in violation of such Law or Regulation).

No provision of any such standard, specification, manual, code or instruction shall be effective to change the duties and responsibilities of DISTRICT, CONTRACTOR or CONSULTANT, or any of their subcontractors, agents or employees from those set forth in the Contract Documents, no shall it be effective to



assign to DISTRICT, EOR'S or any of EOR's agents or employees any duty or authority to supervise or direct the furnishing or performance of the WORK or any duty or authority to undertake responsibility inconsistent with the provisions of paragraph 9.10, (Limitations on EOR) or any other provision of the Contract Documents.

3.5 AMENDING CONTRACT DOCUMENTS:

3.5.1 The Contract Documents may be amended to provide for additions, deletions and revisions in the WORK or to modify the terms and conditions thereof by a Change Order (pursuant to Article 10, Changes in the Work).

3.5.2 Additionally, the requirements of the Contract Documents may be supplemented and minor variations and deviations in the WORK may be authorized, in one or more of the following ways:

3.5.2.1 A Field Order (pursuant to paragraph 9.5, Changes in the Work)

3.5.2.2 EOR'S approval of a Shop Drawing or sample (pursuant to paragraphs 6.11, Shop Drawings and Samples), or

3.5.2.3 EOR'S written interpretation or clarification (pursuant to paragraph 9.4 Clarifications and Interpretations).

3.6 REUSE OF DOCUMENTS:

3.6.1 Neither CONTRACTOR nor any Subcontractor or Supplier or other person or organization performing or furnishing any of the WORK under a direct or indirect contract with the DISTRICT shall have or acquire any title to or ownership rights in any of the Contract Documents, drawings, technical specifications or other documents used on the WORK; and, they shall not reuse any of them on extensions of the Project or any other project without prior written consent of the DISTRICT and EOR.

ARTICLE 4 – SITE OF THE WORK

4.1 AVAILABILITY OF LANDS:

4.1.1 The DISTRICT shall furnish, as indicated in the Contract Documents, the lands upon which the WORK is to be performed, rights-of-way and easements for access thereto and such other lands which are designated for the use of CONTRACTOR. Easements for permanent structures or permanent changes in existing facilities shall be obtained and paid for by the DISTRICT, unless otherwise provided in the Contract Documents. Nothing contained in the Contract Documents shall be interpreted as giving the CONTRACTOR exclusive occupancy of the lands or rights-of-way provided. CONTRACTOR shall provide for all additional lands and access thereto that may be required for temporary construction facilities or storage of materials and equipment.

4.1.2 Occupying Private Land: The Contractor shall not enter upon nor use any property not under the control of the DISTRICT until a written temporary construction easement agreement has been executed by the CONTRACTOR and the property owner, and a copy of said easement furnished to the DISTRICT and EOR prior to said use; and, neither the DISTRICT nor the EOR shall be liable for any claims or damages resulting from the CONTRACTOR'S trespass on or use of any such properties. The CONTRACTOR shall provide the DISTRICT with a signed release from the property owner confirming that the lands have been satisfactorily restored upon completion of the WORK.

4.1.3 WORK in State, County and DISTRICT Rights-of-Way and Easements: When the WORK involves the installation of sanitary sewers, storm sewers, drains, water mains, manholes, underground structures, or other disturbances of existing features in or across streets, rights-of-way, easements, or other property, the CONTRACTOR shall (as the WORK

progresses) promptly back-fill, compact, grade and otherwise restore the disturbed area to a basic condition which shall permit resumption of pedestrian or vehicular traffic and any other critical activity or function consistent with the original use of the land. Unsightly mounds of earth, large stones, boulders, and debris shall be removed so that the site presents a neat appearance as part of the contract.

4.1.4 WORK Adjacent to Telephone, Power, Cable TV and Gas Company Structures: In all cases where WORK is to be performed near telephone, power, water, sewer, drainage, cable TV, or gas company facilities, the Contractor shall provide written notification to the respective companies of the areas of which WORK is to be performed, prior to the actual performance of any WORK in these areas.

4.1.5 Use of Public Streets: The use of public streets and alleys shall be such as to provide a minimum of inconvenience to the public and to other vehicular and non-vehicular traffic. The CONTRACTOR shall remove any earth or excavated materials spilled from trucks and clean the streets to the satisfaction of the DISTRICT, the EOR, the Florida Department of Transportation, or other agency or governmental entity having jurisdiction, as applicable.

4.2 REPORTS OF PHYSICAL CONDITIONS:

4.2.1 Subsurface Explorations: Where applicable, reference is made in the technical specifications for identification of those reports of explorations and tests of subsurface conditions at the site that have been utilized by EOR in preparation of the Contract Documents.

4.2.2 Existing Structures: Where applicable, reference is made to the technical specifications, for identification of those drawings of physical conditions in or relating to existing surface and subsurface structures (except Underground Facilities referred to in paragraph 4.3 herein) which are at or contiguous to the site that have been utilized by EOR in preparation of the Contract Documents.

4.2.3 Neither the DISTRICT nor EOR makes any representation as to the completeness of the reports or drawings referred to in Paragraph 4.2.1. Subsurface Explorations or 4.2.2. Existing Structures above or the accuracy of any data or information contained therein. CONTRACTOR may rely upon the general accuracy of the technical data contained in such reports and drawings but not for the completeness thereof for CONTRACTOR'S purposes including, but not limited to, any aspects of the means, methods, techniques, sequences and procedures of construction to be employed by CONTRACTOR and safety precautions and programs incident thereto. However, the CONTRACTOR may not rely upon any interpretation of such technical data, including any interpolation or extrapolation thereof, or any non-technical data, interpretations, and opinions contained therein.

4.2.4 Where the dimensions and locations of existing structures are of critical importance to the installation or connection of new WORK, the CONTRACTOR shall verify such dimensions and locations in the field before the fabrication of any materials or equipment which is dependent on the correctness of such information. There shall be no additional cost to the DISTRICT for CONTRACTOR'S failure to verify such dimensions and locations, or for inaccurate verifications by CONTRACTOR.

4.3 PHYSICAL CONDITIONS -- UNDERGROUND FACILITIES:

4.3.1 Indicated: The information and data indicated in the Contract Documents with respect to existing Underground Utilities at or contiguous to the site is based on information and data furnished to the DISTRICT or EOR by the owners of such Underground Utilities or by others.

4.3.1.1 The DISTRICT and EOR shall not be responsible for the accuracy or completeness of any such



information or data; and,

4.3.1.2 The CONTRACTOR shall notify the Underground Service Alert (USA) System, Phone No. 1-800-227-2600, and Sunshine State One Call Services (1-800-432-4770) at least 48 hours in advance of the commencement of WORK at any site to allow the member utilities to examine the construction site and mark the location of the utilities' respective facilities.

4.3.1.3 The CONTRACTOR acknowledges that some (or all) of the utility companies with facilities shown on the drawings may not be members of the USA System or Sunshine State One Call Services; and, therefore, not automatically contacted by the above referenced telephone number. The CONTRACTOR shall be responsible for making itself aware of utility company facilities not reported by the USA System or Sunshine State One Call Services, and shall be liable for any and all damages stemming from repair or delay costs or any other expenses resulting from the unanticipated discovery of underground utilities. The CONTRACTOR shall be responsible for notifying all of the utilities at least 48 hours in advance of the commencement of WORK at any site to allow the utilities to examine the construction site and mark the location of the utilities' respective facilities. The CONTRACTOR shall also be responsible for verifying that each utility has responsibly responded to such notification.

4.3.1.4 CONTRACTOR shall have full responsibility for reviewing and checking all such information and data. Further, the CONTRACTOR shall be responsible for locating all Underground Facilities whether or not shown or indicated in the Contract Documents, for coordination of the WORK with the owners of such Underground Facilities during construction, for the safety and protection thereof as provided in paragraph 6.10, and repairing any damage thereto resulting from the WORK, the cost of all of which shall be considered as having been included in the Contract Price.

4.3.1.5 All water pipes, sanitary sewers, storm drains, force mains, gas mains, or other pipe, telephone or power cables or conduits, pipe or conduit casings, curbs, sidewalks, service lines and all other obstructions, whether or not shown, shall be temporarily removed from or supported across utility line excavations. Where it is necessary to temporarily interrupt services, the CONTRACTOR shall notify the DISTRICT or occupant of such facilities both 48 hours before the interruption and again immediately before service is resumed. Before disconnecting any pipes or cables, the CONTRACTOR shall obtain permission from the DISTRICT or occupant, or shall make suitable arrangements for their disconnection by the DISTRICT or occupant. The CONTRACTOR shall be responsible for any damage to any such pipes, conduits or cables, and shall restore them to service promptly, as part of the work, as soon as the WORK has progressed past the point involved. Approximate locations of known water, sanitary, drainage, natural gas, power, telephone and cable TV installations along the route of new pipelines or in the vicinity of new WORK are shown, but are to be verified in the field by the Contractor prior to performing the WORK. The CONTRACTOR shall uncover these pipes, ducts, cables, etc., carefully, by hand prior to installing his WORK. Any discrepancies or differences found shall be immediately brought to the attention of the EOR in order that necessary changes may be made to permit installation of the WORK.

4.3.2 Not Indicated: If an Underground Facility is uncovered or revealed at or contiguous to the site which was not shown, nor located by the facilities DISTRICT and which CONTRACTOR could not reasonably have been expected to be aware of, CONTRACTOR shall, promptly after becoming aware thereof and before performing any WORK affected thereby (except in an emergency as permitted by paragraph 6.10), identify to the DISTRICT of such Underground Facility and give written notice thereof to that owner and to the DISTRICT and the CONSULTANT. The CONSULTANT shall promptly review the Underground Facility to determine the extent to which the

Contract Documents should be modified to reflect and document the consequences of the existence of the Underground Facility, and the Contract Documents shall be amended or supplemented to the extent necessary. During such time, CONTRACTOR shall be responsible for the safety and protection of such Underground Facility as provided in paragraph 6.13.

4.4 DIFFERING SITE CONDITIONS

4.4.1 The CONTRACTOR shall notify the EOR in writing, of the following unforeseen conditions, hereinafter called differing Site conditions, promptly upon their discovery (but in no event later than 14 days after their discovery) and before they are disturbed:

4.4.1.1 Subsurface or latent physical conditions at the Site of the WORK differing materially from those indicated, described, or delineated in the Contract Documents, including those reports discussed in Paragraph 4.2 and 4.3; (Physical Conditions, Underground facilities) and

4.4.3.2 Any unknown physical conditions and the Site of the WORK of an unusual nature differing materially from those ordinarily encountered and generally recognized as inherent in work of the character provided for in the Contract Documents, including those reports and documents discussed in Paragraph 4.2 and 4.3.

4.4.2 EOR shall promptly review the pertinent conditions, determine the necessity of obtaining additional explorations or tests with respect thereto and advise the DISTRICT in writing (with a copy to the CONTRACTOR) of EOR'S findings and conclusions.

4.4.3 If EOR concludes that because of newly discovered conditions a change in the Contract Documents is required, a Change Order shall be issued as provided in Article 10 (Changes in the Work) to reflect and document the consequences of the difference.

4.4.4 In each such case, an increase or decrease in the Contract Price or an extension or shortening of the Contract Time, or any combination thereof, shall be allowable to the extent that they are attributable to any such inaccuracy or difference. If the DISTRICT and CONTRACTOR are unable to agree as to the amount or length thereof, a claim may be made therefor as provided in Article 11, Change of Contract Price, and Article 12, Change of Contract Time.

4.4.5 The CONTRACTOR'S failure to give notice of differing Site conditions within seven (7) days of their discovery and before they are disturbed shall constitute a waiver of all claims in connection therewith, whether direct or consequential in nature.

4.5 REFERENCE POINTS:

4.5.1 The DISTRICT shall provide, if available, engineering surveys to establish reference points for construction, which in EOR'S judgment are necessary to enable CONTRACTOR to proceed with the WORK.

4.5.2 CONTRACTOR shall be responsible for laying out the WORK (unless otherwise specified in the General Requirements), shall protect and preserve the established reference points and shall make no changes or relocations without the prior written approval of the DISTRICT. The CONTRACTOR shall report to the EOR whenever any reference point is lost or destroyed or requires relocation because of necessary changes in grades or locations, and shall be responsible for the accurate replacement or relocation of such reference points by professionally qualified personnel.



Contract Amount	Best Key Rating
Under \$500,000	Class IX A or better
\$500,000 to \$2,499,999.99	Class XI A or better
Over \$2,500,000	Class XIV A or better

ARTICLE 5 – BONDS AND INSURANCE

5.1 BONDS:

5.1.1 CONTRACTOR shall upon receipt of the notice of award furnish Performance and Payment Bonds, each in an amount at least ONE HUNDRED PERCENT (100%) of the Contract Price as security for the faithful performance and payment of all CONTRACTOR'S obligations under the Contract Documents. Said bonds must be provided to the DISTRICT within ten (10) business days of the Notice of Award or delivery of a Purchase Order. These Bonds shall remain in effect at least until one year after the date when final payment becomes due, except as otherwise provided by Law or Regulation or by the Contract Documents. CONTRACTOR shall also furnish such other Bonds as are required by the Supplementary Conditions. Each Bond shall be furnished in an amount equal to ONE HUNDRED PERCENT 100% of the amount of the Contract award and recorded in the public records of the county where the improvement is located. The form and conditions of the Bonds and the Surety shall be as specified in the solicitation.

5.1.2 If requested by the District, the CONTRACTOR shall provide a Maintenance and Guaranty Bond in the amount of 50% of the Performance and Payment Bonds to provide a guarantee against defects in the WORK occurring during the year following the one-year correction period. The Bond shall be payable to the DISTRICT, and be at the sole cost of the CONTRACTOR. The form and conditions of the Bonds and the Surety shall be as specified and supplied by the DISTRICT in the Bid Documents.

5.1.3 The Surety shall be a nationally recognized Surety Company acceptable to the DISTRICT, listed on the current list of "Companies Holding Certificates of Authority as Acceptable Sureties on Federal Bonds and Acceptable Reinsuring Companies" as published in Circular 570 (amended) by the Audit Staff, Bureau of Government Financial Operations, U.S. Treasury Department, and meet the other requirements of Florida Statutes Section 287.0935 (1989).

For projects exceeding five hundred thousand dollars, all bonds shall be placed with sureties with Best Ratings as stated below. The name, address and telephone number of the surety and its agent must be listed on the bond.

5.1.4 For contracts up to \$499,999.99 the surety shall have twice the minimum surplus and capital required by the Florida Insurance Code at the time the bid is issued for the Work, otherwise the surety shall have the following minimum ratings:

5.1.5 The Bond shall specifically incorporate and acknowledge the Surety's responsibility for liquidated damages.

5.1.6 Bonds shall be executed and issued by a resident agent, licensed and having an office in Palm Beach, Dade, Broward, St. Lucie, Indian River and Martin Counties, Florida, representing such corporate sureties.

5.1.7 If the CONTRACTOR is a partnership, the Bond shall be signed by each of the individuals who are partners; if a corporation, the Bond shall be signed in the correct corporate name by duly authorized officer, agent or attorney-in-fact. There shall be executed an appropriate number of counterparts of the

bond corresponding to the number of counterparts in the Contract. Each executed bond shall be accompanied by (a) appropriate acknowledgment of the respective parties; (b) appropriate duly certified copy of Power-of-Attorney or other certification of authority where bond is executed by agent, officer or other representative of Contractor or Surety; (c) duly certified extract from by-laws or resolutions of Surety under which Power-of-Attorney, or other certificate of Authority of its agent, officer or representative was issued.

5.1.8 If the surety on any Bond furnished by CONTRACTOR is declared bankrupt or becomes insolvent or its right to do business is terminated in the state of Florida or it ceases to meet the requirements of paragraph 5.1.3 and 5.1.4, CONTRACTOR shall within five days thereafter substitute another Bond and Surety, both of which must be in conformance with paragraph 5.1.3 and 5.1.4. **Under no circumstances shall the successful CONTRACTOR begin WORK until he/she has supplied to the DISTRICT Performance and Payment Bonds and Affidavit for Bond using the DISTRICT form, and the DISTRICT has approved the bond. Contractor shall execute and record all bonds in the public records of the county where the improvement is located prior to delivering the bonds to the owner. Non-registered bonds shall be rejected.**

5.2 INSURANCE:

5.2.1 The CONTRACTOR agrees to, in the performance of work and services under this Agreement, comply with all Federal, state, and local laws and regulations now in effect, or hereinafter enacted during the term of this agreement that are applicable to the CONTRACTOR, its employees, agents, or subcontractors, if any, with respect to the work and services described herein. The CONTRACTOR shall obtain at CONTRACTOR's expense all necessary insurance in such form and amount as required by the District's Risk & Safety Officer before beginning work under this Agreement. The CONTRACTOR shall maintain such insurance in full force and effect during the life of this Agreement. The CONTRACTOR shall provide to the District's Risk & Safety Officer certificates of all insurance required under this section prior to beginning any work under this Agreement. The CONTRACTOR shall indemnify and save the District harmless from any damage resulting to it for failure of either CONTRACTOR or any subcontractor to obtain or maintain such insurance. The following are required types and minimum limits of insurance coverage, which the CONTRACTOR agrees to maintain during the term of this contract:

Professional Liability	\$1,000,000	\$2,000,000
Line of Business/ Coverage	Occurrence	Aggregate
Commercial General Liability	\$1,000,000	\$2,000,000
Including:		
Premises/		
Operations		
Contractual Liability		
Personal Injury		
Explosion, Collapse, Underground Hazard		
Products/Completed Operations		
Broad Form Property Damage		
Cross Liability and Severability of Interest Clause		
Automobile Liability (including owned, non-owned and hired)	\$1,000,000	\$2,000,000



Workers' Compensation & Statutory limits Employer's Liability

\$500,000 per each disease;
\$500,000 per each accident;
and \$500,000 each employee.

5.2.2 The District reserves the right to require higher limits depending upon the scope of work under this Agreement.

5.2.3 Neither the CONTRACTOR nor any subcontractor shall commence work under this contract until they have obtained all insurance required under this section and have supplied the District with evidence of such coverage in the form of an insurance certificate and endorsement. The CONTRACTOR shall ensure that all subcontractors shall comply with the above guidelines and shall maintain the necessary coverage throughout the term of this Agreement.

5.2.4 All insurance carriers shall be rated at least A-VII per A.M. Best's Key Rating Guide and be licensed to do business in Florida. Policies shall be "Occurrence" form. Each carrier shall give the District sixty (60) days notice prior to cancellation.

5.2.5 The CONTRACTOR's general and automobile liability insurance policies shall be endorsed to add the Martin County School District, its board, employees, officers and agents as an "additional insured". The CONTRACTOR's Worker's Compensation carrier shall provide a Waiver of Subrogation to the District. The CONTRACTOR shall be responsible for the payment of all deductibles and self-insured retentions.

5.2.6 The District may require that the CONTRACTOR purchase a contract or performance bond equal to the cost of the project. If the CONTRACTOR is to provide professional services under this Agreement, the CONTRACTOR must provide the District with evidence of Professional Liability insurance with, at a minimum, a limit of \$1,000,000 per occurrence and \$2,000,000 in the aggregate. "Claims-Made" forms are acceptable for Professional Liability insurance.

5.2.7 The District may require higher limits for Professional Liability depending on the size of the project. In any event, the Bidder shall maintain such Professional Liability insurance in effect three (3) years after the completion of the project.

5.2.8 Should the District require the Bidder to carry Builders Risk insurance for the project, it must be in the amount equal to the full replacement cost of the project.

5.2.9 Fulfillment by the Bidder of the insurance provisions does **not** limit the Bidder's liability to the amount of the policy limits.

ARTICLE 6 – CONTRACTOR'S RESPONSIBILITIES

6.1 CONTRACTOR STATUS:

6.1.1 The Contractor is an independent contractor and is not an employee or agent of the DISTRICT. Nothing in this Contract shall be interpreted to establish any relationship other than that of an independent contractor, between the DISTRICT and the Contractor, its employees, agents, subcontractors, or assigns, during or after the performance of this Contract. The Contractor shall take the whole responsibility for the means, methods, techniques, sequences, and production of the Work.

6.2 CONTRACTOR RISK:

6.2.1 The Contractor shall bear all losses resulting to him, or its, on account of the amount or character of the Work, or because of the nature of the ground beneath, in or on which the Work is done is different from what was assumed or expected, or because of bad weather, or because of errors or omissions in his or its bid on the Contract price, or except as otherwise provided in

the Contract Documents because of any other causes whatsoever. Execution of this Contract by the Contractor is a representation that the Contractor has visited the site, has conducted a sufficient investigation of the surface and sub-surface conditions in order to submit its bid, has become familiar with the local conditions under which the Work is to be performed, and correlated personal observations with the requirements of the Contract Documents.

6.2.2 The Contractor shall protect the entire Work, all materials under the Contract and the DISTRICT's property (including machinery and equipment) in, or on, or adjacent to the site of the Work until final completion and Work, from the action of the elements, acts of other contractors, or except as otherwise provided in the Contract Documents, and from any other causes whatsoever; should any damage occur by reason of any of the foregoing, the Contractor shall repair at his, or its, own expenses to the satisfaction of the DISTRICT or its Project Manager. Neither the DISTRICT nor its officers, employees or agents assume any responsibility for collection of indemnities or damages from any person or persons causing injury to the Work of the Contractor.

6.2.3 At his, or its expense, the Contractor shall take all necessary precautions (including without limitation) the furnishing of guards, fences, warnings signs, walks, flags, cables and lights for the safety of and the prevention of injury, loss and damage to persons and property (including without limitation) in the term persons, members of the public, the DISTRICT and its employees and agents, the Project Manager and his employees, Contractor's employees, his or its subcontractors and their respective employees, other contractors, their subcontractors and respective employees, on, about or adjacent to the premises where said Work is being performed, and shall comply with all applicable provisions of safety laws, rules, ordinances, regulations and orders of duly constituted public authorities and building codes.

6.2.4 The Contractor assumes all risk of loss, damage and destruction to all of his or its materials, tools appliances and property of every description and that of his or its subcontractors and of their respective employees or agents, and injury to or death of the Contractor, his or its employees, subcontractors or their respective employees or agents, including legal fees, court costs or other legal expenses, arising out of or in connection with the performance of this Contract.

6.3 SUPERVISION AND SUPERINTENDENCE:

6.3.1 The CONTRACTOR shall supervise and direct the Work. He shall be solely responsible for the means, methods, techniques, sequences and procedures of construction. The CONTRACTOR shall employ and maintain on the Work a qualified supervisor or superintendent who shall have been designated in writing by the CONTRACTOR as the CONTRACTOR'S representative at the site. The supervisor shall have full authority to act on behalf of the CONTRACTOR and all communications given to the supervisor shall be as binding as if given to the CONTRACTOR. The supervisor shall be present on the site at all times as required to perform adequate supervision and coordination of the Work. (Copies of written communications given to the Superintendent shall be mailed to the Contractor's home office.)

6.4 LABOR, MATERIALS AND EQUIPMENT: CONDITIONS, SUBSTITUTIONS

Related Article: 6.40; Product Substitution Requirements and Procedures

6.4.1 The CONTRACTOR shall provide competent, suitably qualified personnel to survey and lay out the Work and perform construction as required by the Contract Documents. He shall at all times maintain good discipline and order at the site. Except in connection with the safety or protection of persons or the Work or property at the site or adjacent thereto, and except as otherwise



indicated in the Contract Documents, all Work at the site shall be performed during regular working hours, and CONTRACTOR shall not permit overtime work or the performance of Work on Saturday, Sunday or any legal holiday, observed by the DISTRICT, without the DISTRICT'S PROJECT MANAGER'S written consent.

6.4.2 Materials and Equipment: The CONTRACTOR shall furnish all materials, equipment, labor, transportation, construction equipment and machinery, tools, appliances, fuel, power, light, heat, telephone, water and sanitary facilities and all other facilities and incidentals necessary for the execution, testing, initial operation and completion of the Work. All material stored on the job site shall remain the responsibility of the CONTRACTOR until incorporated into the work. The DISTRICT shall not reimburse the CONTRACTOR for materials lost, stolen, or damaged while stored on the job site.

6.4.3 Condition of Materials: All materials and products supplied by the Bidder in conjunction with this bid shall be new, warranted for their merchantability, fit for a particular purpose, free from defects and consistent with industry standards. The products shall be delivered to the District in excellent condition. When special makes or grades of material which are normally packaged by the supplier or manufacturer are specified or approved, such materials shall be delivered to the site in their original packages or container with seals unbroken and labels intact. In the event that any of the products supplied to the District are found to be defective or do not conform to the specifications, the District reserves the right to return the product to the Bidder at no cost to the District.

6.4.4 Installation / Assembly: All materials and equipment shall be applied, installed, connected, erected, used, cleaned and conditioned in accordance with the instructions of the applicable manufacturer, fabricator or processors, except as otherwise provided in the Contract Documents.

6.4.5 Materials, Equipment, Products, and Substitutions: Materials, equipment and products incorporated in the Work must be approved for use before being purchased by the CONTRACTOR. The CONTRACTOR shall submit to the EOR and the DISTRICT'S PROJECT MANAGER a list of proposed materials, equipment or products, together with such samples as may be necessary for him to determine their acceptability and obtain his approval, per Section III General Terms and Conditions if prior to award, or after award, within ten (10) calendar days after the CONTRACTOR should have been aware of then need for substitution, unless otherwise stipulated in the Special Conditions. No request for payment for "or equal" equipment shall be approved until this list has been received and approved by the EOR. The District may require the CONTRACTOR to furnish at CONTRACTOR'S expense a special performance guarantee or other surety with respect to any substitute.

6.4.6 Should any work or materials, equipment or products not conform with requirements of the Drawings and Specifications or become damaged during the progress of the Work, such Work or materials shall be removed and replaced, together with any work disarranged by such alterations, at any time before completion and acceptance of the Project. All such work shall be done at the expense of the CONTRACTOR.

6.4.7 No materials or supplies for the Work shall be purchased by the CONTRACTOR or by any Subcontractor subject to any chattel mortgage or under a conditional sale or

other agreement by which an interest is retained by the Seller. The CONTRACTOR warrants that he has good title to all materials and supplies used by him in the Work.

6.4.8 If a specific means, method, technique, sequence or procedure of construction is indicated in or required by the Contract Documents, CONTRACTOR may furnish or utilize a

substitute means, method, sequence, technique or procedure of construction if acceptable to the DISTRICT and EOR, if CONTRACTOR submits sufficient information to allow DISTRICT and EOR to determine that the substitute proposed is equivalent to that indicated or required by the Contract Documents. The procedure for review by DISTRICT and EOR shall be similar to that provided in paragraph 6.4.5 (Materials, Equipment, Products and Substitutions) as applied by EOR and as may be supplemented in the Technical Specifications.

6.4.9 Any two (2) or more pieces of material or equipment of the same kind, type or classification, and being used for identical types of service, shall be made by the same manufacturer.

6.4.10 The successful CONTRACTOR shall furnish all guarantees and warranties to the Purchasing Department prior to final acceptance and payment. The warranty period shall commence upon final acceptance of the product.

6.5 CONCERNING SUBCONTRACTORS:

6.5.1 The CONTRACTOR shall not employ any Subcontractor, other person or organization (whether initially or as a substitute) against whom the DISTRICT or the EOR may have reasonable objection, nor shall the CONTRACTOR be required to employ any Subcontractor against whom he has reasonable objection. The CONTRACTOR shall not make any substitution for any Subcontractor who has been accepted by the DISTRICT'S PROJECT MANAGER and the EOR, unless the EOR determines that there is good cause for doing so. If after bid opening and prior to the award of the contract, the DISTRICT objects to certain suppliers or subcontractors, the DISTRICT may permit CONTRACTOR to submit an acceptable substitute so long as there is no change in the contract price or contract time. If the contract price or contract time is increased, the DISTRICT may return the bid bond and award the contract to the next qualified, competent BIDDER. If after the award of the contract, the DISTRICT objects to certain suppliers or subcontractors, the DISTRICT shall permit CONTRACTOR to make an appropriate and acceptable substitution which is also acceptable to the DISTRICT. No acceptance by the DISTRICT or the EOR of any such Subcontractor, supplier or other person or organization shall constitute a waiver of any right of the DISTRICT or EOR to reject defective WORK.

6.5.2 Responsibility: The CONTRACTOR shall be fully responsible for all acts and omissions of his Subcontractors and of persons and organizations directly or indirectly employed by them and of persons and organizations for whose acts any of them may be liable to the same extent that he is responsible for the acts and omissions of persons directly employed by him. Nothing in the Contract Documents shall create any contractual relationship between DISTRICT or EOR and any Subcontractor or other person or organization having a direct contract with CONTRACTOR, nor shall it create any obligation on the part of DISTRICT or EOR to pay or to see to the payment of any moneys due any Subcontractor or other person or organization, except as may otherwise be required by law. DISTRICT or EOR may furnish to any Subcontractor or other person or organization, to the extent practicable, evidence of amounts paid to CONTRACTOR on account of specific Work done in accordance with the schedule of values.

6.5.3 Division of Work: The divisions and sections of the Specifications and the identifications of any Drawings shall not control the CONTRACTOR in dividing the Work among Subcontractors or delineating the Work to be performed by any specific trade.

6.5.4 Terms and Conditions: The CONTRACTOR agrees to bind specifically every Subcontractor to the applicable terms and conditions of the Contract Documents for the benefit of the DISTRICT.



6.5.5 Agreement: All Work performed for the CONTRACTOR by a Subcontractor shall be pursuant to any appropriate agreement between the CONTRACTOR and the Subcontractor.

6.5.6 Responsibility: The CONTRACTOR shall be responsible for the coordination of the trades, Subcontractors and material men engaged upon His Work.

6.5.7 The CONTRACTOR shall cause appropriate provisions to be inserted in all subcontracts relative to the Work to bind Subcontractors to the CONTRACTOR by the terms of these General Conditions and other Contract Documents insofar as applicable to the Work of Subcontractors, and to give the CONTRACTOR the same power as regards terminating any subcontract that the DISTRICT may exercise over the CONTRACTOR under any provisions of the Contract Documents.

6.5.8 The DISTRICT or EOR shall not undertake to settle any differences between the CONTRACTOR and his Subcontractors or between Subcontractors.

6.5.9 If in the opinion of the DISTRICT'S PROJECT MANAGER or EOR, any Subcontractor on the Project proves to be incompetent or otherwise unsatisfactory, he shall be replaced if and when directed in writing.

6.5.10 CONTRACTOR shall also:

6.5.10.1 Observe work of each subcontractor to monitor compliance with schedule.

6.5.10.2 Verify that labor and equipment are adequate for the work and the schedule.

6.5.10.3 Verify that product procurement schedules are adequate.

6.5.10.4 Verify that product deliveries are adequate to maintain schedule.

6.5.10.5 Report noncompliance to EOR, with recommendation for changes

6.6 PATENT, FEES AND ROYALTIES:

6.6.1 The CONTRACTOR shall pay all license fees and royalties and assume all costs incident to the use of any invention, design, process or device which is the subject of patent rights or copyrights held by others. He shall indemnify and hold harmless the DISTRICT and EOR and anyone directly or indirectly employed by either of them from and against all claims, damages, losses and expenses (including attorney's fees) arising out of any infringement of such rights during or after completion of the Work, and shall defend all such claims in connection with any alleged infringement of such rights.

6.6.2 Patent Rights: The CONTRACTOR shall be responsible for determining the application of patent rights and royalties on materials, appliances, articles or systems prior to bidding. However, he shall not be responsible for such determination on systems which do not involve purchase by him of materials, appliances and articles.

6.7 PERMITS, LAWS AND REGULATIONS:

6.7.1 Permits: The CONTRACTOR shall secure and pay for all construction permits and licenses and shall pay all governmental charges and inspection fees necessary for the prosecution of the Work, which are applicable at the time of his Bid. The DISTRICT shall assist the CONTRACTOR, when necessary, in obtaining such permits and licenses. The DISTRICT shall be invoiced at actual cost without markup.

6.7.2 The CONTRACTOR shall also pay all public utility charges. The Contractor shall be responsible for obtaining dewatering permits as required. CONTRACTOR shall be responsible for complying with the South Florida Water Management District, Florida Department of Environmental Section IV

Regulation, United States Environmental Protection Agency and any other regulatory agency requirements including financial responsibility (fines, etc.).

6.7.2 Laws and Regulations: The CONTRACTOR shall give all notices and comply with all laws, ordinances, rules and regulations applicable to the Work. If the CONTRACTOR observes that the Specifications or Drawings are at variance therewith, he shall give the EOR prompt written notice thereof, and any necessary changes shall be adjusted by an appropriate Modification. If the CONTRACTOR performs any Work knowing it to be contrary to such laws, ordinances, rules and regulations, and without such notice to the EOR, he shall bear all costs arising therefrom; however, it shall not be his primary responsibility to make certain that the Drawings and Specifications are in accordance with such laws, ordinances, rules and regulations.

6.8 TAXES:

6.8.1 Cost of all sales and other taxes for which the CONTRACTOR is liable under the Contract shall be included in the Contract Price stated by the CONTRACTOR.

6.9 RECORD DOCUMENTS/RIGHT TO AUDIT:

6.9.1 The CONTRACTOR shall keep in a safe place one record copy of all Specifications, Drawings, Addenda, Modifications, and Shop Drawings at the site in good order and annotated to show all changes made during the construction process. These shall be available to the EOR and shall be delivered to him for the DISTRICT upon completion of the project. It shall be used for this purpose only. Final acceptance of the project shall be withheld until approval of the documents is made by the DISTRICT'S PROJECT MANAGER.

6.9.2 The awarded CONTRACTOR shall maintain during the term of the contract all books, reports and records in accordance with generally accepted accounting practices and standards for records directly related to this contract. The form of all records and reports shall be subject to the approval of the District's Auditor. The awarded CONTRACTOR agrees to make available to the District's Auditor, during normal business hours all books of account, reports and records relating to this contract for the duration of the contract and retain them for a minimum period of three (3) years beyond the last day of the contract term.

6.9.3 If the CONTRACTOR submits a claim to the DISTRICT for additional compensation, the DISTRICT shall have the right, as a condition to considering the claim, and as a basis for evaluation of the claim, and until the claim has been settled, to audit the CONTRACTOR'S books to the extent they are relevant. This right shall include the right to examine books, records, documents, and other evidence and accounting procedures and practices, sufficient to discover and verify all direct and indirect costs of whatever nature claimed to have been incurred or anticipated to be incurred and for which claim has been submitted. The right to audit shall include the right to inspect the CONTRACTOR'S plants, or such parts thereof, as may be or have been engaged in the performance of the WORK. The CONTRACTOR further agrees that the right to audit encompasses all subcontracts and is binding upon all subcontractors. The rights to examine and inspect herein provided for shall be exercisable through such representatives as the DISTRICT deems desirable during the CONTRACTOR'S normal business hours at the office of the CONTRACTOR. The accounting records and documents, and other financial data, and upon request, shall submit true copies of requested records to the DISTRICT.

6.10 SAFETY, PROTECTION, STORAGE AND EMERGENCIES:

Related Articles:

6.2-Contractor Risk and Work Protection



6.21-Protection of Existing Property Improvements

6.38-Temporary barriers and Enclosures

6.39-Security

6.10.1 CONTRACTOR shall be responsible for initiating, maintaining and supervising all safety precautions and programs in connection with the WORK. CONTRACTOR shall take all necessary precautions for the safety of, and shall provide the necessary protection to prevent damage, injury or loss to:

6.10.1.1 All employees on the Work and other persons who may be affected thereby,

6.10.1.2 All the Work and all materials or equipment to be incorporated therein, whether in storage on or off the site, and

6.10.1.3 Store and protect Products in accordance with manufacturers' instructions, with seals and labels intact and legible.

6.10.1.4 Store sensitive Products in weather tight, climate controlled enclosures.

6.10.1.5 For exterior storage of fabricated Products, place on sloped supports, above ground.

6.10.1.6 Cover Products subject to deterioration with impervious sheet covering. Provide ventilation to avoid condensation or potential degradation of Product.

6.10.1.7 Store loose granular materials on solid flat surfaces in a well drained area. Prevent mixing with foreign matter.

6.10.1.8 Other property at the site or adjacent thereto, including trees, shrubs, lawns, walks, pavements, roadways, structures and utilities not designated for removal, relocation or replacement in the course of construction.

6.10.2. CONTRACTOR shall comply with all applicable laws, ordinances, rules and regulations of any public body having jurisdiction for the safety of persons or property or to protect them from damage, injury or loss on or off the WORK and shall erect and maintain all necessary safeguards for such safety and protection.

6.10.3 CONTRACTOR shall notify owners of adjacent property and of Underground Facilities and utility owners when prosecution of the WORK may affect them, and shall cooperate with them in the protection, removal, relocation and replacement of their property.

6.10.4 All damage, injury or loss to any property referred to in paragraph 6.10.1.2. or 6.10.1.3 caused, directly or indirectly, in whole or in part, by CONTRACTOR, any Subcontractor, Supplier or any other person or organization directly or indirectly employed by any of them to perform or furnish any of the WORK for anyone for whose acts any of them may be liable, shall be remedied by CONTRACTOR (except damage or loss attributable to the fault of Drawings or Specifications or to the acts or omissions of the DISTRICT or the EOR or anyone employed by either of them or anyone for whose acts either of them may be liable, and not attributable, directly or indirectly, in whole or in part, to the fault or negligence of CONTRACTOR).

6.10.5 CONTRACTOR'S duties and responsibilities for the safety and protection of the WORK shall continue until such time as all the WORK is completed and EOR has issued a notice to the DISTRICT and CONTRACTOR in accordance with paragraph 14.6.(Substantial Completion) that the WORK is acceptable (except as otherwise expressly provided in connection with Substantial Completion).

6.10.6 The safety provisions of applicable laws and building and construction codes shall be observed and the Contractor shall take or cause to be taken such additional safety and health

measures as the Local Public Agency involved may determine to be reasonably necessary. Machinery, equipment and all hazards shall be guarded in accordance with the safety provisions of the "Manual of Accident Prevention in Construction" as published by the Associated General Contractors of America, Inc., to the extent that such provisions are not in conflict with applicable laws.

6.10.7 The Contractor shall maintain an accurate record of all cases of death, occupational disease, or injury requiring medical attention or causing loss of time from WORK, arising out of an and in the course of employment on WORK under the Contract. The Contractor shall promptly furnish the Local Public Agency with reports concerning these matters.

6.10.8 SAFETY REPRESENTATIVE: CONTRACTOR shall designate a responsible representative at the site whose duty shall be the prevention of accidents. This person shall be CONTRACTOR'S superintendent unless otherwise designated in writing by CONTRACTOR to the DISTRICT.

6.10.9 HAZARD COMMUNICATION PROGRAMS: CONTRACTOR shall be responsible for coordinating any exchange of material safety data sheets or other hazard communication information required to be made available to or exchanged between and among employees at the Site in accordance with Laws and Regulations.

6.10.10 SUPERINTENDENT: The CONTRACTOR shall designate a responsible member of his organization at the site whose duty shall be the prevention of accidents. This person shall be the CONTRACTOR'S superintendent unless otherwise designated in writing by the CONTRACTOR to the DISTRICT'S PROJECT MANAGER.

6.10.11 EMERGENCIES: In emergencies affecting the safety of persons or the Work or property at the site or adjacent thereto, the CONTRACTOR, without special instruction or authorization from the EOR or the DISTRICT'S PROJECT MANAGER, is obligated to act, at his discretion, to prevent threatened damage, injury or loss.

6.10.11.1 CONTRACTOR shall give DISTRICT PROJECT Representative and EOR prompt written notice if CONTRACTOR believes that any significant changes in the WORK or variations from the Contract Documents have been caused thereby. If EOR determines that a change in the Contract Documents is required because of the action taken in response to an emergency, or Change Order shall be issued to document the consequences of the changes or variations.

6.10.11.2 During adverse weather, and against the possibility thereof, the CONTRACTOR shall take all necessary precautions to ensure that the WORK shall be done in a good and workmanlike condition and is satisfactory in all respects. When required, protection shall be provided by the use of tarpaulins, wood and building paper shelters, or other acceptable means. The CONTRACTOR shall be responsible for all changes caused by adverse weather, including unusually high winds and water levels and he shall take such precautions and procure such additional insurance as he deems prudent. The EOR may suspend construction operations at any time when, in his judgment, the conditions are unsuitable or the proper precautions are not being taken, whatever the weather or water level conditions may be, in any season.

6.10.11.3 If the CONTRACTOR believes that additional work done by him in an emergency which arose from causes beyond his control entitles him to an increase in the Contract Price or an extension of the Contract Time, he may make a claim therefore as provided in Articles 11 (Change in Contract Price) and 12, (Change in Contract Time).

6.10.12. NATIONAL EMERGENCY: In the event the DISTRICT is prevented from proceeding with any or all of this WORK as stated in this Contract, due to a declaration of war, or



national emergency by the United States government, whereas the construction of the type contracted for herein is specifically prohibited by statute or governmental edict, or due to the stoppage of construction caused by any governmental agency, State, DISTRICT, Town, or County regulations, orders, restrictions, or due to circumstances beyond the DISTRICT'S control, then the DISTRICT herein reserves the right to either suspend the WORK to be done for an indefinite period of time or to cancel this Contract outright by giving notice by registered mail of such intention to the CONTRACTOR herein. In the event of any conditions above mentioned occurring after the WORK herein has already been commenced, then the DISTRICT herein shall be liable for only the cancellation or suspension without the addition of prospective profits or other changes whatsoever.

6.11 SHOP DRAWINGS AND SAMPLES:

Related Article 6.41: Field Samples and Mockups

6.11.1 SHOP DRAWINGS: After checking and verifying all field measurements, the CONTRACTOR shall submit to the CONSULTANT and the DISTRICT'S PROJECT MANAGER for review, in accordance with the accepted schedule of Shop Drawing submissions (see paragraph 2.9) copies (or at the CONSULTANT'S option, one reproducible copy) of all Shop Drawings, which shall have been checked by and stamped with the approval of the CONTRACTOR. The data shown on the Shop Drawings shall be complete with respect to dimensions, design criteria, materials of construction and the like to enable the EOR to review the information as required.

Shop drawings shall include, but not be limited to the following information:

- 6.11.1.2 Fabrication and installation Drawings and details.
- 6.11.1.3 Template placement diagrams.
- 6.11.1.4 Manufacturer's installation instructions.
- 6.11.1.5 Product patterns and colors.
- 6.11.1.6 Coordination Drawings.
- 6.11.1.7 Schedules.
- 6.11.1.8 Product mix formulae.
- 6.11.1.9 Product design or engineering calculations.
- 6.11.1.10 Other information as required by project.

After review, produce copies and distribute per Submittal Procedures article above and for record documents purposes described in Section 6.37 Closeout Submittals.

Submit to EOR for purpose of checking conformance with information given and design concept and District's Project Manager.

6.11.2 SAMPLES: The CONTRACTOR shall also submit to the EOR for review, with such promptness as to cause no delay in Work, all samples required by the Contract Documents. All samples shall have been checked by and stamped with the approval of the CONTRACTOR, identified clearly as to material, manufacturer, any pertinent catalog numbers and the use for which intended.

Contractor shall submit to Consultant for purpose of checking conformance with information given and design concept expressed in the documents.

After review, Consultant shall submit color board to District's Project Manager per Submittal Procedures. Samples shall also conform to the following:

6.11.2.1 Sample finishes and colors shall be from full range of manufacturers' standard colors, textures, and patterns for Consultant's selection and preparation of color board for District's approval.

6.11.2.2 After review and approval by District, provide duplicates and distribute per Submittal Procedures.

6.11.2.3 Submit samples to illustrate functional and aesthetic characteristics of the product, with integral parts and attachment devices. Coordinate sample submittals for interfacing work.

6.11.2.4 Include identification on each sample, with full project information.

6.11.2.5 Submit number of samples specified in specification, one of which Consultant shall retain.

Reviewed samples may be used in work, if indicated.

6.11.3 DEVIATIONS: At the time of each submission, the CONTRACTOR shall in writing call the EOR'S attention to any deviations that the Shop Drawings or sample may have from the requirements of the Contract Documents.

6.11.4 CONFORMANCE REVIEW: The EOR shall review within ten (10) days or as extended by District Shop Drawings and samples, but his review shall be only for conformance with the design concept of the Project and for compliance with the information given in the Contract Documents. The review of a separate item as such shall not indicate review of the assembly in which the item functions. The CONTRACTOR shall make any corrections required by the EOR at CONTRACTOR'S expense and shall return the required number of corrected copies of Shop Drawings and resubmit new samples until the review is satisfactory to the EOR. The CONTRACTOR shall direct specific attention in writing or on resubmitted Shop Drawings to revisions other than the corrections called for by the CONSULTANT on previous submissions. The CONTRACTOR'S stamp of approval on any Shop Drawings or sample shall constitute a representation to the DISTRICT and the EOR that the CONTRACTOR has either determined and verified all quantities, dimensions, field construction criteria, materials, catalogue numbers and similar data or he assumes full responsibility for doing so, and that he has reviewed or coordinated each Shop Drawing or sample with the requirements of the Work and the Contract Documents. Shop Drawings submitted without the CONTRACTOR'S stamp or specific written indication shall be returned without action. Shop Drawings and submittal data shall be reviewed two times, thereafter all further review time shall be charged to the CONTRACTOR.

6.11.5 APPROVAL: No work requiring a Shop Drawing or sample submission shall be commenced until the submission has been reviewed and approved by the EOR. A copy of each Shop Drawing and each approved sample shall be kept in good order by the CONTRACTOR at the site and shall be available to the EOR.

6.11.6 SPECIFIC DEVIATIONS: The EOR'S review of Shop Drawings or samples shall not relieve the CONTRACTOR from his responsibility for any deviations from the requirements of the Contract Documents unless the CONTRACTOR has in writing called the EOR'S attention to such deviation at the time of submission and the EOR has given written approval to the specific deviation, nor shall any review by the EOR relieve the CONTRACTOR from responsibility for errors or omissions in the Shop Drawings.

6.11.7 Where a Shop Drawing or sample is required by the Specifications, any related WORK performed prior to EOR'S review and acceptance of the pertinent submission shall be the sole expense and responsibility of CONTRACTOR.

6.12 SITE CLEAN UP:

6.12.1 SITE: The CONTRACTOR shall clean up behind the Work as much as is reasonably possible as the Work progresses. Upon completion of the Work, and before acceptance of and final payment for the Project by the DISTRICT, the CONTRACTOR



shall remove all his surplus and discarded materials, excavated material and rubbish from the roadways, sidewalks, parking areas, lawns and all adjacent property; shall clean his portion of Work involved in any building under this Contract, so that no further cleaning by the DISTRICT is necessary prior to his occupancy; shall restore all property, both public and private, which has been disturbed or damaged during the prosecution of the Work; and shall leave the whole in a neat and presentable condition.

6.12.2 BUILDING CLEAN-UP: Clean-up operations shall consistently be carried on by the CONTRACTOR at all times to keep the premises free from accumulation of waste materials and rubbish. Upon completion of the Work he shall remove all rubbish, tools, scaffolding, surplus materials, etc., from the building and shall leave his work "broom clean", or its equivalent, unless more exactly specified elsewhere in the Contract. The CONTRACTOR shall do the following special cleaning for all trades upon completion of the Work:

6.12.2.1 Remove putty stains and paint from and wash and polish all glass. Do not scratch or otherwise damage glass.

6.12.2.2 Remove all marks, stains, fingerprints and other soil and dirt from painted, stained and decorated work.

6.12.2.3 Remove all temporary protections and clean and polish floors.

6.12.2.4 Clean and polish all hardware for all trades; this shall include removal of all stains, dust, dirt, paint, etc.

6.12.2.5 General: In case of dispute, the DISTRICT may remove the rubbish and charge the cost to the CONTRACTOR.

6.13 PUBLIC CONVENIENCE AND SAFETY:

6.13.1 Convenience: The CONTRACTOR shall, at all times, conduct the Work in such a manner as to insure the least practicable obstruction to public travel. The convenience of the general public and of the residents along and adjacent to the area of the Work shall be provided for in a satisfactory manner, consistent with the operation and local conditions.

6.13.2 Safety: "Street Closed" signs shall be placed immediately adjacent to the Work, in a conspicuous position, at such locations as traffic demands. At any time that streets are required to be closed, Contractor shall obtain approval to close the street from the appropriate regulatory agencies having jurisdiction. The CONTRACTOR shall notify law enforcement agencies, fire departments, and parties operating emergency vehicles before the street is closed and again as soon as it is opened. Approval from the DISTRICT shall be coordinated through the office of the Director of Facilities including notification of the news media and affected property owners. Access to fire hydrants and other fire extinguishing equipment shall be provided and maintained at all times. Traffic paths shall be maintained for local traffic.

6.14 SANITARY PROVISIONS:

6.14.1 The CONTRACTOR shall furnish necessary toilet conveniences, secluded from public observation, for use of all personnel on the Work, whether or not in his employ. They shall be kept in a clean and sanitary condition and shall comply with the requirements and regulations of the Public Authorities having jurisdiction. He shall commit no public nuisance. Temporary sanitary facilities shall be removed upon completion of the Work and the premises shall be left clean.

6.15 INDEMNIFICATION:

6.15.1 CONTRACTOR agrees to protect, defend, indemnify, and hold harmless the District, its employees, representatives, and elected officials from any and all claims and liabilities including all attorney's fees and court costs, including appeals, for which the District, its employees, representatives, and elected officials can or may be held liable as a result of injury (including death) to persons or damage to property occurring by reason of any negligence, recklessness, or intentional wrongful misconduct of the CONTRACTOR, its employees, or agents, arising out of or connected with this Agreement. The CONTRACTOR shall not be required to indemnify the District or its agents, employees, representatives, or elected officials when an occurrence results solely from the wrongful acts or omissions of the District, or its agents, employees or representatives.

6.15.2 The CONTRACTOR, without exemption, shall indemnify and hold harmless, the District, its employees, representatives and elected officials from liability of any nature or kind, including cost and expenses for or on account of any copyrighted, service marked, trademarked patented or unpatented invention, process, or any other intellectual property right or item manufactured by the CONTRACTOR. Further, if such a claim is made, or is pending, the CONTRACTOR may, at its option and expense, procure for the District the right to use, replace, or modify the item to render it non-infringing. If none of the alternatives are reasonably available, the District agrees to return the article on request to the CONTRACTOR and receive reimbursement from the CONTRACTOR. If the CONTRACTOR used any design, device or materials covered by letters, patent or copyright, it is mutually agreed and understood, without exception, that the Bid prices shall include all royalties or cost arising from the use of such design, device or materials in any way involved in the work. This article shall survive the termination of any contract with the School District.

6.15.3 The parties agree that Ten Dollars (\$10.00) of the total compensation paid to the Bidder for performance of this Agreement shall represent the specific consideration for the Bidder's indemnification of the Owner.

6.15.4 The District reserves the right to select its own legal counsel to conduct any defense in any such proceeding and all costs and fees associated therewith shall be the responsibility of CONTRACTOR under the indemnification agreement.

6.15.5 It is the specific intent of the parties hereto that the foregoing indemnification complies with F.S. 725.06 (Chapter 725). It is further the specific intent and agreement of the parties that all of the Contract Documents on this Project are hereby amended to include the foregoing indemnification and the "Specific Consideration" therefore.

6.15.6 Nothing contained herein is intended nor shall be construed to waive District's rights and immunities under the common law or Florida Statutes 768.28, as amended from time to time.

6.16 CLAIMS:

6.16.1 In any and all claims against the DISTRICT or the EOR or any of their agents or employees, by any employee of the CONTRACTOR, any Subcontractor, anyone directly or indirectly employed by any of them or anyone for whose acts any of them may be liable, the indemnification obligation under paragraph 6.15 (Indemnification) shall not be limited in any way by any limitation on the amount or type of damages, compensation or benefits payable by or for the CONTRACTOR or any Subcontractor under worker's compensation acts, disability benefit acts or other employee benefit acts.

6.16.2 Obligation: The obligations of the CONTRACTOR under paragraph 6.13 shall not extend to the liability of the EOR'S negligent acts, errors or omissions or those of his employees or agents.

6.17 RESPONSIBILITY FOR CONNECTING TO EXISTING WORK:

6.17.1 It shall be the express responsibility of the CONTRACTOR to connect his Work to each part of the existing work or work previously installed as required by the Drawings and Specifications to provide a complete installation.



618 WORK IN STREET, HIGHWAY AND OTHER RIGHTS-OF-WAY: (move to 4.1 section)

6.18.1 Excavation, grading, fill, storm drainage, paving and any other construction or installations in rights-of-way of streets, highways, public carrier lines, utility lines (either aerial, surface or subsurface), etc., shall be done in accordance with requirements of these Specifications and authorities having jurisdiction. The CONTRACTOR shall be responsible for obtaining all permits necessary for the work. Upon completion of the Work, CONTRACTOR shall present to EOR certificates, in triplicate, from the proper authorities stating that the Work has been done in accordance with their requirements.

6.18.2 The DISTRICT shall cooperate with the CONTRACTOR in obtaining action from any utilities or public authorities involved in the above requirements.

6.19 COOPERATION WITH GOVERNMENTAL DEPARTMENTS, PUBLIC UTILITIES, ETC.:

6.19.1 The CONTRACTOR shall be responsible for making all necessary arrangements with governmental departments, public utilities, public carriers, service companies and corporations owning or controlling roadways, railways, water, sewer, gas, electrical, cable television, telephone, and telegraph facilities such as pavements, tracks, piping, wires, cables, conduits, poles, guys, etc., including incidental structures connected therewith, that are encountered in the Work in order that such items may be properly shored, supported and protected, or the CONTRACTOR may relocate them with Utility Owner's approval, if he so desires.

6.19.2 NOTICES: The CONTRACTOR shall give all proper notices, shall comply with requirements of such parties in the performance of his Work, shall permit entrance of such parties on the Project in order that they may perform their necessary work, and shall pay all charges and fees made by such parties for this work.

6.19.3 GOVERNMENT AGENCY CAUSED DELAYS: The CONTRACTOR'S attention is called to the fact that there may be delays on the Project due to work to be done by governmental departments, public utilities, and others in repairing or moving poles, conduits, etc. The CONTRACTOR shall cooperate with the above parties, in every way possible, so that the construction can be completed in the least possible time.

6.19.4 CODES, LAWS, ORDINANCES AND REGULATIONS: The CONTRACTOR shall have made himself familiar with all codes, laws, ordinances and regulations which in any manner affect those engaged in the Work, or materials and equipment used in or upon the Work, or in any way affect the

conduct of the Work, and no plea of misunderstanding shall be considered on account of his ignorance thereof.

6.20 USE OF PREMISES: (move to contractor responsibilities)

6.20.1 CONTRACTOR shall confine construction equipment, the storage of materials and equipment and the operations of workers to the project site and land and areas identified in and permitted by the Contract Documents and other land and areas permitted by laws, ordinances, and regulations, rights-of-way, permits, easements, and directions of the DISTRICT'S REPRESENTATIVE, and shall not reasonably encumber the premises with construction equipment or other materials or equipment.

6.20.2 CONTRACTOR shall assume full responsibility for any damage to any such land or area, or to the DISTRICT or occupant thereof or of any land or areas contiguous thereto, resulting from the performance of the WORK. Should any claim be made against the DISTRICT or EOR by any such owner or occupant because of the performance of the WORK,

CONTRACTOR shall promptly attempt to settle with such other party by Contract or otherwise resolve the claim. CONTRACTOR shall, to the fullest extent permitted by laws and regulations, indemnify and hold the DISTRICT and EOR harmless from and against all claims, damages, losses and expenses (including, but not limited to, fees of engineers, architects, attorneys and other professionals and court costs) arising directly, indirectly or consequentially out of any action, legal or equitable, brought by any such other party against the DISTRICT or EOR to the extent based on a claim arising out of CONTRACTOR'S performance of the WORK.

6.20.3. During the progress of the WORK, CONTRACTOR shall keep the premises free from accumulations of waste materials, rubbish and other and other debris resulting from the WORK. At the completion of the WORK CONTRACTOR shall remove all waste materials, rubbish and debris from and about the premises as well as all tools, appliances, construction equipment and machinery, and surplus materials, and shall leave the site clean and ready for occupancy by the DISTRICT. CONTRACTOR shall restore to original condition all property not designated for alteration by the Contract Documents.

6.20.4 CONTRACTOR shall not overload or permit any part of any structure to be loaded with such weight as shall endanger its safety, nor shall he subject any part of the Work to stresses or pressures that shall endanger it.

6.20.5 CONTRACTOR shall enforce the DISTRICT'S PROJECT MANAGER's instructions in connection with signs, advertisements, fires and smoking.

6.20.6 CONTRACTOR shall arrange and cooperate with DISTRICT in routing and parking of automobiles of his employees, Subcontractors and other personnel, and in routing material delivery trucks and other vehicles to the Project site.

6.21 PROTECTION OF EXISTING PROPERTY IMPROVEMENTS:

Related Articles:

- 6.2- Contractor Risk and Work Protection
- 6.10-Safety, Protection, Storage and emergencies
- 6.38-Temporary barriers and Enclosures
- 6.39-Security

6.21.2 Any existing surface or subsurface improvements, such as pavements, curbs, sidewalks, pipes or utilities, footings, or structures (including portions thereof), trees and shrubbery, not indicated on the Drawings or noted in the Specifications as being removed or altered shall be protected from damage during construction of the Project. Any such improvements damaged during construction of the Project, whether or not such improvements appear on the drawings, shall be restored to a condition equal, or better, to that existing at time of award of Contract. Such restoration or repair shall be at the sole expense of the Contractor, and no claim for an increase in the Contract Price under paragraph 6.21 or under Article 10 shall be allowed.

6.22 TEMPORARY HEAT:

6.22.1 The CONTRACTOR shall provide heat, fuel and services as necessary to protect all work and materials, within all habitable areas of permanent building construction, for all contracts against injury from dampness and cold until final acceptance of all work and materials for the Project, unless building is fully occupied by the DISTRICT prior to such acceptance, in which case the DISTRICT shall assume all expenses of heating from date of full occupancy. Unless otherwise specifically permitted by Special Conditions, the permanent heating system shall not be used to provide temporary heat. CONTRACTOR'S proposed methods of heating shall be submitted for approval.



6.23. SCHEDULE

6.23.1 CONTRACTOR shall submit to EOR for review and comment (to the extent indicated in paragraph 2.6.Finalizing Schedule) proposed adjustments in the progress schedule to reflect the impact thereon of new developments; these shall conform generally to the progress schedule then in effect and additionally shall comply with any provisions of the General Requirements applicable thereto. All approved changes shall be memorialized as change orders.

6.24 CONTINUING THE WORK:

6.24.1 CONTRACTOR shall carry on the WORK and adhere to the progress schedule during all disputes or disagreements with the DISTRICT. No WORK shall be delayed or postponed pending resolution of any disputes or disagreements, except as permitted by Article 15 (Suspension and termination of Work) or as CONTRACTOR and the DISTRICT may otherwise agree in writing.

6.25 CONTRACTOR'S GENERAL WARRANTY AND GUARANTEE:

Related Articles: Warranties Attachment 14.4, Contractor's Warranty of Title

6.25.1 CONTRACTOR warrants and guarantees to DISTRICT and EOR that all work shall be in accordance with the Contract Documents and shall not be *defective*. That Contractor guarantees to repair, replace or otherwise make good to the satisfaction of the DISTRICT any defect in workmanship or material appearing in the Work; and further guarantees the successful performance of the Work for the service intended.

Contractor's warranty and guarantee hereunder excludes defects or damage caused by:

6.25.1.1 Abuse, modification or improper maintenance or operation by persons other than CONTRACTOR, Subcontractors or Suppliers; or;

6.25.1.2 Normal wear and tear under normal usage.

6.25.2 Contractor's obligation to perform and complete the WORK in accordance with the Contract Documents shall be absolute. None of the following shall constitute an acceptance of WORK that is not in accordance with the Contract Documents or a release of CONTRACTOR's obligation to perform the WORK in accordance with the Contract Documents:

6.25.2.1 Observations by EOR;

6.25.2.2 Recommendation of any progress or final payment by EOR;

6.16.2.3 The issuance of a certificate of Substantial Completion or any payment by DISTRICT to CONTRACTOR under the Contract Documents;

6.25.2.4 Use or occupancy of the WORK or any part thereof by DISTRICT;

6.25.2.5 Any acceptance by DISTRICT or any failure to do so;

6.25.2.6 Any review and approval of a Shop Drawing or Sample submittal or the issuance of a notice of acceptability by EOR pursuant to paragraph 14.10;

6.26 DELETION/OVERSIGHT/MISSTATEMENT:

6.26.1 Any deletion, oversight or misstatement of the Specifications shall not release the Bidder from the responsibility of completing the project within the agreed upon time frame.

6.26.2 The cost of incidental work described in these Contract Requirements, for which there are no specific Contract Items, shall be considered as part of the general cost of doing the Section IV

work and shall be included in the prices for the various Contract Items. No additional payment will be made therefore.

6.27 EXCEPTIONS TO SPECIFICATIONS:

6.27.1 Any exceptions to the Specifications and/or drawings must be brought to the attention of the Purchasing Department in writing prior to the expiration of the Bid question period. Failure to list any exceptions with the Purchasing Department in writing prior to the end of the Bid question period means the Bidder is complying 100% with the Specifications. All materials may be inspected by the District upon delivery for compliance with the Specifications. Deviations from the specifications shall be cause for the bid to be rejected as non-responsive unless the deviation was approved prior to the submittal of bids.

6.27.2 Any deletion, oversight or misstatement of these Specifications shall not release the Bidder from full responsibility for unsatisfactory workmanship and /or materials, together with all appurtenances necessary for unrestricted operation, as determined by the District in its sole discretion.

6.28 SILENCE OF SPECIFICATIONS:

6.28.1 The apparent Silence of any Specification as to any details, or the omission from the specifications of a detailed description concerning any point shall be regarded as meaning that only the best commercial practices are to prevail and that materials of the first quality and correct type, size and design are to be used. All workmanship is to be of first quality.

6.28.1.1 Work not specified in the Specifications, but involved in carrying out their intent or in the complete and proper execution of the work, is required and shall be performed by the Contractor as though it were specifically delineated or described.

6.29 QUALITY

6.29.1 Items delivered as a result of award from this bid shall be free of defects. Any item(s) not meeting this specification shall be picked-up by the awarded Bidder for immediate replacement at no additional charge to the District.

6.30 TRANSPORTATION AND HANDLING:

6.30.1 Transport and handle Products in accordance with manufacturer's instructions.

6.30.2 Promptly inspect shipments to ensure that Products comply with requirements, quantities are correct, and Products are undamaged.

6.30.3 Provide equipment and personnel to handle Products by methods to prevent soiling, disfigurement, or damage.

6.31 DISPOSAL:

6.31.1 Before the Contractor disposes of any existing improvements or equipment which is to be removed as a portion of the work, and for which disposition is not specifically provided for elsewhere in these Specifications, he shall contact the DISTRICT and determine if the removal items are to be salvaged. Items to be salvaged by the DISTRICT shall be neatly stockpiled or stored in a neat and acceptable manner at the construction site easily accessible to the DISTRICT. Equipment and materials which shall not be salvaged by the DISTRICT shall become the property of the Contractor to be removed from the site and disposed of in an acceptable manner.

6.32 OCCUPATIONAL HEALTH AND SAFETY:

6.32.1 The CONTRACTOR, as a result of award of the bid, delivering any toxic substances item as defined in Code of Federal Regulation Chapter 29, shall furnish to the Purchasing Department, a Material Safety Data Sheet (MSDS). The material safety data sheet shall be provided with initial shipment and shall be revised on a timely basis as appropriate. The MSDS must include the following information:



6.32.2 The chemical name and the common name of the toxic substance.

6.32.3 The hazards or other risks in the use of the toxic substance, including:

6.32.3.1 The potential for fire, explosion, corrosion and reactivity;

6.32.3.2 The known acute and chronic health effects of risks from exposure, including the medical conditions which are generally recognized as being aggravated by exposure to the toxic substance; and

6.32.3.3 The primary routes of entry and symptoms of overexposure.

6.32.4 The proper precautions, handling practices, necessary personal protective equipment, and other safety precautions in the use of or exposure to the toxic substances including appropriate emergency treatment in case of overexposure.

6.32.5 The emergency procedure for spills, fire, disposal and first aid.

6.32.6 A description in lay terms of the known specific potential health risks posed by the toxic substance intended to alert any person reading this information.

6.32.7 The year and month, if available, that the information was compiled and the name, address and emergency telephone number of the manufacturer responsible for preparing the information. Any questions regarding this requirement should be directed to: Department of Labor and Employment Security, Bureau of Industrial Safety and Health, Toxic Waste Information Center, 2551 Executive Center Circle West, Tallahassee, FL 32301-5014, Telephone 1800-367-4378.

6.33 OSHA:

6.33.1 The CONTRACTOR warrants that the product/services supplied to the District shall conform in all respects to the standards set forth in the Occupational Safety and Health Act 1970, as amended, and the failure to comply with this condition shall be considered as a breach of contract.

6.34 CONDITIONS AND PACKAGING:

Related Article: 6.4 Labor, Materials And Equipment: Conditions, Substitutions

6.34.1 It is understood and agreed that any item offered or shipped as a result of this bid shall be new (current production model at the time of the bid). All containers shall be suitable for storage or shipment, and all prices shall include standard commercial packaging.

6.35 UNDERWRITERS' LABORATORIES:

6.35.1 Unless otherwise stipulated in the bid, all manufactured items and fabricated assemblies shall be UL listed or re-examination testing where such has been established by UL for the items offered and furnished.

6.36 ASBESTOS:

6.36.1 Contractor shall not use any asbestos or asbestos-based fiber materials in the Work performed under this Contract.

6.36.2 If the CONTRACTOR during the course of the WORK observes the existence of asbestos in any structure, building or facility, the CONTRACTOR shall promptly notify the DISTRICT and the EOR. The DISTRICT shall consult with the EOR regarding removal or encapsulation of the asbestos material and the CONTRACTOR shall not perform any WORK pertinent to the asbestos material prior to receipt of special instructions from the DISTRICT through the EOR.

6.37 CLOSEOUT SUBMITTALS:

PART 1 GENERAL

6.37.1 SCOPE OF WORK

- 6.37.1.1 Closeout procedures.
- 6.37.1.2 Final cleaning.
- 6.37.1.3 Adjusting.
- 6.37.1.4 Project record documents.
- 6.37.1.5 As-built survey.
- 6.37.1.6 Operation and maintenance data.
- 6.37.1.7 Spare parts and maintenance Products.
- 6.37.1.8 Warranties and bonds.
- 6.37.1.9 Maintenance service.

6.37.2 RELATED SECTIONS

- Payment Procedures.
- Submission Procedures.
- Commissioning.
- Testing, Adjusting and Balancing of HVAC.
- Commissioning of HVAC.

6.37.3 CLOSEOUT PROCEDURES

6.37.3.1 Submit written certification that contract documents were reviewed, work inspected, and that work is complete in accordance with contract documents and ready for DISTRICT'S Project Manager and EOR'S review.

6.37.3.2 Provide submittals to EORT and DISTRICT'S Project Manager that are required by governing or other authorities.

Submit final application for payment identifying total adjusted contract sum, previous payments, and sum remaining due.

DISTRICT may opt to occupy or portions of completed facilities upon substantial completion of those portions of work.

Contractor/CM shall provide punch list to EOR identifying items remaining to be completed.

EOR shall inspect project to determine completion of punch list and project compliance with Contract Documents.

6.37.4 FINAL CLEANING

6.37.4.1 Execute final cleaning prior to final project assessment.

6.37.4.2 Clean interior and exterior glass, surfaces exposed to view; remove temporary labels, stains and foreign substances, wax, clean and polish transparent and glossy surfaces, vacuum carpet and soft surfaces.

6.37.4.3 Clean equipment and fixtures to sanitary condition with cleaning materials per manufacturer's written recommendations.

6.37.4.4 Replace filters of operating equipment.

6.37.4.5 Clean debris from roofs, gutters, downspouts, and drainage systems.

6.37.4.6 Clean site; sweep paved areas, rake clean landscaped surfaces.

6.37.4.7 Remove waste and surplus materials, rubbish, and construction facilities from the site.

6.37.4.8 Clean and sanitize water fountains (coolers).

6.37.4.9 Clean ledges countertops and shelves with all-purpose non-abrasive cleaner leaving no residue.



6.37.5 ADJUSTING

6.37.5.1 Adjust operating products and equipment to ensure smooth and unhindered operation.

6.37.6 PROJECT RECORD DOCUMENTS

6.37.6.1 Maintain on site one set of record documents, recording accurate field revisions to contract documents to include:

- Drawings/specifications and addenda.
- Change orders and other modifications to work.
- Reviewed shop drawings, product data, and samples.
- Manufacturer's instruction for assembly, installation, and adjusting.

6.37.6.2 Ensure entries are complete and accurate, enabling ready access and reference by DISTRICT's Project Manager.

6.37.6.3 Store record documents separate from documents used for construction.

6.37.6.4 Record information concurrent with construction progress.

6.37.6.5 Specifications shall be legibly marked and recorded for each product used indicating the following:

- Manufacturer's name, product model and number.
- Product substitutions or alternates utilized.
- Changes made by addenda and modifications.

6.37.6.6 Record drawings and shop drawings shall be legibly marked with each item recorded to indicate actual construction as follows"

1. Measured depths of foundations in relation to finish first floor datum.
2. Measured horizontal and vertical locations of underground utilities and appurtenances, referenced to permanent surface improvements.
3. Measured locations of internal utilities and appurtenances concealed in construction, referenced to visible and accessible features of the work.
4. Field changes of dimension and details.
5. Details not on original contract drawings.

6.37.6.7 As-built survey: Upon completion of site construction improvements, provide EOR and DISTRICT's Project Manager with complete and accurate field survey prepared, signed and sealed by Florida registered surveyor.

6.37.6.8 Provide exact horizontal and vertical location relative to property lines and NGVD of buildings, concrete and asphalt surfaces and all drainage features including lakes, detention areas, berms, embankments, swales drainage inlets, storm-water outfalls, storm and sewer manholes and water shut off valve locations.

6.37.6.9 Provide actual grades of spot elevations shown on paving and drainage plans.

6.37.6.10 Provide sufficient information indicating a true representation of constructed grade conditions for areas where grading between two elevation points is not constructed at uniform slope.

6.37.6.11 Survey shall include cross sections elevations at 50' stations of swales, lakes, and drainage retention areas including banks, berms, bottoms and transitions constructed or improved.

Elevations shown shall be accurate to the nearest tenth of a foot.

6.37.6.12 Upon project completion, transfer project record drawing information and recording of building and site survey information to Autocad (2008 or later format) files and provide two copies of CD's to EOR for review and transmitted to DISTRICT, prior to claim for final Application for Payment.

Contractor/CM shall also submit hard copies of record drawings and project manual maintained during project to DISTRICT's Project Manager.

DISTRICT will be responsible for making prints from CD's and for their distribution to DISTRICT's user groups.

6.37.6.13 Submit one additional CD in Autocad to DISTRICT for distribution to Sheriff's Department with following information:

Provide Site Plan on black background indicating the following site information and in colors and layers indicated.

- | | |
|---|---------|
| a. Roads and Driveways into and on site | White |
| b. Backflow and PIV Valves | Cyan |
| c. Valves for Fire Lines | Magenta |
| d. Fire Hydrants | White |
| e. Emergency Generator | Cyan |
| f. Flammable Storage Buildings | Red |
| g. Gas Tanks | Red |

Provide separate drawing files for each floor plan along with mechanical mezzanines and roof access locations showing following systems and in colors and layers indicated.

- | | |
|---|---------|
| a. Intercom Panel | Yellow |
| b. Fire Alarm Panel | Red |
| c. Electrical Panels | Magenta |
| d. HVAC Control Panels | White |
| e. Roof Access Panels | Cyan |
| f. Flammable Storage Spaces | Red |
| g. Custodial Storage | Orange |
| h. Walls, windows, room names and numbers | Gray |

6.37.7 OPERATION AND MAINTENANCE DATA

6.37.7.1 Submit documentation as noted in individual product specifications and as noted herein.

6.37.8 SPARE PARTS AND MAINTENANCE PRODUCTS

6.37.8.1 Provide spare parts, maintenance, and extra products in quantities specified in specification.

6.37.8.2 Deliver to DISTRICT; obtain receipt prior to final payment.

6.37.9 WARRANTIES

6.37.9.1 Submit documentation as noted in individual product specifications and as noted herein.

6.37.9.2 Provide duplicate notarized copies.

6.37.9.3 Execute and assemble transferable warranty documents from subcontractors, suppliers, and manufacturers.

6.37.9.4 Provide Table of Contents and assemble in D-side 3-ring white binders with typed title sheet of contents inside durable plastic front cover.

6.37.9.5 Submit prior to final application for payment.

6.37.9.6 For items of work delayed beyond date of substantial completion, provide updated submittal within ten days after acceptance, listing date of acceptance as start of warranty period.



6.37.10 MAINTENANCE SERVICE

6.37.10.1 Furnish service and maintenance of components indicated in specification sections for one-year from date of substantial completion.

6.37.10.2 Examine, clean, adjust, and lubricate system components as required for reliable operation.

6.37.10.3 Include systematic examination, adjustment, and lubrication of components repairing or replacing parts as required with parts produced by the manufacturer of the original component.

6.37.10.4 DISTRICT shall approve in writing of transfers or reassignments of maintenance service tasks.

6.37.11 ASBESTOS CERTIFICATION

6.37.11.1 Provide notarized letter from Contractor/CM certifying that "to the best of his/her knowledge no asbestos containing building materials were used as a building material in the project", per FS 255.40.

6.37.12 PRODUCTS

6.37.12.1 APPROVED PRODUCTS Use only cleaning and maintenance products approved for use in Florida Educational Facilities.

6.38 TEMPORARY BARRIERS AND ENCLOSURES

6.38.1 GENERAL

Related Articles:

6.2- Contractor Risk and Work Protection

6.10-Safety, Protection, Storage and emergencies

6.21 Protection of Existing Property Improvements

6.38-Temporary barriers and Enclosures

6.39-Security

6.38.1.1 SCOPE OF WORK

6.38.1.2 Temporary barriers and enclosures to provide construction work areas separate from Owner's on-going school operations.

6.38.1.3 Protection of new work, existing facilities and grounds from damage, theft, vandalism, and unauthorized entry.

6.38.1.4 Six (6) foot high chain link fencing surrounding and separating areas under construction including area for contractor's mobilization and parking separate from existing school facilities and on-going school activities.

6.38.1.5 Demising walls and other barriers as required to separate building areas under construction that permits safe and unobstructed exiting of partially Owner occupied buildings.

6.38.1.6 Safety of construction workers and students, faculty and visitors located in areas of school facilities not under renovation or construction.

6.38.1.7 Control dust, erosion and sediment, noise, pollution, rodent and environmental control.

6.38.2 RELATED DOCUMENTS

Project Management and Coordination.

Security Procedures.

Submittal Procedures.

6.38.3 ENTRY CONTROL

6.38.3.3 Restrict entrance of persons and vehicles into Project site and existing facilities in accord with Section 01 35 33 – Security Procedures.

6.38.3.4 Prior to project commencement, Contractor's on-site personnel shall meet with Owner's Project Manager and School staff for renovation and new construction to delineate areas for Contractor's operations to include storage and office trailers, parking, material storage lay-down areas.

6.38.3.5 Material deliveries shall be coordinated with school staff to ensure safe transit of students and staff across delivery routes.

6.38.3.6 Interruption of preapproved entry controls shall be coordinated with Owner's Project Manager and School staff prior to proposed interruption.

6.38.3.7 Allow entrance only to authorized persons with proper identification.

6.38.3.8 Contractor/CM shall post "No Trespassing" and "Hard Hat Area" signs along project perimeter and at construction access points.

1. No Trespassing sign shall include statutory language that area is construction site and that trespassing and theft are felonies and violators will be prosecuted.

2. No Trespassing sign shall include name of Contractor/CM.

3. No Trespassing signs shall not be larger than 24"(600mm) by 24"(600mm).

4. Hard Hat Area sign shall not be larger than 12"(300mm) by 12"(300mm).

6.38.4 DEMISING WALLS

6.38.4.1 Where location of construction is contiguous to or within existing school, Provide demising walls to physically separate new or renovation work from existing on-going school operations.

6.38.4.2 Demising walls shall be continuous plywood with vapor barrier and wood framing to prevent unauthorized entrance, dust or debris from entering occupied portion of school.

6.38.4.3 Where construction is overhead, provide safe and secure method of access through or adjacent to work with system of scaffolding, plywood or wood planking overhead to prevent falling debris or materials from interrupting safe passage through construction area.

6.38.5 FENCING

6.38.5.1 Areas under construction including area for contractor's mobilization and parking shall be separated from existing school facilities and on-going school activities with fencing.

6.38.5.2 Provide 6' high chain link fencing along construction zone boundaries not facing existing buildings.

6.38.5.3 Provide with 6' high chain link fencing with visual fabric covering along construction zone boundaries greater than 20' of existing buildings not in construction zone.

6.38.5.4 Provide with 6' high chain link fencing with plywood covering along construction zone boundaries greater less than 20' of existing buildings not in construction zone.

6.38.5.5 Fencing shall be designed to resist winds up to 74 miles per hour.

6.38.5.6 Contractor (CM) shall have option of providing fencing designed to withstand 140 miles per hour or be completely removed 24 hours prior to occurrence of anticipated high wind event.



6.38.5.7 Provide access gates required by code for ingress and egress and for Owner's and Contractor/CM's access to Owner's access to occupied portion of site and for construction access.

6.38.6 ENVIRONMENTAL CONTROLS

6.38.6.1 Protect existing buildings and adjacent property from dust produced by construction operations. Use encapsulating or wetting devices to control moisture content of traffic and construction areas.

6.38.6.2 Control surface drainage to prevent off site discharge of pollutants and prevent erosion and sedimentation.

6.38.6.3 Provide berms, dikes or drains to divert water flow away from new or existing structures into storm water retention areas.

6.38.6.4 Provide methods necessary to prevent mud and debris from entering storm water system.

6.38.6.5 Provide methods necessary to prevent excessive noise on site.

1. Comply with OSHA and Owner's noise requirements.

2. Coordinate with Owner's Construction Manager for construction activities to limit or cease construction activities creating any noise associated with construction on active school sites when FCAT testing occurs for one week in March of each year.

6.38.6.6 Provide methods necessary to prevent pests and insects from damaging the work.

6.38.6.7 Provide methods necessary to prevent contamination of soil, water, and atmosphere from discharge of noxious, toxic substances or pollutants from construction operations.

6.38.7 SUBMITTALS

6.38.7.1 Comply with Section "Submittal Procedures."

6.38.7.2 Submit site plan and floor plans indicating locations and material construction of proposed protective structures.

6.38.8 TEMPORARY FENCING

6.38.8.1 Six (6) foot high, minimum 10 gage aluminum or galvanized steel fabric.

6.38.8.2 Fencing shall have six foot high visual fabric cover to block visual access to construction activities.

6.38.8.3 5/8" C/D plywood sheets, pressure treated or other means of weather protection, with 2 x 4 wood framing at edges and 24" maximum vertical spacing.

6.38.9 TEMPORARY WALLS

6.38.9.1 Demising Wall: 5/8" C/D plywood sheets, 2 x 4 wood framing at 24" maximum spacing, and 10 mil black polyethylene vapor barrier covering with sealed joints.

6.38.9.2 Overhead Protection: Metal scaffolding with 3/4" B/C plywood or 2" x 12" wood planking.

6.38.10 EXECUTION/ 1 INSTALLATION AND REMOVAL

6.38.10.1 Temporary fencing shall be installed prior to start of vertical construction and removed upon completion of work.

6.38.10.2 Demising walls shall be installed prior to start of renovations or building additions and removed work

6.38.10.3 Walls shall be protected or removed during storm events where winds are anticipated to exceed 74 miles per hour.

6.39 SECURITY PROCEDURES

6.39.1 SCOPE OF WORK

6.39.1.1 Development of site security program, project entry control procedures, personnel screening and identification in compliance with Florida Statute FS1012.465 – Jessica Lunsford Act for vendors, and Contractor/CM's.

6.39.1.2 RELATED SECTIONS

Project Management and Coordination.

Submittal Procedures.

Temporary Barriers and Enclosures.

6.39.1.3 JESSICA LUNSFORD ACT

1. Contractor/CM, his subcontractors, vendors and suppliers who are to be permitted access to school grounds while students are present, or have direct contact with students or have access to or control of school funds shall obtain Level 2 background screening in accord with Florida Statute FS1012.465 – Jessica Lunsford Act.

2. Level 2 screening excludes personnel working on school district property where students are present who have criminal records that include sexual offender, sexual misconduct with developmentally disabled or mental health patients, terrorism, murder, kidnapping, lewd, lascivious or indecent acts or exposure, incest, child abuse or neglect.

3. Persons screened as noted above with other types of criminal history may be allowed on school grounds provided under following conditions:

4. Contractor/CM, subcontractors, vendors and suppliers shall be under continuous direct supervision of school district employee or Level 2 screened and cleared employee as noted above.

5. Contractor/CM, subcontractors, vendors and suppliers may be allowed on a student occupied site if area of construction is isolated from students by continuous six foot high chain link fence separating work area and school.

6. Persons with current Level 2 clearance who are subsequently arrested for disqualifying offenses shall be disqualified from access to school sites and shall immediately surrender their Photo ID Badge to their employer who shall be responsible for returning badge to Martin County School District's Department of Human Resources with 48 hours of arrest or notice of arrest or criminal offense.

7. Persons failing to notify their employer and Martin County School District's Department of Human Resources with 48 hours of arrest will be charged with 3rd degree felony, punishable by up to five years imprisonment and \$1,000 fine.

8. Employers of persons having been arrested for disqualifying offenses who subsequently allows said employee to continue working on school property may also be charged with 3rd degree felony, punishable by up to five years imprisonment and \$1,000 fine.

9. Contractor/CM, his subcontractors, vendors and suppliers working on school board sites shall be fingerprinted and obtain work badges.

10. Contractor/CM, his subcontractors, vendors and suppliers have worked and obtained in other school districts must be screened to obtain new badges.

11. Questions regarding fingerprinting or identification badge processing may be directed to District Personnel Department at (772)219-1200, Ext. 30296.

12. Fingerprinting services are provided by private vendor through Florida Dept. of Education. DOE sponsored website will direct individuals to nearest fingerprinting location.



Cost of fingerprinting is \$81.25 per person and shall be prepaid either by money order to Fingerprinting Services, LLC or by credit card payment via Internet. Website is <http://www.flprints.com>. For information, telephone (877)357-7456.

13. After fingerprinting and criminal background check is complete, individuals shall make appointment for photo ID's by making appointments at Martin County School District Personnel Department located in Building 20 at School District Administration Center, 500 E. Ocean Blvd., Stuart, FL 34994.

Appointments for ID photo badges shall be made after completion of fingerprinting with Martin County School District Personnel Department by phone at (772) 219-1200, Ext. 30296

Cost of Photo ID's is \$6.00. Payment may be made with company check, money order or personal check.

6.39.2 SECURITY PROGRAM

6.39.2.1 Protect new work, existing facilities and grounds from damage, theft, vandalism, and unauthorized entry.

6.39.2.2 Initiate security program in coordination with Owner's existing security system at time of project mobilization to ensure safety of students, faculty and visitors to the unaffected portions of the school facilities.

6.39.2.3 No student contact is permitted between the Contractor's personnel and students. Any breach of this requirement will result in the immediate removal of the personnel from the job site upon direction by the Owner.

6.39.2.4 Smoking is not allowed on School Board property. Any breach of this restriction will result in immediate removal of personnel from the site upon direction by Owner's Project Manager.

6.39.2.5 Maintain security program throughout construction period until Owner's project acceptance.

6.39.3 ENTRY CONTROL

6.39.3.1 Restrict entrance of persons and vehicles into Project site and existing facilities as indicated by Owner approved security plan.

6.39.3.2 Allow entrance only to authorized persons with proper identification.

Maintain log of workers and visitors, make available to Owner on request.

Coordinate access of Owner's personnel to site in coordination with Owner's security forces.

6.39.4 PERSONNEL IDENTIFICATION

6.39.4.1 Contractor/CM on-site staff, subcontractors and vendors on site shall wear identification badges at all times on site.

6.39.4.2 Identification badges shall be current at time of project and shall be reverified and reissued yearly if project extends past original badge expiration date.

6.39.5 SUBMITTALS

6.39.5.1 Comply with Section Submittal Procedures.

6.39.5.2 Provide list of personnel proposed to be used on project for fingerprinting and background checks (only required for existing school projects).

6.39.5.3 Contractor/CM shall submit initial list of accredited persons and provide monthly updated lists to Owner.

6.39.5.4 Provide security plan to Owner indicating how construction site is to be secured and separated from existing school and its operations including normal and emergency egress and

exiting from the operational portion of school and for new additions and existing portion under construction.

6.40 PRODUCT SUBSTITUTION REQUIREMENTS AND PROCEDURES

6.40.1 SCOPE OF WORK

6.40.1.1 Administrative and procedural requirements for consideration of request for substitution during the design and construction phases.

6.40.2 REFERENCES

Submittal Procedures.

References.

Quality Control.

Closeout Submittals.

6.40.3 REQUIREMENTS

6.40.3.1 Whenever a material, article or piece of equipment is identified on the Drawings or Specifications by reference to brand name or catalogue number, it shall be understood that this is referenced for the purpose of defining the performance or other salient requirements, and that other products of equal capacities, quality and function may be considered. The CONTRACTOR may request the substitution of a material, article, or piece of equipment of equal substance and function for those referred to in the Contract Documents by reference to brand name or catalogue number, and if, in the opinion of the EOR and DISTRICT, such material, article, or piece of equipment is of equal substance and function to that specified, the EOR with concurrence of the DISTRICT'S PROJECT MANAGER may approve its substitution and use by the CONTRACTOR

6.40.3.2 A request constitutes a representation that the Contractor or Bidder:

6.40.3.2.1 Has investigated proposed Product and determined that it meets or exceeds the quality level of the specified Product.

6.40.3.2.2 Will provide the same warranty for the Substitution as for the specified Product.

6.40.3.2.3 Will coordinate installation and make changes to other Work which may be required for the Work to be complete with no additional cost to Owner.

6.40.3.2.4 Waives claims for additional costs or time extension which may subsequently become apparent.

6.40.3.2.5 Will reimburse Owner and Consultant for review or redesign services associated with substitution.

6.40.3.3 The application shall state that the evaluation and acceptance of the proposed substitute shall not prejudice CONTRACTOR'S achievement of Substantial Completion on time, whether or not acceptance of the substitute for use in the WORK shall require a change in any of the Contract Documents (or in the provisions of any other direct contract with the DISTRICT for WORK on the Project) to adapt the design to the proposed substitute and whether or not incorporation or use of the substitute in connection with the WORK is subject to payment of any license fee or royalty. All variations of the proposed substitute from that specified shall be identified in the application and available maintenance, repair and replacement service shall be indicated.

6.40.3.4 The application shall also contain an itemized estimate of all costs and cost savings that shall result directly or indirectly from acceptance of such substitute, including costs of redesign and claims of other contractors affected by the resulting change, all of which shall be considered by EOR in evaluating the



proposed substitute. EOR may require CONTRACTOR to furnish at CONTRACTOR'S expense additional data about the proposed substitute.

6.40.3.5 Incidental changes or extra component parts required to accommodate the substitute shall be made by the CONTRACTOR without an increase in the Contract Price or Contract Time. The CONTRACTOR shall reimburse the DISTRICT for charges of the EOR and EOR'S consultants for review evaluating each proposed substitution. These costs shall include transportation to operating installation at factories, etc.

6.40.3.6 No substitute shall be ordered or installed without the written approval of the EOR with the DISTRICT'S PROJECT MANAGER's concurrence. The District may require the CONTRACTOR to furnish at CONTRACTOR'S expense a special performance guarantee or other surety with respect to any substitute.

6.40.3.7 Delay caused by obtaining approvals for substitute materials or installations shall not be considered justifiable grounds for an extension of construction time.

6.40.4 SUBMITTAL PROCEDURES

6.40.4.1 Transmit three (3) copies of each substitution request on company letterhead with completed Product Substitution Request Form in the Sample Forms Section of the Document.

6.40.4.2 During bidding phase, substitution requests shall be directed to the DISTRICT.

6.40.4.3 During construction phase substitution requests shall be directed to the District.

6.40.4.4 Substitution Form shall identify project, Contractor/CM and EOR during bidding phase plus Subcontractor or supplier during construction phase indicating Specification Section and Paragraph number of specified material and pertinent drawing and detail numbers, as appropriate.

Include complete information as required in the Substitution Form. Incomplete information will result in automatic rejection of the substitution request.

6.40.4.5 Apply contractor's stamp, signed or initialed certifying that review, approval, verification of products required, field dimensions, adjacent construction work, and coordination of information are in accordance with the requirements of the work and contract documents.

6.40.4.6 Schedule submittals to expedite the project, and deliver to EOR or Contractor/CM at business address. Coordinate submission of related items.

6.40.4.7 For each submittal for review, allow five(5) work days excluding delivery time to and from the EOR or CM/Contractor.

6.40.4.8 Identify variations from contract documents and product or system limitations, which may be detrimental to successful performance of the completed work.

6.40.4.9 Provide space for Contractor/CM and EOR review stamps.

6.40.4.10 When revised for resubmission, identify all changes made since previous submission.

6.40.4.11 Distribute copies of reviewed submittals as appropriate. Instruct parties to promptly report any inability to comply with requirements.

6.40.4.12 Submittals not requested will not be recognized or processed.

6.40.4.13 Submit shop drawings, product data, and certified test results attesting to the proposed Product equivalence. Burden of proof is on proposer.

6.40.4.14 The Consultant will notify Contractor in writing of decision to accept or reject request.

6.40.5 SUBSTITUTION REQUESTS

Requests for substitutions shall be made not later than ten (10) calendar days prior to bid date. Requests received after the above dates may not be considered.

6.41 FIELD SAMPLES AND MOCKUPS

6.41.1 SCOPE OF WORK

Administrative and procedural requirements for assure quality of construction before and during construction.

General requirements for mockups and field samples, constructed, applied or assembled at the site for reviewed for use as a quality standard.

6.41.2 RELATED SECTIONS

6.11: Shop Drawings and Samples

Payment Procedures

Submittal Procedures.

References.

Quality Control.

Project Storage and Handling Requirements.

Closeout Submittals.

6.41.3 COORDINATION AND PROJECT CONDITIONS

6.41.3.1 Coordinate scheduling, submittals, and work to ensure efficient and orderly sequence of installation of interdependent construction elements, with provisions for accommodating items installed later.

6.41.3.2 Verify utility requirements and characteristics of operating equipment are compatible with building utilities.

6.41.3.3 Coordinate work of various sections having interdependent responsibilities for installing, connecting to, and placing in service, such equipment.

6.41.3.4 Coordinate space requirements, supports and installation of mechanical and electrical work that is indicated diagrammatically on Drawings.

6.41.3.5 Follow routing shown for pipes, ducts, and conduit, as closely as practicable; place runs parallel with line of building. Utilize spaces efficiently to maximize accessibility for other installations, for maintenance, and for repairs.

6.41.3.6 In finished areas, except as otherwise indicated, conceal pipes, ducts, and wiring within the construction. Coordinate locations of fixtures and outlets with finish elements.

6.41.3.7 Coordinate completion and clean up of Work of separate sections in preparation for Substantial Completion and for portions of Work designated for DISTRICT's partial occupancy.

6.41.3.8 After DISTRICT occupancy of premises, coordinate access to site for correction of defective Work and Work not in accordance with Contract Documents, to minimize disruption of DISTRICT's activities.

6.41.3.9 DISTRICT change orders for extra work required by Contractor/CM due to poor coordination with sub trades will not be considered.

6.41.4 FIELD ENGINEERING

Employ Land Surveyor registered in State of Florida approved by DISTRICT from DISTRICT's continuing services providers. Obtain list from DISTRICT's Project Manager.



6.41.4.1 Contractor shall locate and protect survey control and reference points.

6.41.4.2 Control datum for survey is that established by DISTRICT provided survey.

6.41.1.3 Verify setbacks and easements; confirm drawing dimensions and elevations.

6.41.4.4 Provide field engineering services. Establish elevations, lines, and levels, utilizing recognized engineering survey practices.

6.41.4.5 Submit copy of site drawing and certificate signed by the Land Surveyor that the elevations and locations of the Work are in conformance with the Contract Documents.

6.41.5 MOCKUP REQUIREMENTS

6.41.5.1 Tests will be performed under provisions identified in this section and identified in respective product specification sections.

6.41.5.2 Assemble and erect specified items with specified attachment and anchorage devices, flashings, seals, and finishes.

6.41.5.3 Accepted mock-ups shall be comparison standard for remaining Work.

6.41.5.4 Where mock-up has been accepted by Architect/Engineer and is specified in product specification sections to be removed; remove mock-up and clear area when directed to do so by Architect/Engineer.

ARTICLE 7 – OTHER WORK

7.1. RELATED WORK AT SITE:

7.1.1 The DISTRICT may perform other WORK related to the Project at the site by the DISTRICT'S own forces, let other direct contracts therefor which shall contain General Conditions similar to these. If the fact that such other WORK is to be performed was not noted in the Contract Documents, written notice thereof shall be given to CONTRACTOR prior to starting any such other WORK; and, if CONTRACTOR believes that such performance shall involve additional time and the parties are unable to agree as to the extent thereof, CONTRACTOR may make a claim therefor as provided in Articles 11 (Change in Contract Price) and Article 12 (Change in Contract Time). If the performance of additional WORK by other Contractor or the DISTRICT is noted in the Contract Documents, no additional adjustment of time or compensation shall be considered.

7.1.2 CONTRACTOR shall afford the DISTRICT and other contractors who are a party to such a direct contract (or the DISTRICT, if the DISTRICT is performing the additional WORK with the DISTRICT'S employees) proper and safe access to the site and a reasonable opportunity for the introduction and storage of materials and equipment and the execution of such WORK, and shall properly connect

7.1.2 CONTRACTOR shall afford the DISTRICT and other contractors who are a party to such a direct contract (or the DISTRICT, if the DISTRICT is performing the additional WORK with the DISTRICT'S employees) proper and safe access to the site and a reasonable opportunity for the introduction and storage of materials and equipment and the execution of such WORK, and shall properly connect and coordinate the WORK with theirs. CONTRACTOR shall do all cutting, fitting and patching of the WORK that may be required to make its several parts come together properly and integrate with such other WORK. CONTRACTOR shall not endanger any WORK of others by cutting, excavating or otherwise altering their WORK and shall only cut or alter their WORK with the written consent of the DISTRICT, EOR, and others whose WORK shall be affected. The duties and responsibilities of CONTRACTOR under this Section IV

paragraph are for the benefit of the DISTRICT and other contractors to the extent that there are comparable provisions for the benefit of CONTRACTOR in said direct contracts between the DISTRICT and other contractors.

7.1.3 If any part of CONTRACTOR'S WORK depends for proper execution or results upon the WORK of any such other contractor other than CONTRACTOR'S OWN SUBCONTRACTOR, (or the DISTRICT), CONTRACTOR shall inspect and promptly report to CONSULTANT in writing any delays, defects or deficiencies in such other WORK that render it unavailable or unsuitable for such proper execution and results of CONTRACTOR'S WORK. CONTRACTOR'S failure to report shall constitute an acceptance of the other WORK as fit and proper for integration with CONTRACTOR'S WORK except for latent defects and deficiencies in the other WORK.

7.2. COORDINATION:

7.2.1. If the DISTRICT contracts with others for the performance of other WORK on the Project at the site, the person or organization who shall have authority and responsibility for coordination of the activities among the various prime contractors shall be identified in the Technical Specifications and the specific matters to be covered by such authority and responsibility shall be itemized, and the extent of such authority and responsibilities shall be provided in the Technical Specifications. Unless otherwise provided in the Technical Specifications, neither the DISTRICT nor the EOR shall have any authority or responsibility in respect of such coordination.

ARTICLE 8 – DISTRICT'S RESPONSIBILITIES

8.1 COMMUNICATIONS TO CONTRACTOR:

8.1.1 DISTRICT shall issue all communications to CONTRACTOR, copy to EOR.

8.2 FURNISH DATA:

8.2.1 DISTRICT shall promptly furnish the data required of the DISTRICT under the Contract Documents.

8.3. PAYMENTS:

8.3.1 DISTRICT shall make payments to CONTRACTOR promptly when they are due as provided in Sections 14.5 (Review of Application for Progress payment), and 14.10, (Final Payment and Acceptance).

8.4 LANDS, EASEMENTS: REPORTS AND TESTS:

8.4.1 The DISTRICT'S duties in respect of providing lands and easements and providing engineering surveys, if available, to establish reference points are set forth in paragraphs 4.1.1(Availability of Land) and 4.5.1 (Reference Points).

8.4.2 The DISTRICT shall identify and make available to CONTRACTOR copies of reports of physical conditions at the Site and drawings of existing structures that have been utilized in preparing the Contract Documents as set forth in Paragraph 4.2, (Report of Physical Conditions).

8.5 CHANGE ORDERS

8.5.1 The DISTRICT is obligated to execute Change Orders as indicated in Article 10, (Changes in the Work).

8.6 SUSPENSION OF WORK

8.6.1 In connection with the DISTRICT'S right to stop WORK or suspend WORK see paragraph 13.5 (District May Stop Work) and 15.1 District May Suspend Work). Paragraph 15.2 (District May Terminate for Cause) and 15.3 (District May terminate Without Cause) deals with the DISTRICT'S right to terminate services of CONTRACTOR.

8.7 ESTIMATED DOLLAR VALUE:



8.7.1 No guarantee of the dollar amount of this bid is implied or given.

8.8 QUANTITIES:

8.8.1 Quantities shown are estimates only. No guarantee or warranty is given or implied by the District as to the total amount that may or may not be purchased from any resulting contract. The District reserves the right to decrease or increase quantities or add or delete any item from the contract if it is determined that it best serves the interests of the District. Orders shall be placed as needed by individual locations during the contract period. The CONTRACTOR agrees that the price(s) offered shall be maintained irrespective of the quantity actually purchased.

8.9 ADDITIONAL TERMS AND CONDITIONS:

8.9.1 No additional terms and conditions included with the Bid response shall be evaluated or considered, have any force or effect, and are inapplicable to this Bid. It is understood and agreed that the conditions in these Bid Documents are the only conditions applicable to this Bid and the CONTRACTOR's authorized signature on the Bid Form attests to this.

ARTICLE 9 – CONSULTANT'S (EOR) STATUS DURING CONSTRUCTION

9.1 DISTRICT'S REPRESENTATIVE:

9.1.1 The EOR (if specifically designated), or a specifically designated employee of the DISTRICT, shall act as the DISTRICT'S REPRESENTATIVE during the construction period. The duties and responsibilities and the limitations of authority of the EOR as one of the DISTRICT'S REPRESENTATIVES during construction are set forth in Articles 1 through 17 of these Supplementary Conditions and shall not be extended without written consent of the DISTRICT'S PROJECT MANAGER and the EOR.

9.1.2 The EOR's decision with the consent of the DISTRICT'S PROJECT MANAGER in matters relating to aesthetics, shall be final, if within the terms of the Contract Documents.

9.1.3 EOR shall work with the DISTRICT to

9.1.3.1 Establish on-site lines of authority and communications:

9.1.3.2 Schedule and conduct pre-construction meeting and progress meetings.

9.1.4 EOR shall also work with the DISTRICT to Establish procedures for:

9.1.4.1 Submittals

9.1.4.2 Reports and records

9.1.4.3 Recommendations

9.1.4.4 Coordination of drawings

9.1.4.5 Schedules

9.1.4.6 Resolution of conflicts

9.1.5 EOR shall also

9.1.5.1 Interpret Contract Specifications and Drawings

9.1.5.2 Transmit written interpretations to Contractor, and to other concerned parties.

9.1.5.3 Assist in Obtaining permits and approvals

9.1.5.4 Verify that Contractor and subcontractors have obtained inspections for Work and for temporary facilities.

9.1.5.5 Assist DISTRICT to control the use of Site:

9.2 VISITS TO SITE:

9.2.1 After written notice to proceed with the WORK, the EOR shall make visits to the site at intervals appropriate to the various stages of construction or as per EOR'S contract with DISTRICT to observe the progress and quality of the executed WORK and to determine, in general, if the WORK is proceeding in accordance with the Contract Documents. On the basis of his on-site observations, as an experienced and qualified design professional, he shall keep the DISTRICT informed of the progress of the WORK, shall endeavor to guard the DISTRICT against defects and deficiencies in the WORK of the Contractor.

9.3 PROJECT REPRESENTATION:

9.3.1 The Martin County School District or its authorized agents, inspectors or representatives acting within the scope of duties entrusted to them by the DISTRICT.

9.4 CLARIFICATIONS AND INTERPRETATIONS:

9.4.1 The EOR shall issue with reasonable promptness such written clarifications or interpretations of the requirements of the Contract Documents (in the form of Drawings or otherwise) as the DISTRICT may determine necessary, which shall be consistent with or reasonably inferable from the overall intent of the Contract Documents. If CONTRACTOR believes that a written clarification of interpretation justifies an increase in the Contract Price or an extension of the Contract Time and the parties are unable to agree to the amount or extent thereof, CONTRACTOR may make a claim therefor as provided in Articles 11 (Change in Contract Price) and Article 12 (Change in Contract Time).

9.5 MEASUREMENTS:

9.5.1 MEASUREMENTS: All Work completed under the Contract shall be measured by the EOR'S or DISTRICT'S REPRESENTATIVE or PROJECT REPRESENTATIVE according to the United States Standard Measures. All linear surface measurements shall be made horizontally or vertically as required by the item measured.

9.6 REJECTING DEFECTIVE WORK

9.6.1 The EOR, DISTRICT'S REPRESENTATIVE or PROJECT REPRESENTATIVE shall have authority to disapprove or reject Work which is "defective" (which term is hereinafter used to describe Work that is unsatisfactory, faulty or defective, or does not conform to the requirements of the Contract Documents or does not meet the requirements of any inspection, test or approval referred to in the Contract Documents, or has been damaged prior to final acceptance). They shall also have authority to require special inspection or testing of the Work as they may individually or severally deem necessary, whether or not the Work is fabricated, installed or completed.

9.6.2 Mockups must be approved prior to work beginning. The mockup shall be the basis for the quality of work and the work's acceptance.

9.7 SHOP DRAWINGS, CHANGE ORDERS AND PAYMENTS:

9.7.1 In connection with EOR'S responsibility for Shop Drawings and samples, see Sections 6.11 (Shop Drawings and Samples).

9.7.2 In connection with EOR'S responsibilities as to Change Orders see Article 10, (Changes in the Work), Articles 11 (Change in Contract Price) and Article 12 (Change in Contract Time).

9.7.3 In connection with EOR'S responsibilities in respect of Applications for Payment, etc., see Article 14, (Payments to Contractor and Completion).

9.8 DETERMINATIONS FOR UNIT PRICES:



9.8.1 The DISTRICT PROJECT MANAGER and EOR shall determine the actual quantities and classifications of Unit Price WORK performed by CONTRACTOR. The DISTRICT PROJECT MANAGER and EOR shall review with CONTRACTOR EOR'S preliminary determinations on such matters before rendering a written decision thereon (by recommendation of an Application for Payment or otherwise). The DISTRICT PROJECT MANAGER'S written decisions thereon shall be final and binding upon the DISTRICT and CONTRACTOR unless, within ten days after the date of any such decision, the CONTRACTOR delivers to the DISTRICT and to EOR written notice of intention to appeal from such a decision.

9.9 DECISIONS ON DISPUTES:

9.9.1 The DISTRICT PROJECT MANAGER with the input of the CONSULTANT shall be the initial interpreter of the requirements of the Contract Documents and judge of the acceptability of the WORK thereunder. Claims, disputes and other matters relating to the acceptability of the WORK or the interpretation of the requirements of the Contract Documents pertaining to the performance and furnishing of the WORK and claims under Articles 11 (Change in Contract Price) and Article 12 (Change in Contract Time) in respect of changes in the Contract Price or Contract Time shall be referred initially to EOR in writing with a request for a formal decision in accordance with this paragraph, which EOR with the consent of the District Project Director shall render in writing within a reasonable time. Written notice of each such claim, dispute and other matter shall be delivered by the claimant to The DISTRICT PROJECT MANAGER and EOR and the other party to the Contract promptly (but in no event later than ten (10) days) after the start of the occurrence or event giving rise thereto, and written supporting data shall be submitted to The DISTRICT PROJECT MANAGER and EOR within ten (10) days after such occurrence unless CONSULTANT with the consent of the District Project Director allows an additional period of time to ascertain more accurate data in support of such claim, dispute or other matter.

9.9.2 The DISTRICT PROJECT MANAGER and EOR shall submit any response to the claimant within ten (10) days after receipt of the claimant's last submittal (unless The DISTRICT PROJECT MANAGER and EOR allows additional time). EOR with the consent of the District Project Director shall render a formal decision in writing thirty days after receipt of the opposing party's submittal, if any, in accordance with this paragraph. The DISTRICT PROJECT MANAGER'S written decision, on such claim, dispute or other matter shall be final and binding upon CONTRACTOR unless:

(i) an appeal from DISTRICT/ EOR's decision is taken within the time limits and in accordance with the procedures set forth pursuant to Article 16, (Dispute Resolution) or

(ii) a written notice of intention to appeal from The DISTRICT PROJECT MANAGER and EOR's written decision is delivered by CONTRACTOR to the DISTRICT PROJECT MANAGER and EOR within ten (10) days after the date of such decision and a formal proceeding is instituted by the appealing party in a forum of competent jurisdiction to exercise such rights or remedies as the appealing party may have with respect to such claim, dispute or other matter in accordance with applicable Laws and Regulations within thirty (30) days of the date of such decision, unless otherwise agreed in writing by DISTRICT and CONTRACTOR.

9.9.3 The rendering of a decision by The DISTRICT PROJECT MANAGER pursuant to paragraphs 9.8.1, (Determinations for Unit Prices), 9.9.1 and 9.9.2 (Dispute Resolution) with respect to any such claim, dispute or other matter (except any which have been waived by the making or acceptance of final payment as provided in paragraph 14.11 Waiver of Claims) shall be a condition precedent to any exercise by CONTRACTOR of such rights or remedies as either may otherwise have under the Contract Documents or by Laws or

Regulations in respect of any such claim, dispute or other matter pursuant to Article 16.

9.10 INSPECTION AND TESTING:

9.10.1 EOR shall inspect work to assure performance in accord with requirements of Contract Documents as follows:

9.10.1.1 Administer special testing and inspections of suspect Work.

9.10.1.2 Reject Work, which does not comply with requirements of Contract Documents.

9.10.2 Coordinate Testing Laboratory Services:

9.10.2.1 Verify that required laboratory personnel are present.

9.10.2.2 Verify that tests are made in accordance with specified standards.

9.10.2.3 Review test reports for compliance with specified criteria.

9.10.2.4 Recommend and administer any required re-testing.

9.11 LIMITATIONS ON EOR:

9.11.1 Neither EOR'S authority to act under this Article 9 or elsewhere in the Contract Documents nor any decision made by EOR either to exercise or not exercise such authority shall give rise to any duty or responsibility of EOR to CONTRACTOR, any Subcontractor, any Supplier, or any other person or organization performing any of the WORK, or to any surety for any of them.

9.11.2 Whenever in the Contract Documents the term "as ordered", "as directed", "as required", "as allowed", "as approved" or terms of like effect or import are used, or the adjectives "reasonable", "suitable", "acceptable", "proper", or "satisfactory" or adjectives of the like effect or import are used to describe a requirement, direction, review or judgment of EOR as to the WORK, it is intended that such requirement, direction, review or judgment shall be solely to evaluate the WORK for compliance with the Contract Documents (unless there is a specific statement indicating otherwise). The use of any such term or adjective shall not be effective to assign to EOR any duty or authority to supervise or direct the furnishing or performance of the WORK or any duty or authority to undertake responsibility contrary to the provisions of paragraph 9.11.3 or 9.11.4.

9.11.3 EOR shall not be responsible for CONTRACTOR'S means, methods, techniques, sequences or procedures of construction, or the safety precautions and programs incident thereto, and EOR shall not be responsible to CONTRACTOR for CONTRACTOR'S failure to perform or furnish the WORK in accordance with the Contract Documents.

9.11.4 EOR shall not be responsible for the acts or omissions of CONTRACTOR or of any Subcontractor, any Supplier, or of any other person or organization performing or furnishing any of the WORK.

ARTICLE 10 – CHANGES IN THE WORK

10.1 AUTHORIZED CHANGES IN THE WORK

10.1.1 Without invalidating the Contract and without notice to any surety, the DISTRICT may, at any time or from time to time, order additions, deletions or revisions in the WORK; these shall be authorized by a Written Amendment, a Change Order, or a Work Change Directive. Upon receipt of any such document, CONTRACTOR shall promptly proceed with the WORK involved



that shall be performed under the applicable conditions of the Contract Documents, except as otherwise specifically provided.

10.1.2. If the DISTRICT and CONTRACTOR are unable to agree as to the extent, if any, of an increase or decrease in the Contract Price or an extension or shortening of the Contract Time that should be allowed as a result of a Work Change Directive, a claim may be made therefore as provided in Articles 11 (Change in Contract Price) and Article 12 (Change in Contract Time).

10.2 UNAUTHORIZED CHANGES IN THE WORK

10.2.1 CONTRACTOR shall not be entitled to an increase in the Contract Price or an extension of the Contract Time with respect to any WORK performed that is not required by the Contract Documents as amended, modified and supplemented as provided in Section 3.2, (References to Standards) except in the case of an emergency as provided in paragraph 6.10.11 (Emergencies) and except in the case of uncovering WORK as provided in paragraph 13.4.2, (Uncovering Work).

10.3 EXECUTION OF CHANGE ORDERS

10.3.1 The DISTRICT and CONTRACTOR shall execute appropriate Change Orders (or Written Amendments) covering:

10.3.1.1 Changes in the WORK, which are ordered by the DISTRICT pursuant to paragraph 10.1.1, (Changes in the Work) are required because of acceptance of *defective* WORK under paragraph 13.8 or correcting *defective* WORK under paragraph 13.9, or are agreed to by the parties.

10.3.1.2 Changes in the Contract Price or Contract time which the parties agree to.

10.3.1.3 Changes in the Contract Price or Contract Time which embody the substance of any written decision rendered by EOR pursuant to paragraph 9.9.1; (Decisions on Disputes) provided that, in lieu of executing any such Change Order, an appeal may be taken from any such decision in accordance with the provision of the Contract Documents and applicable Laws and Regulations, but during any such appeal, CONTRACTOR shall carry on the WORK and adhere to the progress schedule as provided in paragraph 6.24.1.

10.3.2. Surety. It is distinctly agreed and understood that any changes made in the Contract Documents for this WORK (whether such changes increase or decrease the amount thereof) or any change in the manner or time of payments or time of performance made by the DISTRICT to the CONTRACTOR shall in no way annul, release or affect the liability and surety on the Bonds given by the CONTRACTOR. If notice of any change affecting the general scope of the WORK or the provisions of the Contract Documents (including, but not limited to, Contract Price or contract Time) is required by the provisions of any bond to be given to a Surety, the giving of any such notice shall be CONTRACTOR'S responsibility, and the amount of each applicable Bond shall be adjusted accordingly.

10.3.3 Notwithstanding, anything to the contrary contained within the contract documents, all change orders involving additional cost or extensions of time, shall be governed by the ordinances of the DISTRICT.

ARTICLE 11 – CHANGE OF CONTRACT PRICE

11.1 GENERAL

11.1.1 The Contract Price constitutes the total compensation (subject to authorized adjustments) payable to CONTRACTOR for performing the WORK. All duties, responsibilities and obligations assigned to or undertaken by CONTRACTOR shall be at his expense without change in the Contract Price.

11.1.2 The Contract Price may only be changed by a Change Order or by a Written Amendment. Any claim for an increase or decrease in the Contract Price shall be based on

written notice delivered by the party making the claim to the other party and to EOR promptly (but in no event later than ten (10) days) after the occurrence of the event giving rise to the claim and stating the general nature of the claim. Notice of the amount of the claim with supporting data shall be delivered within thirty (30) days after such occurrence (unless EOR allows an additional period of time to ascertain more accurate data in support of the claim) and shall be accompanied by claimant's written statement that the amount claimed covers all known amounts (direct, indirect and consequential) to which the claimant is entitled as a result of the occurrence of said event. All claims for adjustment in the Contract Price shall be determined by DISTRICT and EOR in accordance with paragraph 9.9.1 if the DISTRICT and CONTRACTOR cannot otherwise agree on the amount involved. No claim for an adjustment in the Contract Price shall be valid if not submitted in accordance with this paragraph 11.1.2.

11.1.3 The value of any WORK covered by a Change Order or of any claim for an increase or decrease in the Contract Price shall be determined in one of the following ways:

11.1.3.1 Where the WORK involved is covered by unit prices contained in the Contract Documents, by application of unit prices to the quantities of the items involved (subject to the provisions of Section 11.5 (Unit Price Work) inclusive).

11.1.3.2 By mutual acceptance of a lump sum (which shall include an allowance for overhead and profit in accordance with paragraph 11.3.1.2.a Contractor's Fee).

11.1.3.3 On the basis of the Cost of the WORK (determined as provided in Section 11.2, inclusive) plus a CONTRACTOR'S Fee for overhead and profit (determined as provided in Section 11.3, Contractor's Fee, inclusive).

11.2 COST OF THE WORK:

11.2.1 General. The term Cost of the WORK means the sum of all costs necessary incurred and paid by CONTRACTOR in the proper performance of the WORK. Except as otherwise may be agreed to in writing by the DISTRICT, such costs shall be in amounts no higher than those prevailing in the locality of the Project, shall include only the following items and shall not include any of the costs itemized in paragraph 11.2.2: (Exclusions to Cost of the Work).

11.2.1.1 Labor. Payroll costs for employees in the direct employ of CONTRACTOR in the performance of the WORK under schedules of job classification agreed upon by the DISTRICT and CONTRACTOR. Payroll costs for employees not employed full time on the WORK shall be apportioned on the basis of their time spent on the WORK. Payroll costs shall include, but not be limited to, salaries and wages plus the cost of fringe benefits which shall include social security contributions, unemployment, excise and payroll taxes, workers' or workmen's compensation, health and retirement benefits, sick leave, vacation and holiday pay applicable thereto. Such employees shall include superintendents and foremen at the site. The expenses of performing WORK after regular working hours, on Saturday, Sunday or legal holidays shall be included in the above to the extent authorized by the DISTRICT.

11.2.1.2 Materials and Equipment. Cost of all materials and equipment furnished and incorporated in the WORK, including costs of transportation and storage thereof, and Suppliers' field services required in connection therewith. All cash discounts shall accrue to CONTRACTOR unless the DISTRICT deposits funds with CONTRACTOR with which to make payments, in which case the cash discounts shall accrue to the DISTRICT. All trade discounts, rebates and refunds and all returns from sale of surplus materials and equipment shall accrue to the DISTRICT, and CONTRACTOR shall make provisions so that they may be obtained.



11.2.1.3 Subcontractor. Payments made by CONTRACTOR to the Subcontractors for WORK performed by Subcontractors. If required by the DISTRICT, CONTRACTOR shall obtain competitive bids from Subcontractors acceptable to CONTRACTOR and shall deliver such bids to the DISTRICT who shall then determine, with the advice of the EOR, which bids shall be accepted. If a subcontract provides that the Subcontractor is to be paid on the basis of Cost of the WORK Plus a Fee, the Subcontractor's Cost of the WORK shall be determined in the same manner as CONTRACTOR'S Cost of WORK. All subcontracts shall be subject to the other provisions of the Contract Documents insofar as applicable.

11.2.1.4 Costs of Special Consultants (including but not limited to engineers, architects, testing laboratories, surveyors, attorneys and accountants) employed for services specifically related to the WORK.

11.2.1.5 Supplemental costs include the following:

a. Cost, including transportation and maintenance, of all materials, supplies, equipment, machinery, appliances, office and temporary facilities at the site and tools not owned by the workers, which are consumed in the performance of WORK, and cost less market value of such items used but not consumed which remain the property of CONTRACTOR.

b. Rentals of all construction equipment and machinery and the parts thereof whether rented from CONTRACTOR or others in accordance with rental agreements approved by the DISTRICT with the advice of EOR, and the costs of transportation, loading, unloading, installation, dismantling and removal thereof--all in accordance with terms of said rental agreements. The rental of any such equipment, machinery or parts shall cease when the use thereof is no longer necessary for the WORK. For special equipment and machinery such as power driven pumps, concrete mixers, trucks, front end loaders, backhoes, and tractors, or other equipment, required for the economical performance of the authorized WORK, the CONTRACTOR shall receive payment based on the weekly rate divided by 40 to arrive at an hourly cost. The weekly rate shall be from the latest edition of the Rental Rate blue book for Construction Equipment, published by Equipment Guide Book Co., reduced by 25 percent. Equipment cost shall be calculated based upon the actual time the equipment is used in the WORK. If said WORK required the use of machinery not on the WORK or not to be used on the WORK, the cost of transportation, not exceeding a distance of one hundred (100) miles, of such machinery to and from the WORK shall be added to the fair rental rate; provided, however, that this shall not apply to machinery or equipment already required to be furnished under the terms of the Contract.

c. Sales, consumer, use or similar taxes related to the WORK and for which CONTRACTOR is liable, imposed by laws and regulations.

d. Royalty payments and fees for permits and licenses.

e. The site costs of utilities, fuel and sanitary facilities.

f. Cost of premiums for additional bonds and insurance required because of changes in the WORK.

11.2.2 Exclusions to Cost of the Work: The term Cost of the WORK shall not include any of the following:

11.2.2.1 Payroll costs and other compensation of CONTRACTOR'S officers, executives, principals (of partnership and sole proprietorships), general managers, engineers, architects, estimators, attorneys, auditors, accountants, purchasing and contracting agents, expeditors, timekeepers, clerks and other personnel employed by CONTRACTOR whether at the site or in CONTRACTOR'S principal or a branch office for general administration of the WORK and not specifically included in the agreed upon schedule of job classifications referred to in Section IV

paragraph 11.2.1.1 or specifically covered by paragraph 11.2.1.4 -- all of which are to be considered administrative costs covered by the CONTRACTOR'S Fee.

11.2.2.2 Expenses of CONTRACTOR'S principal and branch offices other than CONTRACTOR'S office at the site.

11.2.2.3 Any part of CONTRACTOR'S capital expenses, including interest on CONTRACTOR'S capital employed for the WORK and charges against CONTRACTOR for delinquent payments.

11.2.2.4 Cost of premiums for all Bonds and for all Insurance whether or not CONTRACTOR is required by the Contract Documents to purchase and maintain the same (except for the cost of premiums covered by subparagraph 11.2.1.5f above).

11.2.2.5 Costs due to the negligence or intentional acts of the CONTRACTOR, any Subcontractor, or anyone whose acts any of them may be liable, including but not limited to, the correction of defective WORK, disposal of materials or equipment wrongly supplied and making good any damage to property.

11.2.2.6 Costs associated with fringe benefits that are greater than actual costs; i.e., where worker hours exceed a typical 8-hour day and 40-hour workweek.

11.2.2.7 Other overhead or general expense costs of any kind and the costs of any item not specifically and expressly included in Section 11.2.

11.3 CONTRACTOR'S FEE:

11.3.1 The CONTRACTOR'S Fee for overhead and profits shall be determined as follows:

11.3.1.1 A mutually acceptable fixed fee; or if none can be agreed upon,

11.3.1.2 A fee based on the following percentages of the various portions of the Cost of the WORK:

a. For costs incurred under paragraphs 11.2.1.1 (Labor) and 11.2.1.2, (Materials and Equipment) the CONTRACTOR'S Fee shall be five (5%) percent;

b. For costs incurred under paragraph 11.2.1.3, (Subcontractors) the CONTRACTOR'S Fee shall be five percent; and if a subcontract is on the basis of Cost of the WORK Plus a Fee, the maximum allowable to CONTRACTOR on account of overhead and profit of all Subcontractors shall be five (5%) percent;

c. No fee shall be payable on the basis of costs itemized under paragraphs 11.2.1.4, (Cost of EORs) 11.2.1.5 (Supplemental Costs) and 11.2.2; (Exclusions)

d. The amount of credit to be allowed by CONTRACTOR to the DISTRICT for any such change which results in a net decrease in cost shall be the amount of the actual net decrease plus a deduction in CONTRACTOR'S Fee by an amount equal to ten percent of the net decrease; and

e. When both additions and credits are involved in any one change, the adjustment in CONTRACTOR'S Fee shall be computed on the basis of the net change in accordance with paragraphs 11.3.1.2a through 11.3.1.2d, inclusive.

11.3.2 Whenever the cost of any WORK is to be determined pursuant to paragraph 11.2.1 (General) or 11.2.2, (Exclusions), CONTRACTOR shall submit in form acceptable to EOR an itemized cost breakdown together with supporting data.

11.4 CASH ALLOWANCES:

11.4.1 It is understood that CONTRACTOR has included in the Contract Price all allowances so named in the Contract



Documents and shall cause the WORK so covered to be done by such Subcontractors or Suppliers and for such sums within the limit of the allowances as may be acceptable to the DISTRICT, CONTRACTOR agrees that:

11.4.1.1 The allowances include the cost to CONTRACTOR (less any applicable trade discounts) of materials and equipment required by the allowances to be delivered at the site, and all applicable taxes; and

11.4.1.2 CONTRACTOR'S costs for unloading and handling on the site, labor, installation costs, overhead, profit and other expenses contemplated for the allowances have been included in the Contract Price and not in the allowances. No demand for additional payment on account of any thereof shall be valid.

11.4.1.3 Prior to final payment, an appropriate Change order shall be issued as recommended by EOR to reflect actual amounts due CONTRACTOR on account of WORK covered by allowances, and the Contract Price shall be correspondingly adjusted.

11.5 UNIT PRICE WORK:

11.5.1 Where the Contract Documents provide that all or part of the WORK is to be Unit Price WORK, initially the Contract Price shall be deemed to include for all Unit Price WORK an amount equal to the sum of the established unit prices for each separately identified item of Unit Price WORK times the estimated quantity of each item as indicated in the Contract. The estimated quantities of items of Unit Price WORK are not guaranteed and are solely for the purpose of comparison of Bids and determining an initial Contract Price. Determinations of the actual quantities and classifications of Unit Price WORK performed by CONTRACTOR shall be made by EOR DISTRICT in accordance with Paragraph 9.8, Determinations for Unit Prices.

11.5.2 Each unit price shall be deemed to include an amount considered by CONTRACTOR to be adequate to cover CONTRACTOR'S overhead and profit for each separately identified item.

11.5.3 Where the quantity of any item of Unit Price WORK performed by CONTRACTOR differs materially and significantly from the estimated quantity of such item indicated in the Contract and there is no corresponding adjustment with respect to any other item of WORK and if CONTRACTOR believes that CONTRACTOR has incurred additional expense as a result thereof, CONTRACTOR may make a claim for an increase in the Contract Price in accordance with Article 11 Change of Contract Price, if the parties are unable to agree as to the amount of any such increase.

11.5.4 Where the quantity of any item of Unit Price WORK performed by CONTRACTOR differs materially and significantly from the estimated quantity of such item indicated in the Contract and there is no corresponding adjustment with respect to any other item of WORK and if DISTRICT believes that CONTRACTOR has incurred reduced expense as a result thereof, DISTRICT may make a claim for a decrease in the Contract Price in accordance with Article 11 Change of Contract Price if the parties are unable to agree as to the amount of any such decrease.

11.6 OMITTED WORK:

11.6.1 The DISTRICT may at any time, by written order, without Notice to the Sureties, require omission of such contract WORK as it may find necessary or desirable. An order for omission of WORK shall be valid only by an executable change order. All WORK so ordered must be omitted by the CONTRACTOR. The amount by which the contract price shall be reduced shall be determined as follows:

11.6.1.1 By such applicable unit prices, or rates for WORK of a similar nature or character as set forth in the contract; or,

11.6.1.2. By the appropriate lump sum price set forth in the Contract; or,

11.6.1.3. By the reasonable and fair estimated cost of such omitted WORK and profit percentage as determined by the CONTRACTOR and the EOR, and approved by the DISTRICT.

ARTICLE 12 – CHANGE OF CONTRACT TIME

12.1 GENERAL

12.1.1 The Contract Time may only be changed by a Change Order or Written Amendment. Any claim for an extension or shortening of the Contract time shall be based on written notice delivered by the party making the claim to the other party and to EOR promptly (but in no event later than ten days) after the occurrence of the event giving rise to the claim and stating the general nature of the claim. Notice of the extent of the claim with supporting data shall be delivered within ten (10) days after such occurrence (unless EOR allows an additional period of time to ascertain more accurate data in support of the claim) and shall be accompanied by the claimant's written statement that the adjustment claimed is the entire adjustment to which the claimant has reason to believe it is entitled as a result of the occurrence of said event. Claims made beyond these time limits shall be null and void.

12.1.2 Requests for extension of time shall be fully documented and shall include copies of daily logs, letters, shipping orders, delivery tickets, and other supporting information. In case of a continuing cause of delay only one (1) claim is necessary. Normal working weeks are based on a five (5) day week. All claims for adjustment of the Contract Time shall be determined by the DISTRICT with input from the EOR. No claim for an adjustment in the Contract Time shall be valid if not submitted in accordance with the requirements of this paragraph 12.1.1.

12.1.3 All time limits stated in the Contract Documents are of the essence of the Contract.

12.1.4 Where CONTRACTOR is prevented from completing any part of the WORK within the Contract Times (or Milestones) that, in the sole judgment of the DISTRICT whose decision shall be binding upon CONTRACTOR are due to delay beyond the control of CONTRACTOR, the Contract Times (or Milestones) shall be extended in an amount equal to the time lost due to such delay if a claim is made therefore as provided in paragraph 12.1.1.

12.1.5 Delays beyond the control of CONTRACTOR shall include, but not be limited to, acts or neglect by DISTRICT, acts or neglect of utility owners or other contractors performing other work as contemplated by Article 7, (Related Work at Sight) fires, floods, epidemics, or acts of God.

12.1.6 The CONTRACTOR must mitigate any loss of time by performing but not be limited to just performing ancillary WORK as is applicable to the project.

12.1.7 Claims for delay due to inclement weather (i.e., beyond the 10 year mean average) shall be made by the 10th day of the month following the month of the delay.

12.1.8 Delays attributable to and within the control of a Subcontractor or Supplier shall be deemed to be delays within the control of CONTRACTOR.

12.1.9 Where CONTRACTOR IS prevented from completing any part of the WORK within the Contract Times (or Milestones) due to delay beyond the control of both DISTRICT and CONTRACTOR, an extension of the Contract Times (or



Milestones) in an amount equal to the time lost due to such delay shall be CONTRACTOR's sole and exclusive remedy for such delay. In no event shall DISTRICT be liable to CONTRACTOR, any Subcontractor, any Supplier, any other person or organization, or to any surety or employee or agent of any of them, for damages arising out of or resulting from (i) delays caused by or within the control of CONTRACTOR, or (ii) delays beyond the control of both parties including but not limited to fires, floods, epidemics, abnormal weather conditions, acts of God or acts of neglect by utility owners or other contractors performing other work as contemplated by Article 7, (Related work at Sight).

2,000,001 to 3,000,000	370.00
3,000,001 to 4,000,000	400.00
4,000,001 to 5,000,000	425.00
5,000,001 to 6,000,000	450.00
6,000,001 to 7,000,000	475.00
7,000,001 to 8,000,000	500.00
8,000,001 to 9,000,000	525.00
9,000,001 to 10,000,000	550.00
10,000,001 to 11,000,000	575.00
11,000,001 to 12,000,000	600.00
12,000,001 and over	625.00

12.2 LIQUIDATED DAMAGES.

12.2.1 The DISTRICT and CONTRACTOR recognize and acknowledge that time is of the essence of this Contract and that the DISTRICT shall suffer financial loss if the WORK is not completed within the times specified in paragraph 2.3 of the Supplementary Conditions and the Notice To Proceed, plus any extensions thereof allowed in accordance with Article 12 of the General Conditions. Each of the parties acknowledges that it has attempted to quantify the damages which would be suffered by DISTRICT in the event of the failure of CONTRACTOR to perform in a timely manner, but neither one has been capable of ascertaining such damages with a certainty. DISTRICT and CONTRACTOR also recognize and acknowledge the delays, expense and difficulties involved in proving in a legal proceeding the actual loss suffered by the DISTRICT if the WORK is not completed on time. Accordingly, instead of requiring any such proof, the DISTRICT and CONTRACTOR agree that as liquidated damages for delay (but not as a penalty) CONTRACTOR shall pay the DISTRICT:

for each day that expires after the time specified in paragraph 2.3 of the Supplementary Conditions and as stated in the NOTICE TO PROCEED.

12.2.3 This sum is not a penalty, being the liquidated damages the DISTRICT shall have sustained in event of such default by the Contractor. The DISTRICT reserves the right to additionally recover direct job site expenses incurred during the period of any delay. The Contractor shall be liable for liquidated damages even if the Contract is terminated by the DISTRICT for cause or if the Contractor abandons the Work. The liability of the Contractor and its surety or sureties for damages provided by this Article is joint and several.

12.3 REIMBURSEMENT OF CONSULTANT EXPENSES:

12.3.1 Should the completion of this Contract be delayed beyond the specified or adjusted time limit, CONTRACTOR shall reimburse the DISTRICT for all expenses of consulting and inspection incurred by the DISTRICT during the period between said specified or adjusted time and the actual date of final completion. All such expenses for consulting and inspection incurred by the DISTRICT shall be charged to CONTRACTOR and be deducted from payments due CONTRACTOR as provided by this Contract. Said expenses shall be further defined as EOR charges associated with the construction contract administration, including resident project representative costs.

Base Bid Liquidated Damages Per Day	(\$ Dollar Amt
\$1000 to \$20,000	100
20,001 to 75,000	500
75,001 to 150,000	200
150,000 to 350,000	750
350,001 to 750,000	800
750,001 to 1,000,000	1,000
1,000,001 to 2,000,000	1,200
2,000,001 to 3,000,000	1,500
3,000,001 to 4,000,000	1,600
4,000,001 to 5,000,000	1,700
5,000,001 to 6,000,000	1,800
6,000,001 to 7,000,000	1,900
7,000,001 to 8,000,000	2,000
8,000,001 to 9,000,000	2,100
9,000,001 to 10,000,000	2,200
10,000,001 to 11,000,000	2,300
11,000,001 to 12,000,000	2,400
12,000,001 and over	2,500

ARTICLE 13 – TESTS AND INSPECTIONS, CORRECTION, REMOVAL OR ACCEPTANCE OF DEFECTIVE WORK

13.1 NOTICE OF DEFECTS:

13.1.1 Prompt notice of all defects for which DISTRICT or EOR have actual knowledge shall be given to CONTRACTOR. All defective WORK, whether or not in place, may be rejected, corrected or accepted as provided in Article 13, Test and Inspections: Correction, Removal or Acceptance of Defective Work.

13.1.2 Unremedied defects identified for correction during the guarantee period but remaining after its expiration shall be considered as part of the obligations of the guarantee. Defects in material, workmanship or equipment, which are remedied as a result of obligations of the guarantee, shall subject the remedied portion of the WORK to an extended guarantee period of one year after the defect has been remedied. The Surety shall be bound with and for the Contractor in the Contractor's faithful observance of the guarantee.

for each day that expires after the time specified in paragraph 2.3 of the Supplementary Conditions, and the NOTICE TO PROCEED for substantial completion.

12.2.2 After Substantial Completion, if CONTRACTOR shall neglect, refuse or fail to complete the remaining WORK within the Contract Time or any proper extension thereof granted by the DISTRICT, CONTRACTOR shall pay DISTRICT

13.2 ACCESS TO WORK:

13.2.1 EOR'S and EOR'S representatives, other representatives of the DISTRICT, testing agencies and governmental agencies with jurisdictional interests shall have access to the WORK at reasonable times for their observation, inspecting and testing. CONTRACTOR shall provide proper and safe conditions for such access.

13.3 TESTS AND INSPECTIONS:

13.3.1 CONTRACTOR shall give EOR timely notice of readiness of the WORK for all required inspections, tests or approvals.

Base Bid Liquidated Damages Per Day

\$1000 to \$20,000	\$25.00
20,001 to 75,000	50.00
75,001 to 150,000	125.00
150,000 to 350,000	187.50
350,001 to 750,000	200.00
750,001 to 1,000,000	250.00
1,000,001 to 2,000,000	300.00



13.3.2 If Laws or Regulations of any public body having jurisdiction require any WORK (or part thereof) to specifically be inspected, tested or approved, CONTRACTOR shall assume full responsibility therefor, pay all costs in connection therewith and furnish EOR the required certificates of inspection, testing or approval. CONTRACTOR shall also be responsible for and shall pay all costs in connection with any inspection or testing required in connection with the DISTRICT'S or EOR'S acceptance of a Supplier of materials or equipment proposed to be incorporated in the WORK, or of materials or equipment submitted for approval prior to CONTRACTOR'S purchase thereof for incorporation in the WORK.

13.3.3 All inspections, tests or approvals other than those required by Laws or Regulations of any public body having jurisdiction shall be performed by organizations acceptable to the DISTRICT (or by EOR if so specified).

13.3.4 If any WORK (including the WORK of others) that is to be inspected, tested or approved is covered without written concurrence of EOR, it must, if requested by EOR, be uncovered for observation. Such uncovering shall be at CONTRACTOR'S expense unless CONTRACTOR has given EOR timely notice of CONTRACTOR'S intention to cover the same and EOR has not acted with reasonable promptness in response to such notice.

13.3.5 Neither observations by EOR nor inspections, tests or approvals by others shall relieve CONTRACTOR from CONTRACTOR'S obligation's to perform the WORK in accordance with the Contract Documents.

13.3.6 General: For tests specified to be made by the Contractor, the testing personnel shall make the necessary inspections and tests and the reports thereof shall be in such form as will facilitate checking to determine compliance with the Contract Documents. Five (5) copies of the reports shall be submitted and authoritative certification thereof must be furnished to the Consultant as a prerequisite for the acceptance of any material or equipment.

13.3.6.1 If, in the making of any test of any material or equipment, it is ascertained by the EOR that the material or equipment does not comply with the Contract Documents, the Contractor will be notified thereof and he will be directed to refrain from delivering said material or equipment, or to remove it promptly from the site or from the work and replace it with acceptable material, without cost to the DISTRICT.

13.3.6.2 Tests of electrical and mechanical equipment and appliances shall be conducted in accordance with the recognized test codes.

13.3.7 Costs: All inspection and testing of materials furnished under this Contract will be provided by the Contractor, unless otherwise expressly specified.

13.3.7.1 Materials and equipment submitted by the Contractor as the equivalent to those specifically named in the Contract may be tested by the DISTRICT for compliance. The Contractor shall reimburse the DISTRICT for the expenditures incurred in making such tests of materials and equipment which are rejected for non-compliance.

13.3.8 Certificate of Manufacture: Contractor shall furnish Consultant authoritative evidence in the form of Certificate of Manufacture that the materials to be used in the work have been manufactured and tested in conformity with the Contract Documents.

13.3.8.1 These certificates shall be notarized and shall include copies of the results of physical tests and chemical analyses, where necessary, that have been made directly on the product or on similar products of the manufacturer.

13.3.9 Start up Tests: As soon as conditions permit, the Contractor shall furnish all labor, materials, and instruments and shall make start-up tests of equipment.

13.3.9.1 If the start-up tests disclose any equipment furnished under this Contract which does not comply with the requirements of the Contract Documents, the Contractor shall, prior to demonstration tests, make all changes, adjustments and replacements required. The furnishing Contractor shall assist in the start-up tests as applicable.

13.4 TESTING AND INSPECTIONS SPECIFIC

RESPONSIBILITIES

13.4.1 The independent firm will perform tests, inspections and other services specified in individual specification sections and as may be required by Owner.

13.4.1.1 Laboratory: Authorized to operate at Project location.

13.4.1.2 Laboratory Staff: Maintain full time specialist on staff to review services.

13.4.1.3 Testing Equipment: Calibrated at reasonable intervals with devices of accuracy traceable to National Bureau of Standards or accepted values of natural physical constants.

13.4.2 Testing, inspections and source quality control may occur on or off project site. Perform off-site testing as required by Architect/Engineer or Owner.

13.4.3 Reports will be submitted by independent firm to Architect/Engineer, Contractor, and authority having jurisdiction, in duplicate, indicating observations and results of tests and indicating compliance or non-compliance with Contract Documents. Submit final report indicating correction of Work previously reported as non-compliant.

13.4.4 Cooperate with independent firm; furnish samples of materials, design mix, equipment, tools, storage, safe access, and assistance by incidental labor as requested.

13.4.4.1 Notify Owner, Architect/Engineer and independent firm [24] hours prior to expected time for operations requiring services.

13.4.4.2 Make arrangements with independent firm and pay for additional samples and tests required for Contractor's use.

13.4.5 Testing and employment of testing agency or laboratory shall not relieve Contractor of obligation to perform Work in accordance with requirements of Contract Documents.

13.4.6 Re-testing or re-inspection required because of non-conformance to specified requirements shall be performed by same independent firm on instructions by Architect/Engineer. Payment for re-testing or re-inspection will be charged to Contractor by deducting testing charges from Contract Sum/Price.

13.4.7 Testing Agency Responsibilities:

13.4.7.1 Test samples of mixes submitted by Contractor.

13.4.7.2 Provide qualified personnel at site.

13.4.7.3 Cooperate with Owner, Architect/Engineer and Contractor in performance of services.

13.4.7.4 Perform specified sampling and testing of products in accordance with specified standards.

13.4.7.5 Ascertain compliance of materials and mixes with requirements of Contract Documents.

13.4.7.6 Promptly notify Owner, Architect/Engineer and Contractor of observed irregularities or non-conformance of Work or products.

13.4.7.7 Perform additional tests required by Architect/Engineer.



13.4.8 Testing Agency Reports

After each test, promptly submit five (5) copies of report to Architect/Engineer, Contractor, and authority having jurisdiction. When requested by Architect/Engineer, provide interpretation of test results. Include the following:

- 13.4.8.1 Date issued.
- 13.4.8.2 Project title and number.
- 13.4.8.3 Name of inspector.
- 13.4.8.4 Date and time of sampling or inspection.
- 13.4.8.5 Identification of product and specifications section.
- 13.4.8.6 Location in Project.
- 13.4.8.7 Type of inspection or test.
- 13.4.8.8 Date of test.
- 13.4.8.9 Results of tests.
- 13.4.8.10 Conformance with Contract Documents

13.4.9 Limits On Testing Authority:

13.4.9.1 Agency or laboratory may not release, revoke, alter, or enlarge on requirements of Contract Documents.

13.4.9.2 Agency or laboratory may not approve or accept any portion of the Work.

13.4.9.3 Agency or laboratory may not assume duties of Contractor.

13.4.9.4 Agency or laboratory has no authority to stop the Work.

13.5 MANUFACTURERS' FIELD SERVICES

13.5.1 When specified in individual specification sections, require material or product suppliers or manufacturers to provide qualified staff personnel to observe site conditions, conditions of surfaces and installation, quality of workmanship, as applicable, and to initiate instructions when necessary.

13.5.2 Submit qualifications of observer to Architect/Engineer [30] days in advance of required observations.

13.5.3 Report observations and site decisions or instructions given to applicators or installers that are supplemental or contrary to manufacturers' written instructions.

13.6. UNCOVERING WORK:

13.6.1. If any WORK is covered contrary to the request of EOR, it must, if requested by EOR, be uncovered for EOR'S observation and replaced, at CONTRACTOR'S expense.

13.6.2. If EOR considers it necessary or advisable that covered WORK be observed by EOR or inspected or tested by others, CONTRACTOR, at EOR'S request shall uncover, expose or otherwise make available for observation, inspection or testing as EOR may require, that portion of the WORK in question, furnishing all necessary labor, material and equipment. If it is found that such WORK is *defective*, CONTRACTOR shall bear all direct, indirect and consequential costs of such uncovering, exposure, observation, inspection and testing and of satisfactory reconstruction, (including but not limited to fees and charges of engineers, architects, attorneys and other professionals), and the DISTRICT shall be entitled to an appropriate decrease in the Contract Price, and, if the parties are unable to agree as to the amount thereof, may make a claim therefor as provided in Article 11. If, however, such WORK is not found to be *defective*, CONTRACTOR shall be allowed an increase in the Contract Price or an extension of the Contract time, or both, directly attributable

to such uncovering, exposure, observation, inspection, testing and reconstruction; and if the parties are unable to agree as to the amount or extent thereof. CONTRACTOR may make a claim therefor as provided in Article 11 Change of Contract Price and Article 12, Change of Contract Time.

13.7 DISTRICT MAY STOP THE WORK:

13.7.1 If the WORK is *defective*, or CONTRACTOR fails to supply sufficient skilled workers or suitable materials or equipment, or fails to furnish or perform the WORK in such a way that the completed WORK shall conform to the Contract Documents, the DISTRICT may order CONTRACTOR to stop the WORK, or any portion thereof, until the cause for such order has been eliminated; however, this right of the DISTRICT to stop the WORK shall not give rise to any duty on the part of the DISTRICT to exercise this right for the benefit of CONTRACTOR or any other party.

13.8 CORRECTION OR REMOVAL OF DEFECTIVE WORK:

13.8.1 If required by EOR, CONTRACTOR shall promptly, as directed, either correct all *defective* WORK, whether or not fabricated, installed or completed, or, if the WORK has been rejected by EOR, remove it from the site and replace it with non-*defective* WORK. CONTRACTOR shall bear all direct, indirect, and consequential costs of such correction or removal (including but not limited to fees and charges of engineers, architects, attorneys and other professionals) made necessary thereby.

13.8.2 If the Contractor refuses to comply, the DISTRICT has the right to do either (or more) of the following:

13.8.3 The DISTRICT has the right to correct any work so performed by the CONTRACTOR and deduct the expenses for doing so from the final payment due the CONTRACTOR, or

13.8.4 The DISTRICT shall hold back final payment due CONTRACTOR until such time as the work is completed to the satisfaction of the DISTRICT'S PROJECT MANAGER and in compliance with the DISTRICT'S specifications. The DISTRICT'S PROJECT MANAGER shall have the sole discretion to determine if the work is satisfactory and in compliance with specifications.

13.8.5 The remedies contained herein are not exclusive and the OWNER reserves the right to pursue any and all other remedies it deems applicable.

13.9 ONE-YEAR CORRECTION PERIOD:

13.9.1 If within one year after the date of Acceptance of WORK or such longer period of time as may be prescribed by Laws or Regulations or by the terms of any applicable special guarantee required by the Contract Documents or by any specific provision of the Contract Documents, any WORK is found to be *defective*, CONTRACTOR shall promptly, without cost to the DISTRICT and in accordance with the DISTRICT'S written instructions, either correct such *defective* WORK, or, if it has been rejected by the DISTRICT, remove it from the site and replace it with non-*defective* WORK.

13.9.2 If CONTRACTOR does not promptly comply with the terms of such instructions or in an emergency where delay would cause serious risk of loss or damage, the DISTRICT may have the *defective* WORK corrected or the rejected WORK removed and replaced, and all direct, indirect and consequential costs of such removal and replacement (including but not limited to fees and charges of engineers, architects, attorneys and other professionals) shall be paid by CONTRACTOR.

13.9.3 In special circumstances where a particular item of equipment is placed in continuous service before Final Acceptance of all the WORK, the correction period for that item may start to run from an earlier date if so provided in the Specifications or by Written Amendment.



13.9.4 Nothing herein shall be deemed a waiver of the statute of limitations as provided in Florida Law.

13.9.5 Where defective WORK (and damage to other WORK resulting therefrom) has been corrected, removed or replaced under this paragraph 13.7., the correction period hereunder with respect to such WORK shall be extended for an additional period of one year after such correction or removal and replacement has been satisfactorily completed.

13.10 ACCEPTANCE OF DEFFECTIVE WORK:

13.10.1 If, instead of requiring correction or removal and replacement of defective WORK, DISTRICT (and, prior to EOR's recommendation of final payment, also EOR) prefers to accept it, DISTRICT may do so. CONTRACTOR shall pay all claims, costs, losses and damages attributable to DISTRICT'S evaluation of and determination to accept such defective WORK (such costs to be approved by EOR as to reasonableness and to include but not be limited to fees and charges of engineers, architects, attorneys and other professionals).

13.10.2 If any such acceptance occurs prior to CONSULTANT'S recommendation of final payment, a Change Order shall be issued incorporating the necessary revisions in the Contract Documents with respect to the WORK; and the DISTRICT shall be entitled to an appropriate decrease in the Contract Price, and, if the parties are unable to agree as to the amount thereof, the DISTRICT may make a claim therefor as provided in Article 11, Change of Contract Price. If the acceptance occurs after such recommendation, CONTRACTOR shall pay an appropriate amount to the DISTRICT.

13.11 DISTRICT MAY CORRECT DEFECTIVE WORK:

13.11.1 If CONTRACTOR fails within thirty days (30) after written notice of EOR to proceed to correct and to correct defective WORK or to remove and replace rejected WORK as required by CONSULTANT in accordance with paragraph 13.7.1, or if CONTRACTOR fails to perform the WORK in accordance with the Contract Documents, or if CONTRACTOR fails to comply with any other provision of the Contract Documents, the DISTRICT may, after seven days written notice to CONTRACTOR, correct and remedy any such deficiency.

13.11.2 In exercising the rights and remedies under this paragraph the DISTRICT shall proceed expeditiously. To the extent necessary to complete corrective and remedial action, the DISTRICT may exclude CONTRACTOR from all or part of the site, take possession of all or part of the WORK, and suspend CONTRACTOR'S services related thereto, take possession of CONTRACTOR'S tools, appliances, construction equipment and machinery at the site and incorporate in the WORK all materials and equipment stored at the site or for which the DISTRICT has paid CONTRACTOR but which are stored elsewhere. CONTRACTOR shall allow the DISTRICT, the DISTRICT'S representative, agents and employees such access to the site as may be necessary to enable the DISTRICT to exercise the rights and remedies under this paragraph.

13.11.3 All direct, indirect and consequential costs of the DISTRICT in exercising such rights and remedies shall be charged against CONTRACTOR by DISTRICT and a Change Order shall be issued incorporating the necessary revisions in the Contract Documents with respect to the WORK; and the DISTRICT shall be entitled to an appropriate decrease in the Contract Price, and, if the parties are unable to agree as to the amount thereof, the DISTRICT may make a claim therefor as provided in Article 11, Change of Contract Price. Such direct, indirect and consequential costs shall include but not be limited to fees and charges of engineers, architects, attorneys and other professionals, all court costs and all costs of repair and/or replacement of WORK of others destroyed or damaged by correction, removal or replacement of CONTRACTOR'S defective WORK. Contractor shall also be responsible for restoring any

other sites affected by such repairs or remedial work at no cost to DISTRICT. CONTRACTOR shall not be allowed an extension of the Contract Time because of any delay in performance of the WORK attributable to the exercise by the DISTRICT of the DISTRICT'S rights and remedies hereunder.

ARTICLE 14 - PAYMENTS TO CONTRACTOR AND COMPLETION

14.1 SCHEDULE OF VALUES

14.1.1 The schedule of values established as provided in paragraph 2.6., Finalizing Schedules, shall serve as the basis for progress payments and shall be incorporated into a form of Application for Payment acceptable to EOR.

14.2 UNIT PRICE BID SCHEDULE

14.2.1 Progress payments on account of Unit Price WORK shall be based on the number of units completed.

14.2.2 The quantities for payment under this Contract shall be determined by actual measurement of the completed items, in place, ready for service and accepted by the DISTRICT, in accordance with the applicable method of measurement therefore contained herein.

14.2.3 The Contractor shall receive and accept the compensation provided in the Bid and the Contract as full payment for furnishing all materials, labor, tools and equipment, for performing all operations necessary to complete the work under the Contract, and also in full payment for all loss or damages arising from the nature of the work, or from any discrepancy between the actual quantities of work and quantities herein estimated by the EOR, or from the action of the elements or from any unforeseen difficulties which may be encountered during the prosecution of the work until the final acceptance by the DISTRICT.

14.2.4 The prices stated in the Bid include all costs and expenses for taxes, labor, equipment, materials, commissions, transportation charges and expenses, patent fees and royalties, labor for handling materials during inspection, together with any and all other costs and expenses for performing and completing the work as shown on the Drawings and specified herein. The basis of payment for an item at the unit price shown in the bid shall be in accordance with the description of that item.

14.3 APPLICATION FOR PROGRESS PAYMENTS:

14.3.1 Unless otherwise prescribed by law, at the end of each month, the CONTRACTOR shall submit to the EOR for review, an Application for Progress Payment filled out and signed by the CONTRACTOR covering the WORK completed as of the date of the Application and accomplished by such supporting documentation as is required by the Contract Documents.

14.3.2 The Application for Progress Payment shall identify, as a subtotal, the amount of the CONTRACTOR'S Total Earnings to Date, plus the Value of Materials Stored which have not yet been incorporated in the WORK, less a deductive adjustment for materials stored which have been installed which were not previously incorporated in the WORK, but for which payment was allowed.

14.3.3 The Net Payment Due to the CONTRACTOR shall be the above mentioned subtotal from which shall be deducted the amount of retainage specified in the Contract, and the total amount of all previous approved Applications for Progress Payment submitted by the CONTRACTOR. Retainage shall be calculated based upon the above-mentioned subtotal.

The above calculation in tabular form is as follows:

Total Earnings to Date	\$
Value of Materials Stored	\$



Less Value of Materials Stored for which payment was allowed and which have been installed (\$)
Sub Total	\$
Less Retainage (based on sub total)	(\$)
Less total of all previous approved Applications for Progress Payment	(\$)
NET PAYMENT DUE	\$

14.3.4 The Value of Materials Stored shall be an amount equal to the specified percent of the value of same as set forth in the Contract or Schedule of Values. Said amount shall be based upon the value of all acceptable materials and equipment not incorporated in the WORK but delivered and suitably stored at the site or at another location agreed to in writing; provided, each such individual item has a value of more than \$5,000 and shall become a permanent part of the WORK and is planned for installation within the following thirty (30) days. The Application for Progress Payment shall also be accompanied by a Bill of Sale, paid invoice, or other documentation warranting that the DISTRICT has received the materials and equipment free and clear of all liens, charges, security interests, and encumbrances (which are hereinafter in these General Conditions referred to as "Liens") and evidence that the materials and equipment are covered by appropriate property insurance and other arrangements to protect the DISTRICT'S interest therein, all of which shall be satisfactory to the DISTRICT.

14.3.5 List each Change Order executed prior to date of submission, at the end of the continuation sheets. List by Change Order Number, and description, as for an original component item of work.

14.3.6 As provided for in the "Application for Payment" form, the Contractor shall certify, for each current pay request, that all previous progress payments received from the DISTRICT, under this Contract, have been applied by the Contractor to discharge in full all obligations of the Contractor in connection with Work covered by prior Applications for Payment, and all materials and equipment incorporated into the Work are free and clear of all liens, claims, security interest and encumbrances. Contractor shall attach to each Application for Payment like affidavits by all subcontractors

14.4 CONTRACTOR'S WARRANTY OF TITLE:

14.4.1 The CONTRACTOR warrants and guarantees that title to all Work and equipment covered by an Application for Payment, whether incorporated in the Project or not, shall have passed to the DISTRICT prior to the making of the Application for Payment, free and clear of all liens, claims, security interests and encumbrances (hereafter in these General Conditions referred to as "Liens"); and that no work or equipment covered by an Application for Payment shall have been acquired by the CONTRACTOR or by any other person performing the Work at the site or furnishing equipment for the Project, subject to an agreement under which an interest therein or encumbrance thereon is retained by the seller or otherwise imposed by the CONTRACTOR or such other person.

14.5 REVIEW OF APPLICATIONS FOR PROGRESS PAYMENT:

14.5.1 EOR shall, within ten days after receipt of each Application for Payment, either indicate in writing a recommendation of payment and present the Application to the DISTRICT, or return the Application to CONTRACTOR indicating in writing EOR'S reasons for refusing to recommend payment. In the latter case, CONTRACTOR may make necessary corrections and resubmit the Application. Thirty days after receipt of the Application for Payment by the DISTRICT with EOR'S recommendation, the amount recommended shall (subject to the provisions of the last sentence of paragraph 14.5.4) become due and when due shall be paid by the DISTRICT to CONTRACTOR.

14.5.2 EORS recommendation of any payment requested in the application for payment shall not prohibit the DISTRICT from withholding payment or prohibit the DISTRICT from paying additionally sums regarding other matters or issues between the parties.

14.5.3 EOR'S recommendation of final payment shall constitute an additional representation by EOR to the DISTRICT that the conditions precedent to CONTRACTOR'S being entitled to final payment as set forth in paragraph 14.10, Final Payment and Acceptance, have been fulfilled.

14.5.4 EOR may refuse to recommend the whole or any part of any payment if, in EOR'S opinion, it would be incorrect to make such representations to the DISTRICT. The EOR may also refuse to recommend any such payment, or, because of subsequently discovered evidence or the results of subsequent inspections or tests, nullify any such payment previously recommended, to such extent as may be necessary in EOR'S opinion to protect the DISTRICT from loss, including but not limited to:

14.5.4.1 The WORK is *defective*, or completed WORK has been damaged requiring correction or replacement.

14.5.4.2 The Contract Price has been reduced by a Written Amendment or Change Order.

14.5.4.3 The DISTRICT has been required to correct *defective* WORK or complete WORK in accordance with paragraph 13.9, or

14.5.4.4 Of EOR'S actual knowledge of the occurrence of any of the events enumerated in paragraphs 15.2.1.1 through 15.2.1.9 inclusive (District May Terminate).

14.5.5 The DISTRICT may refuse to make payment of the full amount recommended by the EOR because claims have been made against the DISTRICT on account of CONTRACTOR'S performance or furnishing of the WORK, or there are other items entitling the DISTRICT to credit against the amount recommended, but the DISTRICT must give CONTRACTOR written notice (with a copy to EOR) stating the reasons for such action.

14.5.6 The Work for which payment is requested cannot be verified,

14.5.7 Claims or Liens have been filed or there is reasonable evidence indicating the probable filing thereof,

14.5.8 Of unsatisfactory prosecution of the Work, including failure to clean up as required

14.5.9 Of persistent failure to cooperate with other Contractors on the Project and persistent failure to carry out the Work in accordance with the Contract Documents,

14.5.10 Of liquidated damages payable by the CONTRACTOR, or

14.5.11 Of any other violation of, or failure to comply with, the provisions of the Contract Documents

14.6 SUBSTANTIAL COMPLETION:

14.6.1 When the CONTRACTOR considers the entire WORK ready for its intended use, the CONTRACTOR shall notify the DISTRICT and the EOR in writing that the WORK is substantially complete and request that the EOR prepare a Certificate of Substantial Completion

14.6.2 For construction projects having an estimated cost of less than \$10 million, the DISTRICT, the EOR and the CONTRACTOR shall make an inspection of the WORK within thirty (30) calendar days after the notice from the CONTRACTOR that the work is substantially complete to determine the status of completion.



14.6.3 For construction projects having an estimated cost of more than \$10 million, the DISTRICT, the EOR and the CONTRACTOR shall make an inspection of the WORK within thirty (30) calendar days unless otherwise extended by contract not to exceed sixty (60) calendar days after notice from the CONTRACTOR that the work is substantially complete to determine the status of completion. If the EOR does not consider the WORK substantially complete, the EOR shall notify the CONTRACTOR in writing giving the reasons therefore. If the EOR considers the WORK to be substantially complete, the EOR shall prepare and deliver to the DISTRICT for its execution and recordation the Certificate of Substantial Completion signed by the EOR and CONTRACTOR, which shall fix the Date of Substantial Completion.

14.6.4 The DISTRICT shall have the right to exclude CONTRACTOR from the WORK after the date of Substantial Completion, but the DISTRICT shall allow CONTRACTOR reasonable access to complete or correct items on the "punch list".

14.7 PARTIAL UTILIZATION:

14.7.1 The DISTRICT shall have the right to enter the premises for the purpose of doing work not covered by the Contract Documents. This provision shall not be construed as relieving the CONTRACTOR of the sole responsibility for the care and protection of the Work, or the restoration of any damaged Work except such as may be caused by agent or employees of the DISTRICT

14.7.2 Prior to Substantial Completion, the DISTRICT, with the approval of the EOR and with the concurrence of the CONTRACTOR, may use any completed or substantially completed portion of the Work. Such use shall not constitute an acceptance of such portions of the Work.

14.7.3 Use by the DISTRICT of any finished part of the WORK, which has specifically been identified in the Contract Documents, or which the DISTRICT, EOR and CONTRACTOR agree constitutes a separately functioning and useable part of the WORK that can be used by the DISTRICT without significant interference with CONTRACTOR'S performance of the remainder of the WORK, may be accomplished prior to Substantial Completion of all WORK subject to the following:

14.7.4 The DISTRICT at any time may request CONTRACTOR in writing to permit the DISTRICT to use any such part of the WORK which the DISTRICT believes to be ready for its intended use and substantially complete. If CONTRACTOR agrees, CONTRACTOR shall certify to the DISTRICT and EOR that said part of the WORK is substantially complete and request CONSULTANT to issue a certificate of Substantial Completion for that part of the WORK. CONTRACTOR at any time may notify the DISTRICT and EOR in writing that CONTRACTOR considers any such part of the WORK ready for its intended use and substantially complete and request EOR to issue a certificate of Substantial Completion for that part of the WORK. Within a reasonable time after either such request, the DISTRICT, CONTRACTOR and EOR shall make an inspection of that part of WORK to determine its status of completion. If CONSULTANT does not consider that part of the WORK to be substantially complete, EOR shall notify the DISTRICT and CONTRACTOR in writing giving the reasons therefore. If EOR considers that part of the WORK to be substantially complete, the provisions of paragraphs 14.6.1 and 14.6.2 shall apply with respect to certification of Substantial Completion of that part of the WORK and the division of responsibility in respect thereof and access thereto.

14.7.5 The DISTRICT may at any time request CONTRACTOR in writing to permit the DISTRICT to take over operation of any such part of the WORK although it is not substantially complete. A copy of such request shall be sent to EOR and within a reasonable time thereafter the DISTRICT, CONTRACTOR and EOR shall make an inspection of that part of

the WORK to determine its status of completion and shall prepare a list of items remaining to be completed or corrected thereon before final payment. If CONTRACTOR does not object in writing to the DISTRICT and EOR that such part of the WORK is not ready for separate operation by the DISTRICT, EOR shall finalize the list of items to be completed or corrected and shall deliver such list to the DISTRICT and CONTRACTOR together with a written recommendation as to the division of responsibilities pending final judgment between the DISTRICT and CONTRACTOR with respect to security, operation, safety, maintenance, utilities, insurance, warranties and guarantees for that part of the WORK which shall become binding upon the DISTRICT and CONTRACTOR at the time when the DISTRICT takes over such operation (unless they shall have otherwise agreed in writing and so informed EOR). During such operation and prior to Substantial Completion of such part of the WORK, the DISTRICT shall allow CONTRACTOR reasonable access to complete or correct items on said list and to complete other related WORK.

14.8. FINAL INSPECTION:

14.8.1 Upon written notice from CONTRACTOR that the entire WORK or an agreed portion thereof is complete, EOR shall make a final inspection with the DISTRICT and CONTRACTOR and shall notify CONTRACTOR in writing of all particulars in which this inspection reveals that the WORK is incomplete, *defective*, or not in accordance with the Contract Documents. CONTRACTOR shall immediately take such measures as are necessary to remedy such deficiencies.

14.9 FINAL APPLICATION FOR PAYMENT:

14.9.1 After CONTRACTOR has completed in writing all such corrections to the satisfaction of EOR and delivered all maintenance and operating instructions, schedules, guarantees, Bonds, certificates of inspection, marked-up record documents (as provided in paragraph 14.6, Substantial Completion) and other documents--all as required by the Contract Documents, and after EOR has indicated in writing that the WORK is acceptable and has been completed in conformance with the drawings and specifications and any approved changes thereto, CONTRACTOR may make application for final payment following the procedure for progress payments. The final Application for Payment shall be accompanied by: (i) all documentation called for in the Contract Documents, including but not limited to the evidence of insurance required, (ii) consent of the surety, if any, to final payment, and (iii) complete and legally effective releases or waivers (satisfactory to DISTRICT) of all Liens arising out of or filed in connection with the WORK.

14.10 FINAL PAYMENT AND ACCEPTANCE:

14.10.1 Upon receipt of written notice from the Contractor that the WORK has been completed in conformity with the Drawings and Specifications and any approved changes thereto, and receipt of the Final Application for Payment, Final Receipt and Release of Lien and accompanying documentation, the DISTRICT'S EOR shall promptly examine the WORK and, making such tests as he may deem proper and using all of the care and judgment normally exercised in the examination of completed WORK by a properly qualified and experienced Professional EOR, shall satisfy himself that the CONTRACTOR'S statement appears to be correct and the CONTRACTOR'S other obligations under the Contract Documents have been fulfilled. He shall then inform the DISTRICT in writing that he has examined the WORK and that it appears, to the best of his knowledge and belief, to conform to the Contract Drawings, Specifications and any approved Change Orders, that the CONTRACTORS other obligations under the Contract Documents have been fulfilled, and that he therefore recommends acceptance of the WORK for ownership and Final Payment to the CONTRACTOR. However, it is agreed by the DISTRICT and the CONTRACTOR that such statement by the DISTRICT'S EOR does not in any way relieve



the CONTRACTOR from his responsibility to deliver a fully completed job in a good and workmanlike condition, and does not render the EOR or the DISTRICT liable for any faulty WORK done or defective materials or equipment used by the CONTRACTOR.

14.10.2 The EOR shall then make a final estimate of the value of all WORK done and shall deduct all previous payments which have been made. The EOR shall report such estimate to the DISTRICT together with his recommendation as to the acceptance of the WORK or his findings as to any deficiencies therein. After receipt and acceptance by the DISTRICT of the properly executed Final Warranty of Title and after approval of the EOR'S estimate and recommendation to the DISTRICT, the DISTRICT shall make final payment to the CONTRACTOR of the Amount remaining after deducting all prior payments and all amounts to be kept or retained under the provisions of the Contract Documents, or as may be lawfully retained, including, but not limited to, Liquidated Damages, as applicable. Title passes and warranty begins at final acceptance.

14.10.3. All prior estimates are subject to correction in the final estimate. Thirty days after approval by the DISTRICT of the application for final payment, the amount recommended by EOR shall become due and shall be paid to Contractor.

14.11 WAIVER OF CLAIMS:

14.11.1 The making and acceptance of final payment shall constitute:

14.11.1.1 A waiver of all claims by DISTRICT against CONTRACTOR, except claims arising from unsettled Liens, from *defective* WORK appearing after final inspection pursuant to paragraph 14.8, Final Inspection, from failure to comply with the Contract Documents or the terms of any special guarantees specified therein, or from CONTRACTOR'S continuing obligations under the Contract Documents or the Public Construction Bond and Payment Bonds; and

14.11.1.2 a waiver of all claims by CONTRACTOR against DISTRICT other than those previously made in writing and still unsettled.

14.12 PUNCHLIST PROCEDURES:

For Contracts over \$10,000,000.00: Further to §218.735(7)(a)(ii) Florida Statutes, punchlist procedures to render the Work complete, satisfactory and acceptable are established as follows:

14.12.1 Within twenty (20) days of Substantial Completion of the construction services purchased as defined in the Contract, Contractor shall schedule a walkthrough with DISTRICT AND EOR ("Initial Walkthrough" a/k/a "IW"). The purpose of the IW is to develop a preliminary checklist ("Checklist") of items to be performed by the Contractor, based upon observations made jointly between the Contractor, EOR and DISTRICT during the IW. The IW is to occur within twenty (20) days of Substantial Completion of the Work as defined by the Contract, again predicated upon the Contractor's timely initiation of a request for the IW. At its option, DISTRICT may conduct the IW with its and EOR.

14.12.2 Contractor shall endeavor to address and complete as many items as possible noted on the Checklist either during the IW itself, or thereafter for a period of forty-five (45) days from the date of the IW.

14.12.3 No later than forty-five (45) days following the scheduled IW, Contractor shall again initiate and request a second walkthrough of the Project with DISTRICT. The purpose of this second walkthrough is to identify which items remain to be performed from the IW Checklist and to supplement that list as necessary (based, for example, upon work which may have been damaged as a result of the Contractor's performance of completion of items contained on the IW Checklist) and for the purpose of developing a joint Final Punchlist.

14.12.4 The intent of this section is for DISTRICT and the Contractor to cooperate to develop a Final Punchlist to be completed no later than forty-five (45) days from the date of reaching Substantial Completion of the construction services purchase as defined in the Contract.

14.12.5 In no event may the Contractor request payment of final retainage under §218.735(7)(d) Florida Statutes until the Contractor considers the Final Punch list to be 100% complete.

14.12.6 Contractor agrees to complete the Final Punchlist items within sixty (60) days of the date of its issuance by DISTRICT.

14.12.7 Contractor acknowledges and agrees that no item contained on the Final Punchlist shall be considered a warranty item until such time as (a) the Final Punchlist is 100% complete, and (b) DISTRICT has been able to operate or utilize the affected punchlist item for an additional period of fifteen (15) days.

14.12.8 Contractor acknowledges and agrees that DISTRICT may, at its option, during performance of the Work and prior to Substantial Completion, issue lists of identified non-conforming or corrective work for the Contractor to address. The intent of any such DISTRICT generated lists prior to Substantial Completion is to attempt to streamline the punchlist process upon achieving Substantial Completion, and to allow for the Contractor to address needed areas of corrective work as they may be observed by DISTRICT during performance of the Work.

14.12.9 Contractor acknowledges and agrees that in calculating 150% of the amount which may be withheld by DISTRICT as to any Final Punchlist item for which a good faith basis exists as to it being complete, as provided for by §218.735(7)(d) Florida Statutes, DISTRICT may include within such percentage calculation its total costs for completing such item of work, including its administrative costs as well as costs to address other services needed or areas of work which may be affected in order to achieve full completion of the Final Punchlist item. Such percentage shall in no event relate to the schedule of value associated with such Work activity, but rather total costs are based upon the value (i.e. cost) of completing such Work activity based upon market conditions at the time of Final Punchlist completion.

For Contracts between \$200,000.00 and \$10,000,000.00: Further to §218.735(7)(a)(ii) Florida Statutes, punchlist procedures to render the Work complete, satisfactory and acceptable are established as follows:

14.12.10 Within five (5) days of Substantial Completion of the construction services purchased as defined in the Contract, Contractor shall schedule a walkthrough with DISTRICT ("Initial Walkthrough" a/k/a "IW"). The purpose of the IW is to develop a preliminary checklist ("Checklist") of items to be performed by the Contractor, based upon observations made jointly between the Contractor and DISTRICT during the IW. The IW is to occur within ten (10) days of Substantial Completion of the Work as defined by the Contract, again predicated upon the Contractor's timely initiation of a request for the IW. At its option, DISTRICT may conduct the IW with its Field Inspector.

14.12.11 Contractor shall endeavor to address and complete as many items as possible noted on the Checklist either during the IW itself, or thereafter for a period of fifteen (15) days from the date of the IW.

14.12.12 No later than fifteen (15) days following the scheduled IW, Contractor shall again initiate and request a second walkthrough of the Project with DISTRICT. The purpose of this second walkthrough is to identify which items remain to be performed from the IW Checklist and to supplement that list as necessary (based, for example, upon work which may have been damaged as a result of the Contractor's performance of completion of items contained on the IW Checklist) and for the purpose of developing a joint Final Punchlist.



14.12.13 The intent of this section is for DISTRICT and the Contractor to cooperate to develop a Final Punchlist to be completed no later than thirty (30) days from the date of reaching Substantial Completion of the construction services purchase as defined in the Contract.

14.12.14 In no event may the Contractor request payment of final retainage under §218.735(7)(d) Florida Statutes until the Contractor considers the Final Punch list to be 100% complete.

14.12.15 Contractor agrees to complete the Final Punchlist items within forty-five (45) days of the date of its issuance by DISTRICT.

14.12.16 Contractor acknowledges and agrees that no item contained on the Final Punchlist shall be considered a warranty item until such time as (a) the Final Punchlist is 100% complete, and (b) DISTRICT has been able to operate or utilize the affected punchlist item for an additional period of fifteen (15) days.

14.12.17 Contractor acknowledges and agrees that DISTRICT may, at its option, during performance of the Work and prior to Substantial Completion, issue lists of identified non-conforming or corrective work for the Contractor to address. The intent of any such DISTRICT generated lists prior to Substantial Completion is to attempt to streamline the punchlist process upon achieving Substantial Completion, and to allow for the Contractor to address needed areas of corrective work as they may be observed by DISTRICT during performance of the Work.

14.12.18 Contractor acknowledges and agrees that in calculating 150% of the amount which may be withheld by DISTRICT as to any Final Punchlist item for which a good faith basis exists as to it being complete, as provided for by §218.735(7)(d) Florida Statutes, DISTRICT may include within such percentage calculation its total costs for completing such item of work, including its administrative costs as well as costs to address other services needed or areas of work which may be affected in order to achieve full completion of the Final Punchlist item. Such percentage shall in no event relate to the schedule of value associated with such Work activity, but rather total costs are based upon the value (i.e. cost) of completing such Work activity based upon market conditions at the time of Final Punchlist completion.

14.13 REDUCTION OF RETAINAGE PROCEDURES:

14.13.1 Contractor may request a reduction of retainage as provided for by §218.735(7)(8) Florida Statutes. The term "Fifty Percent Completion" as contained in §218.735(7)(8)(b) Florida Statutes shall be defined as follows, in lieu of any other definition:

14.13.2 "Fifty Percent Completion" of the Work is defined as that point in time where 50% of the overall value of Work items incorporated and which shall remain in place subsequent to final completion of the Work have been completed, based upon the schedule of values contained in the Contract. As such, and by way of example, the value of Contractors mobilization, general conditions, supervision or like items which do not involve permanent incorporation of Work do not apply to the determination of "Fifty Percent Completion" of the Work for purposes of establishing entitlement to a reduction of retainage.

14.13.3 With regard to any contract for construction services, a local governmental entity may withhold from each progress payment made to the contractor an amount not exceeding 10 percent of the payment as retainage until 50-percent completion of such services.

14.13.4 After 50-percent completion of the construction services purchased pursuant to the contract, the local governmental entity must reduce to 5 percent the amount of retainage withheld from each subsequent progress payment made to the contractor. For purposes of this subsection, the term "50-percent completion" has the meaning set forth in the contract between the local governmental entity and the contractor or, if not

defined in the contract, the point at which the local governmental entity has expended 50 percent of the total cost of the construction services purchased as identified in the contract together with all costs associated with existing change orders and other additions or modifications to the construction services provided for in the contract. However, notwithstanding this subsection, a municipality having a population of 25,000 or fewer, or a county having a population of 100,000 or fewer, may withhold retainage in an amount not exceeding 10 percent of each progress payment made to the contractor until final completion and acceptance of the project by the local governmental entity.

14.13.5 After 50-percent completion of the construction services purchased pursuant to the contract, the contractor may elect to withhold retainage from payments to its subcontractors at a rate higher than 5 percent. The specific amount to be withheld must be determined on a case-by-case basis and must be based on the contractor's assessment of the subcontractor's past performance, the likelihood that such performance will continue, and the contractor's ability to rely on other safeguards. The contractor shall notify the subcontractor, in writing, of its determination to withhold more than 5 percent of the progress payment and the reasons for making that determination, and the contractor may not request the release of such retained funds from the local governmental entity.

14.13.6 After 50-percent completion of the construction services purchased pursuant to the contract, the contractor may present to the local governmental entity a payment request for up to one-half of the retainage held by the local governmental entity. The local governmental entity shall promptly make payment to the contractor, unless the local governmental entity has grounds, pursuant to paragraph (f), for withholding the payment of retainage. If the local governmental entity makes payment of retainage to the contractor under this paragraph which is attributable to the labor, services, or materials supplied by one or more subcontractors or suppliers, the contractor shall timely remit payment of such retainage to those subcontractors and suppliers.

14.13.7 This section does not prohibit a local governmental entity from withholding retainage at a rate less than 10 percent of each progress payment, from incrementally reducing the rate of retainage pursuant to a schedule provided for in the contract, or from releasing at any point all or a portion of any retainage withheld by the local governmental entity which is attributable to the labor, services, or materials supplied by the contractor or by one or more subcontractors or suppliers. If a local governmental entity makes any payment of retainage to the contractor which is attributable to the labor, services, or materials supplied by one or more subcontractors or suppliers, the contractor shall timely remit payment of such retainage to those subcontractors and suppliers.

14.13.8 This section does not require the local governmental entity to pay or release any amounts that are the subject of a good faith dispute, the subject of a claim brought pursuant to s. [255.05](#), or otherwise the subject of a claim or demand by the local governmental entity or contractor.

14.13.9 The time limitations set forth in this section for payment of payment requests apply to any payment request for retainage made pursuant to this section.

14.13.10 Paragraphs 14.13.3 through 14.13.6 do not apply to construction services purchased by a local governmental entity which are paid for, in whole or in part, with federal funds and are subject to federal grantor laws and regulations or requirements that are contrary to any provision of the Local Government Prompt Payment Act.

14.13.11 This subsection does not apply to any construction services purchased by a local governmental entity if the total cost of the construction services purchased as identified in the contract is \$200,000 or less.

14.13.12 All payments due under this section and not made within the time periods specified by this section shall bear



interest at the rate of 1 percent per month, or the rate specified by contract, whichever is greater.

ARTICLE 15 – SUSPENSION OF WORK AND TERMINATION

15.1 DISTRICT MAY SUSPEND/STOP WORK:

15.1.1 The DISTRICT may, at any time and without cause, suspend the WORK or any portion thereof for a period of not more than ninety days by notice in writing to CONTRACTOR and EOR which shall fix the date on which WORK shall be resumed. CONTRACTOR shall resume the WORK on the date so fixed. CONTRACTOR shall be allowed an increase in the Contract Price or an extension of the Contract Time, or both, directly attributable to any suspension if CONTRACTOR makes an approved claim therefore as provided in Articles 11 (Change of Contract Price) and 12, (Change of Contract Time).

15.1.2 THE DISTRICT MAY STOP WORK: The DISTRICT REPRESENTATIVE may stop the Work or any portion thereof when it has been determined that the Contractor is not complying with the Drawings or Specifications or the intent thereof. The Stop Work order may be verbal and the CONTRACTOR shall cease work immediately except for leaving the Work area in a safe and acceptable condition. A verbal Stop Work order shall be confirmed in writing. The CONTRACTOR shall not be allowed an increase in the contract price or an extension of the Contract time during the Stop Work period. A Start Work order may be verbal and shall be confirmed in writing.

15.2 DISTRICT MAY TERMINATE FOR CAUSE:

15.2.1 Upon the occurrence of any one or more of the following events:

15.2.1.1 If CONTRACTOR commences a voluntary case under any chapter of the Bankruptcy Code (Title 11, United States Code), as now or hereafter in effect, or if CONTRACTOR takes any equivalent or similar action by filing a petition or otherwise under any other federal or state law in effect at such timing relating to the bankruptcy or insolvency;

15.2.1.2 If a petition is filed against CONTRACTOR under any chapter of the Bankruptcy Code as now or hereafter in effect at the time of filing, or if a petition is filed seeking any such equivalent or similar relief against CONTRACTOR under any other federal or state law in effect at the time relating to bankruptcy or insolvency;

15.2.1.3 If CONTRACTOR makes a general assignment for the benefit of creditors;

15.2.1.4 If a trustee, receiver, custodian or agent of CONTRACTOR is appointed under applicable law or under contract, whose appointment or authority to take charge of property of CONTRACTOR is for the purpose of enforcing a Lien against such property or for the purpose of general administration of such property for the benefit of CONTRACTOR'S creditors;

15.2.1.5. If CONTRACTOR admits in writing an inability to pay its debts generally as they become due;

15.2.1.6 If CONTRACTOR fails to perform the WORK in accordance with the Contract Documents (including, but not limited to, failure to supply sufficient skilled workers or suitable materials or equipment or failure to adhere to the progress schedule established under paragraph 2.6 as revised from time to time);

15.2.1.7 If CONTRACTOR disregards Laws or Regulations of any public body having jurisdiction;

15.2.1.8 If CONTRACTOR disregards the authority of EOR; or

15.2.1.9 If CONTRACTOR otherwise violates any provisions of the Contract Documents;

15.2.1.10 In the event of termination, the DISTRICT may take possession of the premises and all materials, tools, and appliances, thereon and finish the Work by whatever method it may deem expedient. In such cases, the Contractor shall only be entitled to receive payment for Work satisfactorily completed prior to the termination date, subject to any setoffs due the DISTRICT in completing the Project and for reimbursement of damages incurred. The DISTRICT may take possession of and use any materials, plant, tools, equipment, and property of any kind furnished by Contractor to complete the Work. In such case CONTRACTOR shall not be entitled to receive any further payment until the WORK is finished. If the expense incurred by the DISTRICT to finish the Work (including additional managerial and administrative services, plus the DISTRICT'S direct, indirect and consequential losses), exceeds the unpaid balance on this Contract, the Contractor or the Surety shall pay the difference to the DISTRICT promptly on demand. The expense incurred by the DISTRICT as herein provided, and the damage incurred through the Contractor's default, shall be certified by the Project Manager. The Contractor shall be responsible for both liquidated damages attributable to delay and for excess completion costs. The liability of the Contractor and its surety or sureties for such damages and costs is joint and several. The obligations of the Contractor and his surety with respect to the warranty and maintenance shall remain in full force and effect for the portion of the Work completed by the Contractor and shall not expire until the expiration of the prescribed time period measured from the final acceptance of the project in its entirety. These clauses shall survive the termination of this Contract. If the DISTRICT makes a determination pursuant to this Contract to hold the Contractor in default and terminate the Contract for cause and it is subsequently determined that any such determination was improper, unwarranted, or wrongful, then any such termination shall be deemed for all purposes as a termination without cause as described below. The Contractor agrees that it shall be entitled to no damages, allowances or expenses of any kind other than as provided in this Agreement in connection with such termination, and does expressly waive, in the event of termination, any and all claims for consequential damages, loss of bonding capability, destruction of business, unabsorbed home office overhead, lost profit and the like.

15.2.2 Where CONTRACTOR'S services have been so terminated by the DISTRICT, the termination shall not affect any rights or remedies of the DISTRICT against CONTRACTOR then existing or which may thereafter accrue. Any retention or payment of moneys due CONTRACTOR by the DISTRICT shall not release CONTRACTOR from liability.

15.3 DISTRICT MAY TERMINATE WITHOUT CAUSE:

15.3.1 The DISTRICT may terminate this Contract without cause by giving seven (7) days prior written notice to the Contractor, and in such event, the DISTRICT shall pay the CONTRACTOR for that portion of the Contract Sum, less the aggregate of previous payments, allocable to the WORK completed as of the Date of Termination, plus reasonable termination expenses. The DISTRICT also shall reimburse the CONTRACTOR for all costs necessarily incurred for organizing and carrying out the stoppage of the WORK and paid directly by the CONTRACTOR, not including overhead, general expenses or profit. The DISTRICT shall not be responsible to reimburse the CONTRACTOR for any continuing contractual commitments to subcontractors or material men or for penalties or damages for canceling such contractual commitments, (with the exception that the DISTRICT shall reimburse the CONTRACTOR for major materials or equipment purchased before termination if the CONTRACTOR can show proof of said purchases prior to notice of termination) inasmuch as the CONTRACTOR shall make all subcontracts and other commitments subject to this provision. In the event of termination by the DISTRICT, the DISTRICT may require the CONTRACTOR promptly to assign to it all or some subcontracts, construction, plant, materials, tools, equipment,



appliances, rental agreements, and other commitments which the DISTRICT, in its sole discretion, chooses to take by assignment, and in such event the CONTRACTOR shall promptly execute and deliver to the DISTRICT written assignments of the same.

15.4 REMOVAL OF EQUIPMENT DUE TO TERMINATION:

15.4.1 Removal of Equipment: In the case of termination of this Contract before completion, for any cause whatever, the CONTRACTOR, if notified to do so by the DISTRICT'S PROJECT MANAGER, shall promptly remove any part or all of this equipment and supplies from the property of the DISTRICT. Should the CONTRACTOR not remove such equipment and supplies, the DISTRICT shall have the right to remove them at the expense of the CONTRACTOR. Equipment and supplies shall not be construed to include such items for which the CONTRACTOR has been paid in whole or in part.

15.5 CONTRACTOR MAY STOP WORK OR TERMINATE:

15.5.1 If, through no act or fault of CONTRACTOR, the WORK is suspended for a period of more than ninety (90) days by the DISTRICT or under an order of court or other public authority, or EOR fails to act on any Application for Payment within thirty (30) days after it is submitted, or the DISTRICT fails for sixty (60) days to pay CONTRACTOR any sum finally determined to be due, then CONTRACTOR may, upon seven (7) days written notice to the DISTRICT and EOR, terminate the Contract and the DISTRICT shall pay the CONTRACTOR for that portion of the Contract Sum, less the aggregate of previous payments, allocable to the WORK completed as of the Date of Termination plus reasonable termination expenses. The DISTRICT shall not be responsible to reimburse the CONTRACTOR for any continuing contractual commitments for canceling such contractual commitments inasmuch as the CONTRACTOR shall make all subcontracts and other commitments subject to this provision. The DISTRICT may require the CONTRACTOR promptly to assign to it all or some subcontracts, construction, plant, materials, tools, equipment, appliances, rental agreements, and any other commitments which the DISTRICT, in its sole discretion, chooses to take by assignment, and in such event the CONTRACTOR shall promptly execute and deliver to the DISTRICT written assignments of the same. In addition and in lieu of terminating the Contract, if EOR has failed to act on an Application for Payment or the DISTRICT has failed to make any payment as aforesaid, CONTRACTOR may upon seven days written notice to the DISTRICT and EOR stop the WORK until payment of all amounts then due. The provisions of this paragraph shall not relieve CONTRACTOR of the obligations under paragraph 6.24, Continuing the Work, to carry on the WORK in accordance with the progress schedule and without delay during disputes and disagreements with the DISTRICT.

ARTICLE 16 – DISPUTE RESOLUTION

16.1 GOOD FAITH EFFORT:

16.1.1 Any disputes relating to interpretation of the terms of this Contract or a question of fact or arising under this Contract shall be resolved through good faith efforts upon the part of the CONTRACTOR and the DISTRICT or its Project Manager. At all times, the CONTRACTOR shall carry on the work and maintain its progress schedule in accordance with the requirements of the Contract and the determination of the DISTRICT or its representatives, pending a final resolution of the dispute, including, if necessary, any determination by a Court of competent jurisdiction. Any dispute which is not resolved by mutual agreement of CONTRACTOR and DISTRICT Project Manager shall be decided by the DISTRICT Superintendent or designee who shall reduce the decision to writing. The decision of the DISTRICT shall be final and conclusive unless determined by a court of competent jurisdiction to be fraudulent, capricious, arbitrary, so grossly erroneous as to necessarily imply bad faith, or not be supported by substantial evidence.

16.2 MEDIATION:

16.2.1 Prior to initiating any litigation concerning this Contract, the DISTRICT reserves the right to submit the disputed issue or issues to a mediator for non-binding mediation. The parties shall agree on a mediator chosen from a list of certified mediators available from the Clerk of Court for Martin County. The fee of the mediator shall be shared equally by the parties. To the extent allowed by law, the mediation process shall be confidential and the results of the mediation or any testimony or argument introduced at the mediation shall not be admissible as evidence in any subsequent proceeding concerning the disputed issue.

ARTICLE 17 – MISCELLANEOUS

17.1 GIVING NOTICE:

17.1.1 All notices, requests, consents, and other communications required or permitted under this Contract shall be in writing and shall be (as elected by the person giving such notice) hand delivered by messenger or courier service, telecommunicated, electronically communicated, or mailed by registered or certified mail (postage prepaid) return receipt requested, addressed to:

<u>As To DISTRICT:</u>	<u>With A Copy To:</u>	<u>CONTRACTOR:</u>
Director of Facilities	Director of Purchasing	Individual or to a member of the firm or to an officer of the corporation for whom it is intended
Martin County School District	Martin County School District	
1050 East 10 th St.	2845 S.E. Dixie Hwy, Bldg 7	
Stuart, Fl., 34996	Stuart, Fl., 34997	

17.2 COMPUTATION OF TIME:

17.2.1 When any period of time is referred to in the Contract Documents by days, it shall be computed to exclude the first and include the last day of such period. If the last day of any such period falls on a Saturday or Sunday or on a day made a legal holiday by the law of the applicable jurisdiction, such day shall be omitted from the computation.

17.3 NOTICE OF CLAIM:

17.3.1 Should DISTRICT or CONTRACTOR suffer injury or damage to person or property because of any error, omission or act of the other party or of any of the other party's employees or agents or others for whose acts the other party is legally liable, claim shall be made in writing to the other party within a reasonable time of the first observance of such injury or damage. The provisions of this paragraph 17.3 shall not be construed as a substitute for or a waiver of the provisions of any applicable statute of limitations or repose.

17.4 CUMULATIVE REMEDIES:

17.4.1 The duties and obligations imposed by these General Terms & Conditions and the rights and remedies available hereunder to the parties hereto, and, in particular but without limitation, the warranties, guarantees and obligations imposed upon CONTRACTOR by Sections 6, Contractor's Responsibilities, Section 13, Test and Inspections, Correction, Removal or Acceptance of Defective Work, Section 14, Payments to Contractor and Completion, and Section 15, Suspension of work and Termination and all of the rights and remedies available to the DISTRICT and EOR thereunder, are in addition to , and are not to be construed in any way as a limitation of, any rights and remedies available to any or all of them which are otherwise imposed or available by Laws or Regulations, by special warranty or guarantee or by other provisions of the Contract Documents, and the provisions of this paragraph shall be as effective as if repeated specifically in the Contract Documents in connection



with each particular duty obligation, right and remedy to which they apply. All representations warranties and guarantees made in the Contract Documents shall survive final payment and termination or completion of the Contract.

17.5 ACCIDENT AND PREVENTION:

17.5.1 The safety provisions of applicable laws and building and construction codes shall be observed and the Contractor shall take or cause to be taken such additional safety and health measures as the Local Public Agency involved may determine to be reasonably necessary. Machinery, equipment and all hazards shall be guarded in accordance with the safety provisions of the "Manual of Accident Prevention in Construction" as published by the Associated General Contractors of America, Inc. to the extent that such provisions are not in conflict with applicable laws. The Contractor shall maintain an accurate record of all cases of death, occupational disease, or injury requiring medical attention or causing loss of time from WORK, arising out of and in the course of employment on WORK under the Contract. The Contractor shall promptly furnish the Local Public Agency with reports concerning these matters.

17.6 FLORIDA PRODUCTS AND LABOR:

17.6.1 The CONTRACTOR'S attention is called to Section 255.04, Florida Statutes, which requires that on public building contracts, Florida products and labor shall be used wherever price and quality are equal.

17.6.2 255.099 Preference to State Residents.—

(1) Each contract for construction that **is funded by state funds** must contain a provision requiring the contractor to give preference to the employment of state residents in the performance of the work on the project if state residents have substantially equal qualifications to those of nonresidents. A contract for construction funded by local funds may contain such a provision.

(a) As used in this section, the term "substantially equal qualifications" means the qualifications of two or more persons among whom the employer cannot make a reasonable determination that the qualifications held by one person are better suited for the position than the qualifications held by the other person or persons.

(b) A contractor required to employ state residents must contact the Department of Economic Opportunity to post the contractor's employment needs in the state's job bank system.

(2) No contract shall be let to any person refusing to execute an agreement containing the provisions required by this section. However, in work involving the expenditure of federal aid funds, this section may not be enforced in such a manner as to conflict with or be contrary to federal law prescribing a labor preference to honorably discharged soldiers, sailors, or marines, or prohibiting as unlawful any other preference or discrimination among the citizens of the United States.

17.6.3 255.0991 Contracts For Construction Services; Prohibited Local Government Preferences.—

(1) For purposes of this section, the term:

(a) "Competitive solicitation" has the same meaning as in s. 255.248.

(b) "State-appropriated funds" means all funds appropriated in the General Appropriations Act, excluding federal funds.

(2) For a competitive solicitation for construction services in which 50 percent or more of the cost will be paid from state-appropriated funds which have been appropriated at the time of the competitive solicitation, a state college, county, municipality, school district, or other political subdivision of the state **may not use a local ordinance** or regulation that provides a preference based upon:

(a) The contractor's maintaining an office or place of business within a particular local jurisdiction;

(b) The contractor's hiring employees or subcontractors from within a particular local jurisdiction; or

(c) The contractor's prior payment of local taxes, assessments, or duties within a particular local jurisdiction.

(3) For any competitive solicitation that meets the criteria in subsection (2), a state college, county, municipality, school district, or other political subdivision of the state shall disclose in the solicitation document that any applicable local ordinance or regulation does not include any preference that is prohibited by subsection (2).

(4) Except as provided in subsection (2), this section does not prevent a state college, county, municipality, school district, or other political subdivision of the state from awarding a contract to a contractor in accordance with applicable state laws or local ordinances or regulations.

17.6.4 255.20 Specification of State-Produced Lumber.

(3)(a) All county officials, boards of county commissioners, school boards, city councils, city commissioners, and all other public officers of state boards or commissions that are charged with the letting of contracts for public work, for the construction of public bridges, buildings, and other structures must specify in the contract lumber, timber, and other forest products produced and manufactured in this state, if wood is a component of the public work, and if such products are available and their price, fitness, and quality are equal.

(b) This subsection does not apply:

1. To plywood specified for monolithic concrete forms.

2. If the structural or service requirements for timber for a particular job cannot be supplied by native species.

3. If the construction is financed in whole or in part from federal funds with the requirement that there be no restrictions as to species or place of manufacture.

17.7 EMPLOYEES:

17.7.1 All labor described in these specifications or indicated on the Drawings and the WORK specified or indicated shall be executed in a thoroughly substantial and workmanlike manner by mechanics skilled in the applicable trades.

17.7.2 Any person employed on the WORK who fails, refuses or neglects to obey the instructions of the CONTRACTOR in anything relating to this WORK or who appears to the DISTRICT to be disorderly, intoxicated, insubordinate, or incompetent, shall upon the order of the DISTRICT, be at once discharged and not again employed in any part of the WORK. Any interference with, or abuse or threatening conduct toward the DISTRICT, EOR or their inspectors by the CONTRACTOR or his employees or agents, shall be authority for the DISTRICT to annul the Contract and re-let the WORK. No intoxicating substance shall be allowed on the WORK site.

17.8 NON-DISCRIMINATION:

17.8.1 The CONTRACTOR shall not discriminate against employees or applicants for employment because of race, creed, color, religion, sex, age, handicapped status, disabilities, or national origin. The CONTRACTOR shall endeavor to ensure that applicants are employed and that employees are treated during employment, without regard to their race, creed, color, religion, sex, age, handicapped status, or national origin. Such action shall include but not be limited to the following: employment, upgrading, demotion, or transfer; recruitment advertising; layoff or termination; rates of pay or other forms of compensation; and selection for training including apprenticeship.



The CONTRACTOR agrees to post in conspicuous places, available to employees and applicants for employment, notices setting forth the provisions of this nondiscrimination clause. These provisions apply to all subcontractors and it is the responsibility of the subcontractor compliance.

17.9 DRUG-FREE WORKPLACE:

17.9.1 The DISTRICT requires all prospective contractors to maintain a drug free work place and have their Drug Free Workplace policy posted in their offices and available for inspection by the DISTRICT.

17.10 PUBLIC ENTITY CRIMES:

17.10.1 Pursuant to F.S. 287.133, as amended: a person or affiliate who has been placed on the convicted vendor list following a conviction for a public entity crime may not submit a Bid on a Contract to provide any goods or services to a public entity, may not submit a Bid on a Contract with a public entity for the construction or repair of a public building or public work, may not submit Bids on leases of real property to a public entity, may not be awarded or perform work as a Contractor, supplier, subcontractor, or EOR under a Contract with any public entity, and may not transact business with any public entity in excess of the threshold amount provided in F.S. 287.017 for CATEGORY TWO or higher for a period of 36 months from the date of being placed on the convicted vendor list.

The DISTRICT shall not intentionally award publicly-funded contracts to any contractor who knowingly employs unauthorized alien workers, constituting a violation of the employment provisions contained in U.S.C. Section 1324a(e) [Section 274A9e) of the Immigration and Nationality Act (INA@)].The DISTRICT shall consider the employment by any contractor of unauthorized aliens a violation of Section 274A(e) of the INA. Such a violation by the Recipient of the employment provisions contained in Section 274A(e) of the INA shall be grounds for unilateral cancellation of this Agreement by the DISTRICT.

17.11 ASSIGNMENT:

17.11.1 This Contract, nor any monies due hereunder, or any part thereof, shall not be assigned, or transferred, by CONTRACTOR, nor shall the DISTRICT be liable to any assignee or transferee, without the written consent of the DISTRICT, to the assignment, or transfer. The DISTRICT shall not release or discharge CONTRACTOR from any obligation hereunder. The DISTRICT shall not approve an assignment or transfer unless the Surety on the Contract Performance and Payment Bonds has informed the DISTRICT in writing that it consents to the assignment or transfer.

17.12 VENUE:

17.12.1 This Contract shall be interpreted as a whole unit and section headings are for convenience only. All interpretations shall be governed by the laws of the State of Florida. In the event it is necessary for either party to initiate legal action regarding this Contract, venue shall be exclusively in the Nineteenth Judicial Circuit for Martin County, Florida, for claims under state law and the Southern District of Florida for any claims which are justiciable in Federal court.

17.13 FUNDING OUT:

17.13.1 Florida School Laws prohibit the Board or its designee from creating obligations on anticipation of budgeted revenues from one fiscal year to another without year-to-year extension provisions in the contracts. It is necessary that fiscal funding out provisions be included in all bids in which the terms are for periods of longer than one year. Therefore, the following funding out provisions are an integral part of this Invitation to Bid and must be agreed to by all CONTRACTORS:

17.13.2 The Board or its designee may, during the contract period, terminate or discontinue the items covered in this bid for lack of appropriated funds upon the same terms and conditions.

17.13.3 Such prior written notice shall state that the lack of appropriated funds is the reason for termination, and

17.13.4 Board agrees not to replace the equipment or services being terminated with equipment and services with functions similar to those performed by the equipment covered in this bid from another awarded CONTRACTOR in the succeeding funding period.

17.14 DISTRICT PURCHASING CARD:

17.14.1 The School District has authorized the use of a Purchasing Card to expedite small dollar purchases for materials, supplies, and other items needed for daily operations. CONTRACTOR may be presented these credit cards by authorized School District personnel for the above mentioned purchases.

17.14.2 Additionally, The District reserves the right to use the Purchasing Card as an optional method to pay invoices for the project WORK submitted by the CONTRACTOR.

17.15 DEBARMENT:

17.15.1 The Board shall have the authority to debar a person / corporation for cause for consideration or award of future contracts. The debarment shall be for a period commensurate with the seriousness of the causes, generally not to exceed three (3) years. When the offense is shallful or blatant, a longer term of debarment may be imposed, up to an indefinite period.

17.16 REQUIREMENTS FOR PERSONNEL ENTERING DISTRICT PROPERTY:

17.16.1 Possession of firearms shall not be tolerated in or near school buildings. Nor shall violations of Federal or State Laws and any applicable District policy regarding Drug Free Workplace be tolerated. Violators shall be subject to immediate termination.

17.16.2 "Firearm" means any weapon (including a starter gun or antique firearm) which shall, is designed to, or may readily be converted to expel a projectile by the action of an explosive; the frame or receiver of any such weapon; any destructive device; or any machine gun.

17.16.3 No person who has a firearm in their vehicle may park their vehicle on District property. Furthermore, no person may possess or bring a firearm on District property.

17.16.4 If any employee of an independent awarded CONTRACTOR or subcontractor is found to have brought a firearm on District property, said employee must be terminated from the Board project by the independent awarded CONTRACTOR or subcontractor. If the subcontractor fails to terminate said employee, the subcontractor's agreement with the independent awarded CONTRACTOR for the District project shall be terminated. If the independent awarded CONTRACTOR fails' to terminate said employee or fails to terminate the agreement with the subcontractor, who fails to terminate said employee, the independent awarded CONTRACTOR's agreement with the District shall be terminated.

17.16.5 CONTRACTORS are advised that they are responsible to ensure that no employee, agent or representative of their company who has been convicted or who is currently under investigation for a crime against children in accordance with section 435.04, Florida Statutes shall enter any school site.

17.17 BACKGROUND INVESTIGATION:

17.17.1 As a part of the Bid evaluation process, the District may conduct a background investigation including a criminal



record check of CONTRACTOR's officers and/or employees, by the Sheriff's Office. The CONTRACTOR's submission of a bid constitutes acknowledgement of and consent to such investigation. The District shall be the sole judge in determining the CONTRACTOR's qualifications.

17.18 PRODUCT RECALL:

17.18.1 In the event the awarded CONTRACTOR receives notice that a product delivered by the awarded CONTRACTOR to the District has been recalled, seized or embargoed, and/or has been determined to be misbranded, adulterated, or found to be unfit for human consumption by a packer, processor, subcontractor, retailer, manufacturer, or by any State or Federal regulatory agency, the awarded CONTRACTOR shall notify the District's Purchasing Department within two business days of receiving such notice. The District's acceptance or failure to reject the affected product as non-conforming shall not in any way impact, negate, or diminish the awarded CONTRACTOR's duty to notify the District's Purchasing Department that the affected product has been recalled, seized or embargoed, and/or has been determined to be misbranded, adulterated, or found to be unfit for human consumption. The form and content of such notice to the District shall include the name and description of the affected product; the approximate date the affected product was delivered to the District; the bid number; and relevant information relating to the proper handling of the affected product and/or proper disposition of the affected product by the District, if necessary to protect the health, welfare, and safety of District students or employees; and any health hazards known to the awarded CONTRACTOR which may be caused or created by the affected product.

17.18.2 The awarded CONTRACTOR shall, at the option of the Purchasing Department, either reimburse the purchase price or provide an equivalent replacement product at no additional cost to the District. Unless it was absolutely necessary for the District to dispose of the affected product, the awarded CONTRACTOR shall be responsible for removal and/or replacement of the affected product within the time specified by the District, without causing significant inconvenience to the District.

17.18.3 At the option of the District, the awarded CONTRACTOR may be required to reimburse storage, disposal and/or handling fees to be calculated from time of delivery and acceptance to actual removal or disposal. The awarded CONTRACTOR shall bear all costs associated with the removal and proper disposal of the affected product. The failure to reimburse the purchase price and storage and/or handling fees or to remove and/or replace the affected product with an equivalent replacement within the time specified by the District, without causing significant inconvenience to the District shall be considered a default.



SECTION V SPECIAL CONDITIONS

5.1 QUALIFICATIONS OF BIDDERS

This ITB shall be awarded only to a responsive and responsible Bidder, qualified to provide the work specified. The Bidder should submit the following information with their bid response package to be considered responsive in order for the District to fully evaluate the firm's qualifications. Failure to fully submit the requested information may result in the bid response being considered non-responsive.

- A. No bid will be accepted from, nor will any contract be awarded to, any person who is in arrears to the District, upon any debt or contract, or who has defaulted, as surety or otherwise, upon any obligation to the District, or who is deemed irresponsible or unreliable by the Martin County School Board in its sole discretion.
- B. Contractor must provide proof of at least three (3) successfully completed projects in similar scope and complexity within the past five (5) years.
- C. Contractor must provide current proof of a general contractor's license to work in the State of Florida and must be registered with the State of Florida DBPR Construction Industry Licensing Board at time of Bid opening. Copies of all applicable certificates, registrations and licenses must be submitted with the Bid and must be in the name of the Bidder shown on the Signature of Bidder Form.
- D. Contractor must provide proof that their firm is registered with the Division of Corporations for the State of Florida.
- E. Contractor shall comply with Business Tax Receipt requirements for their business location, if required. A copy of the business tax receipt or proof of exemption must be included with the submittal package.
- F. Contractor shall provide evidence of bondability/Letter of Credit from Surety within their submittal response.

5.2 MEETING SCHEDULE

- A. **Mandatory Pre-Bid Meeting:** A Mandatory Pre-Bid Meeting will be held on June 10, 2021 at 10:00 AM via Zoom teleconference. Zoom meeting information will be posted on the Purchasing Website: <https://www.martinschools.org/Page/945>. All Interested Bidders are required to register via Zoom. Participants will remain in a waiting room muted upon entry. The Purchasing Chair will unmute and allow entry prior to 10:05 am. Promptly at 10:06am call to order by Chair followed by Roll Call. Contractors that participate in roll call shall announce company name, name of representative and title, which shall act as proof of attendance in order for their Bid to be considered. Participants that arrive after 10:05am will be considered late and shall not be permitted entry to the meeting. Failure to attend the Mandatory Prebid Meeting shall be cause for disqualification of Bidder's submittal.
- B. **Site Visit:** Contractors that participate in the Mandatory Prebid Meeting, as stated above, will be provided, by email, the location, date and time, to complete the Site Visit. The Contractor shall visit the facility and thoroughly familiarize themselves with existing conditions. No claims for additional work due to reasonable inferred observable conditions will be considered. Bidders shall make every effort to attend the scheduled site visit dates. Dates for additional appointments shall not be granted. This is a site visit only and no questions will be addressed. Contractors shall address their questions in writing to the bids@martinschools.org. Any requests for modifications shall be presented in writing as possible addenda to the "Invitation to Bid" in accordance with the Instructions to Bidders. **Oral explanation given before the bid opening will not be binding.** Contractors interested in attending must bring their own equipment to view the existing conditions.
- C. **Questions Deadline:** The Purchasing Department will receive written requests for clarification and inquiries concerning the meaning or interpretation of this ITB. Questions shall be emailed to bids@martinschools.org with reference to the ITB number in the subject for faster recognition.



Only questions answered by formal written Addenda issued by the MCSD Purchasing Department shall be binding. Oral and other interpretations or clarifications shall be without legal effect. The District will respond to written inquiries, if received by no later than 2:00pm on June 23, 2021. The District shall record its responses to inquiries and any supplemental instructions in the form of a written addendum. If addenda are issued, the District **shall make every attempt to issue such** addenda at least seven (7) calendar days before the date fixed for receiving the bid submittals.

- D. **Bid Opening:** Firms desiring to provide the goods and services described above shall submit one (1) complete electronic submittal, contained in one (1) file, PDF format preferred, submitted electronically through www.DemandStar.com or bids@martinschools.org containing all of the required information on the proper forms as identified in Section VII, **no later than 2:00pm, June 30, 2021.** Bids will be opened and read aloud via Zoom teleconference. It is the sole responsibility of the Bidder to assure that bids are received no later than the specified time and date.
- E. **Preconstruction Conference:** The District will schedule a preconstruction conference within fifteen (15) business days after Notice of Award. The final executed contract, notice to proceed, bid bond, and purchase order will be distributed at the Preconstruction Meeting.

5.3. BUSINESS OPERATIONS

- A. **Hours of Operation:** Unless otherwise directed by the Facilities Director; or designee, the successful Contractor(s) shall insure that the following schedule is adhered to and services as required must be scheduled to insure that **all work must be between the hours of 2:30 PM and 10:30pm**, including weekends from the hours of 7:00am until 7:00pm. No additional expenses shall be granted for work performed after hours. Contractor is not permitted to perform work on any District observed holiday, without the written consent of the District Project Manager. Detailed work schedule shall be determined in advance at the preconstruction meeting.
- B. **Inclement Weather Conditions:** Upon approval by the Facilities Director or designee, the Contractor may cease operations of services during inclement weather conditions.
- C. **Observed Holidays:** The District also schedules non-work days throughout the calendar year. The Facilities Director or designee will notify the awarded Contractor of any non-work days that may affect the work schedule at the preconstruction meeting.

New Year's Day	Martin Luther King Day
President's Day	Spring Break
Memorial Day	Independence Day
Labor Day	Veteran's Day
Thanksgiving Day & Day After	Christmas Break

5.4 BADGE POLICY

This work is to take place on an active campus with active buildings around the area of work. All personnel working onsite with this project must have & wear MCSD badge at all times on the site. The Awarded Contractor must apply for the MCSD Badge and pay for all associated costs for each individual working on the project, and as specified in the General Notes of plan drawings.

5.5 SUBCONTRACTING

If a Contractor subcontracts any portion of a contract for any reason, he must include, in writing the **name and address of the Subcontractor**. Include the name of the person to be contacted, telephone number and extent of work to be performed. This information is to be submitted with bid response. If Contractor should need to change subcontractor information, changes are subject to the approval by the District. The District reserves the right to reject a bid of any bidder if the bid names a subcontractor who has previously failed in the proper performance of an award or failed to deliver on time contract of a similar nature, or who is not in a position to perform properly under this award.



5.6 AWARD METHOD

The District reserves the right to award on an all or none basis to the lowest and best responsive responsible bidder.

5.7 LIQUIDATED DAMAGES

Liquidated damages are identified in Section IV, Article 12, Change of Contract Time.

5.8 INSURANCE REQUIREMENTS & INDEMNIFICATION

The minimum limits of coverage are as specified below and supersedes Section IV, Article 5 of Supplementary Conditions. All other language with regard to Article 5 is applicable.

Type of Coverage	Minimum Coverage Limit	Notes
Commercial General Liability	\$1,000,000 / \$2,000,000	Requires endorsements CG 20 37 and 20 38 and contract language shall require Waiver of Subrogation
Workers' Compensation Employer's Liability	To Statutory Limits (F.S. 440) \$500,000/\$500,000/\$500,000	Contract language shall require Waiver of Subrogation
Auto Liability	\$1,000,000	Contract language shall require Waiver of Subrogation with owned, hired, and non-owned.
Umbrella Liability	\$3,000,000	Must follow form of underlying commercial general liability
Builder's Risk	Purchased by the contractor in form acceptable to the School Board, for full value of building and labor.	Applicable if project includes construction or rehab of a building (re-roof). School Board to be listed as additional insured and contractor responsible for deductibles.
Professional Liability	\$1,000,000	Required for all design and design/build activities such as architects, engineers, etc.
Pollution Liability	\$1,000,000	If applicable to work being performed
Railroad Protective Liability	\$1,000,000	If applicable to work being performed next to railroad property.



SECTION VI SCOPE OF WORK

6.1 WORK OBJECTIVE

The Martin County School District (hereinafter referred to as "MCSD") is soliciting a Licensed General Contractor to install new enhanced security systems in accordance with the MCSD Project Manual specifications and plans at the following four (4) schools:

- A. **Citrus Grove Elementary School:** This project includes the security enhancement of installing a new entry vestibule within the existing lobby of the administration area at Citrus Grove Elementary school located at 2527 SW Citrus Blvd, Palm City, FL 34990 within the Martin County School District. The installation of the new impact resistant storefront vestibule will correspond with the removal of an existing exterior window and replacing it with a new storefront door and window assembly. New casework, interior partition walls and doors will also be installed.
- B. **Indiantown Middle School:** This project includes the security enhancement of installing a new impact resistant storefront vestibule within the existing lobby of the administration area at Indiantown Middle School located at 16303 SW Farm Road, Indiantown, FL 34956 within the Martin County School District. New casework, interior partition walls and doors will also be installed.
- C. **J.D. Parker Elementary School:** This project includes the security enhancement of installing a new entry vestibule within the existing lobby of the administration area at J.D. Parker Elementary School located at 1010 East 10th Street, Stuart, FL 34996 within the Martin County School District. The installation of the new impact resistant storefront vestibule will correspond with the removal of an existing exterior window and replacing it with a new storefront door and window assembly. New casework, interior partition walls and doors will be installed.
- D. **Warfield Elementary School:** This project includes the security enhancement project for the reception/administration area at Warfield Elementary School located at 15260 SW 150th Street, Indiantown, FL 34956 within the Martin County School District, including the following: interior selective demolition of existing finishes, acoustical ceiling tiles, light fixtures, mechanical diffusers, doors, windows, walls and millwork. New work is composed of the installation of new impact resistant store fronts with card readers and electronic release hardware, new floor finishes, wall base, acoustical ceiling tiles, light fixtures, mechanical diffusers, metal stud and gypsum wall board walls, wall paint, and new millwork.

6.2 INTENT AND INFORMATION

- A. It is the intent of the bid and construction documents to have a finished project at completion of construction. Thus, the Bidder shall include all costs associated with the construction documents, including but not limited to, all necessary services, furnish and pay for all materials, labor, supervision, equipment, supplies, fees, expertise, incidentals and services necessary to ensure a full and complete bid for the construction and associated site work. If a specific bid quantity is not listed in the construction and bid documents, it is the Contractor's responsibility to include such items in like or in associated bid items.
- B. All work shall be performed in a professional and workmanlike manner; and shall conform to all applicable District, County, SREF, State, Federal Regulations, OSHA, 2017 Florida Building Code Sixth Edition, including amendments, and the Florida Fire Prevention code and any other applicable codes. The installation of the proposed work shall be in accordance with drawings and project manual specifications set forth in these documents, with direction given by the District and as per manufacturers recommended installation requirements.
- C. Contractors are advised to make a thorough inspection of the site. After bid has been awarded, no extra charge or compensation will be allowed by the District as a result of differences between actual materials and labor, unless by reason of unforeseeable causes beyond his control and without fault or negligence, including, but not restricted to acts of God or neglect of any other contractor.



- D. **Measurements:** Awarded Contractor will be responsible for their own measurements and must submit a firm price accordingly. There will be no adjustments, for increase or decrease of measurements required for this job. Therefore, the "Total Offer" must be based on accurate measurements by Contractor during inspection. Failure to do so will be at the Contractor's risk.
- E. **Inspection and Direction:** The work will be conducted under the general direction of the Facilities Department, and is subject to inspection by an appointed inspector to insure compliance with the terms of the bid. No inspector is authorized to change any provision of the specifications without written authorization from the Project Manager, nor shall the presence or absence of an inspector relieve the Contractor from any requirements of the bid. Appointments for the final inspection shall be made three (3) days in advance.
- F. **Schedule of Values:** All work for this project, including but not limited to, all profit and overhead, incidentals, all labor, mobilization/demobilization, supervision, testing, machinery, equipment, tools, materials, coordination with utility companies, cleanup and other means of construction necessary to complete the described work in accordance with the specifications, and other contract documents. The District close out form with punch list items must be completed prior to final payment.
- G. **Warranty:** The successful bidder shall warranty all workmanship/labor for a period of 12 months from date of completion and final acceptance by the Facilities Department designee. Should any defect in workmanship, excepting ordinary wear and tear, appear during the above stated warranty period, the successful bidder shall repair or replace same at no cost to the District, immediately upon written notice from the Facilities Department Designee.
- H. The specifications and drawings were prepared by Harvard Jolly Architecture (HJA), Master Consulting Engineers Inc., and Johnson, Levinson, Ragan, Davila, Inc. (JLRD).
- I. Contractor shall not change its Construction Project Manager (CPM), unless agreed to by the District in writing. The Facilities Director or designee shall have the right to direct Contractor to remove or replace any on-site personnel whose performance becomes unsatisfactory to the District. In such event, Contractor shall promptly replace such personnel without entitlement to additional personal or additional time for the replacement.

6.3 **CONTRACTOR RESPONSIBILITIES**

- The Contractor is responsible for construction means and methods.
- The Contractor will be working on fully active school site(s) & building(s). The Contractor is responsible for coordinating with District Facilities Staff all work.
- To obtain all permits and licenses required to perform work.
- All areas, regardless of location, will be required to be repaired, if disturbed by the installation of the scope of work.
- Review of all as-built documents before commencing construction and visit the site to recognize the areas within the scope of work.
- Manage the construction site and provide for the administration and supervision of the Project.
- Provide temporary public restroom facilities with daily maintenance.
- Maintain competent staff at the Project site and/or its office to coordinate and direct the work and sub-contractors: One or more of Construction Team (CT) shall be at the jobsite at all times when work is being performed.
- Provide continuous monitoring and inspection of work to determine progress and conformance. Establish and maintain project/construction schedule, including identifying variances, delays or early completion of tasks, and the maintenance of the schedule.
- Maintain written project progress records and provide written reports of project progress and status relating to budget, progress payments, change orders, performance and schedule adherence, including progress photos, job meeting notes, and status of applications for payment.



- Protection of property in the areas in the adjacent vicinity of the project; and for the protection of his own equipment, supplies, materials and work, against any damage resulting from the elements (such as flooding, rainstorms, wind damage, or other acts of God) or vandalism. Ensure the security of the project area, equipment and materials. Provide jobsite safety in accordance with OSHA requirements and jobsite security; Conduct a safety meeting with Construction staff, sub-contractors, District staff and EOR prior to starting work on site.
- Provide all signs, barricades and take all necessary precautions to protect buildings and personnel. All work shall be complete in every respect and accomplished in a satisfactory, workmanlike manner and contractor shall provide for timely removal of all debris from District properties.
- At all times guard against damage or loss to the property of the District or that of other vendors or contractors, and shall be held responsible for replacing or repairing any such loss or damage. The District may withhold payment or make such deductions, as deemed necessary, to ensure reimbursement or replacement for loss or damage to property through negligence of the successful bidder or their agents.
- In coordination with the Facilities Director or designee maintain a daily log containing a record of weather, sub-contractors working on the site, number of workers, work accomplished, problems encountered and other similar relevant data as the District may reasonably require.
- Schedule and coordinate all required inspections with appropriate disciplines and governing authorities including the District, School District Building Official, Fire Inspector, and etc. Perform or cause to be performed, all required remedial work identified through the inspection process.
- Monitor small business participation to ensure compliance with the established goal.
- Develop plan, coordinate, and assist in the start-up testing and certification of any systems and equipment, replaced and/or affected by the construction;
- Prepare shop drawings, RFI's and other documents necessary to accomplish the work.
- Establish and enforce job rules governing parking, use of facilities, clean-up and worker discipline.
- Manage the change order process, payment application process, through project close out coordination. Provide Certificate of Completion and all documents of record to PMT for archiving
- Ensure compliance with all applicable Federal, State laws, County and District ordinances, including but not limited to the Americans with Disabilities Act, State Requirements for Educational Facilities, and OSHA.

6.4 **BOND REQUIREMENTS**

The Successful Contractor shall be required to submit the following Bond requirements on a per project basis based upon method of award.

- A. **Bonding Capacity:** The awarded Contractor shall provide evidence of bondability, and a Letter of Credit from Surety within their submittal response that demonstrates the firm's capacity and credibility. **Capacity** is defined as the maximum output that a **business** can produce in a given period with the available resources, and the volume and aptitude of experienced personnel to simultaneously complete the work on all four schools in a timely manner.
- B. **Bid Bond:** The bond shall be in an amount equal to five percent (5%) of the total amount. The guarantee may be in the form of a Surety Bond with a carrier duly licensed and authorized to do business in the State of Florida, a Cashier's Check or a Certified Check (checks made payable to District). Purpose of the Bid Bond/Guarantee is to assure the apparent low, responsive and responsible bidder will enter into a contract to provide the described services. Should the Bidder not enter into a contract the Bid Bond/Guarantee shall be retained by the District to defray the additional costs of either awarding to the second low, responsive and responsible Bidder or re-advertise and re-solicit the project.
- C. **Payment & Performance Bonds:** Provide evidence confirming the firm's ability to obtain Payment and Performance Bonds for the construction project as detailed herein. The successful



Bidder will be required to furnish payment and performance bonds with a carrier duly licensed and authorized to do business in the State of Florida, equal to one hundred percent (100%) of the total amount of the contract to assure faithful performance and timely payments to all persons providing labor, materials or supplies used in the performance of the work.

6.5 PROJECT SCHEDULE

Project (Four (4) schools); Indiantown Middle School, Citrus Grove Elementary School, JD Parker Elementary School, and Warfield Elementary School with one (1) Schedule:

It is hereby understood and mutually agreed by and between parties hereto that the time of completion is an essential condition of this contract. By submitting a bid response, successful bidder agrees to start the work within 10 days of issuance of the Notice to Proceed. Awarded Contractor is to prosecute the work uninterrupted in such a manner, with sufficient labor, equipment and/or materials so as to insure its completion by no later than 180 days from notice to proceed as indicated below:

- Calendar Days from Notice to Proceed to Completion of Shop Drawings, All Material Ordered & Delivered on Site, work progression
- Calendar Days from Completion of All Material Order & Delivered On-Site, work progression to Substantial Completion
- Calendar Days from Substantial Completion to Final Completion



SECTION VII

FORMS

- 7.1 COVER PAGE CHECKLIST
- 7.2 BID FORM
- 7.3 SCHEDULE OF PRICES
- 7.4 BID BOND
- 7.5 QUALIFICATIONS STATEMENT
- 7.6 SUBCONTRACTOR LIST
- 7.7 WARRANTIES
- 7.8 REFERENCE QUESTIONNAIRE
- 7.9 NON-COLLUSIVE AFFIDAVIT
- 7.10 CONFLICT OF INTEREST
- 7.11 DRUG FREE WORKPLACE
- 7.12 PUBLIC ENTITY CRIMES
- 7.13 NO BID



COVER PAGE CHECKLIST

THIS SHOULD BE THE FIRST PAGE OF YOUR SUBMITTAL

SOLICITATION NAME:

SOLICITATION NO:

COMPANY NAME:

PHONE NO:

- 1. Submit one (1) complete electronic submittal, contained in one (1) file, PDF format preferred, submitted electronically through www.DemandStar.com or bids@martinschools.org containing all of the required information **prior to the Bid deadline**. Bids submitted after the bid deadline shall be retained unopened and deemed non-responsive.
- 2. **Bid Bond:** Include a five percent (5%) Bid Bond. **Failure to provide a Bid guarantee will result in automatic rejection of your Bid.** All required Bonds must be submitted on the DISTRICT'S Bond forms, included in this document. *Failure to properly complete and submit this document using the form provided shall cause the Bid submittal to be rejected as non-responsive.*
- 3. Bid Form/Schedule of Bid Prices/Bid Submittal Certification: **Carefully read all Bid Documents, and properly complete the Bid Form and execute the certification.** *(Failure to properly complete and sign this document shall cause the Bid submittal to be rejected as non-responsive.)*
- 4. Bonding Guaranty Letter: **Failure to submit the notarized letter with your bid may cause it to be rejected as non-responsive.**
- 5. Bidder's Qualification Statement: **Complete and sign the Bidder's Qualification Statement.** *(Failure to properly complete and sign this document shall cause the Bid submittal to be rejected as non-responsive.)*
- 6. Subcontractor List: **Complete the form.**
- 7. Warranties: **Complete and sign the Warranties form**
- 8. References: **Complete and submit three references on the designated Form.**
- 9. Non-Collusion Affidavit: Sign the Non-Collusion Affidavit and have it notarized.
- 10. Conflict of Interest: Complete and sign the form.
- 11. Drug Free WorkPlace Form: **Sign the Drug Free WorkPlace Form.**
- 12. Public Entity Crime Statement: Sign the Public Entity Crime Statement and have it notarized.
- 13. Material List: **Complete the form.**
- 14. Proof of Insurance: Include proof of insurance containing **a provision or endorsement that the coverage afforded will not be canceled, reduced in coverage, or renewal refused until at least 30 days' prior written notice has been given to the DISTRICT and additional insured by certified mail. All such insurance required herein (except for worker's compensation and employer's liability) shall name the DISTRICT, and their officers, directors, agents, and employees as "additional insured".** Attach to the back of your submittal.
- 15. Licenses: **Attach certificate of competency, state registration and any other applicable licenses.** Attach to the back of your submittal.
- 16. **Proof that firm is registered with Florida Division of Corporations (Sunbiz) and Business Tax Receipt, if applicable.**
- 17. **IF "NO BID" is offered, please complete the last section in the Bid Form and return to the Purchasing Department.**



BID FORM

SOLICITATION NAME:

SOLICITATION NO:

Submitted By: (BIDDER)

Date:

A. SCOPE OF WORK

The scope of work as identified in Section VI, and in accordance with the MCSD Project Manual Specifications and Plans.

B. BIDDER ACKNOWLEDGES

In order to be considered for this project, **the Bidder must** have successfully completed a minimum of three (3) projects of similar scope and complexity over the past five (5) years, in the State of Florida, and must be able to document the required experience upon request.

- 1. The undersigned BIDDER proposes and agrees, if this Bid is accepted, to enter into an Contract with the DISTRICT to perform and furnish all WORK and deliver all materials in accordance with the bid documents as specified herein for the Contract Price and within the Contract Period indicated in this Bid.
- 2. This Bid will remain subject to acceptance for ninety (90) days after the day of Bid opening. BIDDER will sign and submit the necessary documents required by the DISTRICT within ten (10) days after the date of DISTRICT'S Notice of Award.
- 3. In submitting this Bid, BIDDER represents, as more fully set forth in the Contract, that;
 - a. BIDDER has examined the Bid Documents, including the following addenda, receipt of which is hereby acknowledged:

Number	Date	Number	Date	Number	Date
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____

- b. BIDDER has familiarized itself with the nature and extent of the Bid Documents, locality, and all local conditions and laws and regulations that in any manner may affect cost, progress, performance or furnishing of the WORK. These General Conditions are applicable to all specifications contained in the project manual.
 - c. BIDDER has given the DISTRICT written notice of all conflicts, errors or discrepancies that it has discovered in the Bid Documents and the written resolution thereof by the DISTRICT is acceptable to BIDDER.
- 4. BIDDER proposes to furnish the WORK in conformity with the specifications and at the Bid Prices referenced below in the Schedule of Bid Prices. The Bid Prices quoted have been checked and certified to be correct. Said Bid Prices are fixed and firm and shall be paid to BIDDER for the successful completion of its obligation as specified in the Bid Documents.
- 5. BIDDER agrees that the WORK will be completed by no later than _____.



6. BIDDER accepts the provisions of the Contract as to liquidated damages in the event of failure to complete the WORK on time.

7. Communications concerning this Bid shall be as follows:

Contact Person

Business Address

City, State, Zip Code

Business Phone No.

Fax No.

Cell Phone No.

8. Other pertinent information is as follows:

License No.
(Attach Copy)

Federal Tax ID No.

Federal Employment ID No.



SCHEDULE OF PRICES

For all work associated and described in the bid documents, drawings and specifications. The cost of incidental work described in these Contract Requirements, for which there are no specific Contract and or contract line items, shall be considered as part of the general cost of doing the work and shall be included in the prices for the various Contract Items.

The District intends to award a contract on an all or none basis to the lowest and best responsive responsible bidder. Items include all profit and overhead, incidentals, all labor, supervision, testing, machinery, equipment, tools, materials, cleanup and other means of construction to successfully complete the project in accordance with specifications and construction documents herein.

A materials list with unit price shall be recorded and reviewed with the Owner and Architect at each Project Progress Meeting. Acceptances of quantities / materials list used to date are to be documented in the Meeting Minutes.

If these documentation and approval procedures are not followed by the contractor, a later request for award of Unit Price Costs may be denied by the Owner and Architect.

ITEM	DESCRIPTION	TOTAL COST
1	Immobilization and Demobilization; all labor, supervision, equipment and materials as required for work to Citrus Grove Elementary School in accordance with specifications, including but not limited to the following:	
	Demolition and removal of demolition material as required for all work & materials in accordance with Construction Documents (Drawings & Specifications)	
	Ceiling Tile/Grid materials as required for all work & materials in accordance with Construction Documents (Drawings & Specifications)	
	Drywall Soffit/Framing materials as required for all work & materials in accordance with Construction Documents (Drawings & Specifications)	
	HVAC/Mechanical Systems materials as required for all work & materials in accordance with Construction Documents (Drawings & Specifications)	
	Electrical Materials/ Systems materials as required for all work & materials in accordance with Construction Documents (Drawings & Specifications)	
	Camera Phone, Card Reader, Push Button, Speaker Systems materials as required for all work & materials in accordance with Construction Documents (Drawings & Specifications)	
	Metal Stud Framing/ Drywall/ Finishing/ Patch & Repair Systems materials as required for all work & materials in accordance with Construction Documents (Drawings & Specifications)	
	Window Systems and associated materials as required for all work & materials in accordance with Construction Documents (Drawings & Specifications)	
	Door Frame/ Panels/ Hardware Systems and associated materials as required for all work & materials in accordance with Construction Documents (Drawings & Specifications)	
	Finish Floor Systems, associated materials and patching & repairing existing as required for all work & materials in accordance with Construction Documents (Drawings & Specifications)	
	Casework and associated materials as required for all work & materials in accordance with Construction Documents (Drawings & Specifications)	
	Painting, Priming, associated materials and patching & repairing existing as required for all work & materials in accordance with Construction Documents (Drawings & Specifications)	
	Concrete, Grout and associated materials required for all work & materials in accordance with Construction Documents (Drawings & Specifications)	
	Canopy System and associated materials required for all work & materials in accordance with Construction Documents (Drawings & Specifications)	
	All associated work & materials required to provide a complete project not listed above and in accordance with Construction Documents (Drawings & Specifications)	
SUBTOTAL ITEM 1		\$



ITEM	DESCRIPTION	TOTAL COST
2	Immobilization and Demobilization; all labor, supervision, equipment and materials as required to replace roof gutters at Indiantown Middle School in accordance with specifications, including but not limited to the following:	
	Demolition and removal of demolition material as required for all work & materials in accordance with Construction Documents (Drawings & Specifications)	
	Ceiling Tile/Grid materials as required for all work & materials in accordance with Construction Documents (Drawings & Specifications)	
	Drywall Soffit/Framing materials as required for all work & materials in accordance with Construction Documents (Drawings & Specifications)	
	HVAC/Mechanical Systems materials as required for all work & materials in accordance with Construction Documents (Drawings & Specifications)	
	Electrical Materials/ Systems materials as required for all work & materials in accordance with Construction Documents (Drawings & Specifications)	
	Camera Phone, Card Reader, Push Button, Speaker Systems materials as required for all work & materials in accordance with Construction Documents (Drawings & Specifications)	
	Metal Stud Framing/ Drywall/ Finishing/ Patch & Repair Systems materials as required for all work & materials in accordance with Construction Documents (Drawings & Specifications)	
	Window Systems and associated materials as required for all work & materials in accordance with Construction Documents (Drawings & Specifications)	
	Door Frame/ Panels/ Hardware Systems and associated materials as required for all work & materials in accordance with Construction Documents (Drawings & Specifications)	
	Finish Floor Systems, associated materials and patching & repairing existing as required for all work & materials in accordance with Construction Documents (Drawings & Specifications)	
	Casework and associated materials as required for all work & materials in accordance with Construction Documents (Drawings & Specifications)	
	Painting, Priming, associated materials and patching & repairing existing as required for all work & materials in accordance with Construction Documents (Drawings & Specifications)	
	Concrete, Grout and associated materials required for all work & materials in accordance with Construction Documents (Drawings & Specifications)	
	Canopy System and associated materials required for all work & materials in accordance with Construction Documents (Drawings & Specifications)	
	All associated work & materials required to provide a complete project not listed above and in accordance with Construction Documents (Drawings & Specifications)	
SUBTOTAL ITEM 2		\$
ITEM	DESCRIPTION	TOTAL COST
3	Immobilization and Demobilization; all labor, supervision, equipment and materials as required to replace roof gutters at JD Parker Elementary School in accordance with specifications, including but not limited to the following:	
	Demolition and removal of demolition material as required for all work & materials in accordance with Construction Documents (Drawings & Specifications)	
	Ceiling Tile/Grid materials as required for all work & materials in accordance with Construction Documents (Drawings & Specifications)	
	Drywall Soffit/Framing materials as required for all work & materials in accordance with Construction Documents (Drawings & Specifications)	
	HVAC/Mechanical Systems materials as required for all work & materials in accordance with Construction Documents (Drawings & Specifications)	



ITEM	DESCRIPTION	TOTAL COST
	Electrical Materials/ Systems materials as required for all work & materials in accordance with Construction Documents (Drawings & Specifications)	
	Camera Phone, Card Reader, Push Button, Speaker Systems materials as required for all work & materials in accordance with Construction Documents (Drawings & Specifications)	
	Metal Stud Framing/ Drywall/ Finishing/ Patch & Repair Systems materials as required for all work & materials in accordance with Construction Documents (Drawings & Specifications)	
	Window Systems and associated materials as required for all work & materials in accordance with Construction Documents (Drawings & Specifications)	
	Door Frame/ Panels/ Hardware Systems and associated materials as required for all work & materials in accordance with Construction Documents (Drawings & Specifications)	
	Finish Floor Systems, associated materials and patching & repairing existing as required for all work & materials in accordance with Construction Documents (Drawings & Specifications)	
	Casework and associated materials as required for all work & materials in accordance with Construction Documents (Drawings & Specifications)	
	Painting, Priming, associated materials and patching & repairing existing as required for all work & materials in accordance with Construction Documents (Drawings & Specifications)	
	Concrete, Grout and associated materials required for all work & materials in accordance with Construction Documents (Drawings & Specifications)	
	Canopy System and associated materials required for all work & materials in accordance with Construction Documents (Drawings & Specifications)	
	All associated work & materials required to provide a complete project not listed above and in accordance with Construction Documents (Drawings & Specifications)	
SUBTOTAL ITEM 3		\$
ITEM	DESCRIPTION	TOTAL COST
4	Immobilization and Demobilization; all labor, supervision, equipment and materials as required to replace roof gutters at Warfield Elementary School in accordance with specifications, including but not limited to the following:	
	Demolition and removal of demolition material as required for all work & materials in accordance with Construction Documents (Drawings & Specifications)	
	Ceiling Tile/Grid materials as required for all work & materials in accordance with Construction Documents (Drawings & Specifications)	
	Drywall Soffit/Framing materials as required for all work & materials in accordance with Construction Documents (Drawings & Specifications)	
	HVAC/Mechanical Systems materials as required for all work & materials in accordance with Construction Documents (Drawings & Specifications)	
	Electrical Materials/ Systems materials as required for all work & materials in accordance with Construction Documents (Drawings & Specifications)	
	Camera Phone, Card Reader, Push Button, Speaker Systems materials as required for all work & materials in accordance with Construction Documents (Drawings & Specifications)	
	Metal Stud Framing/ Drywall/ Finishing/ Patch & Repair Systems materials as required for all work & materials in accordance with Construction Documents (Drawings & Specifications)	
	Window Systems and associated materials as required for all work & materials in accordance with Construction Documents (Drawings & Specifications)	
	Door Frame/ Panels/ Hardware Systems and associated materials as required for all work & materials in accordance with Construction Documents (Drawings & Specifications)	



ITEM	DESCRIPTION	TOTAL COST
	Finish Floor Systems, associated materials and patching & repairing existing as required for all work & materials in accordance with Construction Documents (Drawings & Specifications)	
	Casework and associated materials as required for all work & materials in accordance with Construction Documents (Drawings & Specifications)	
	Painting, Priming, associated materials and patching & repairing existing as required for all work & materials in accordance with Construction Documents (Drawings & Specifications)	
	Concrete, Grout and associated materials required for all work & materials in accordance with Construction Documents (Drawings & Specifications)	
	Canopy System and associated materials required for all work & materials in accordance with Construction Documents (Drawings & Specifications)	
	All associated work & materials required to provide a complete project not listed above and in accordance with Construction Documents (Drawings & Specifications)	
SUBTOTAL ITEM 4		\$
CALENDAR DAYS FROM NOTICE TO PROCEED TO FINAL COMPLETION		DAYS
OVERALL TOTAL COST-(ITEMS 1-4)		\$

ALL LINE ITEMS MUST ADD UP TO THE TOTAL COST OF THAT SECTION AND TOTAL COST OF THE BID SUBMITTAL

Submitted on this day of , 20 .

- a. (If an individual, partnership, or non-incorporated organization)

Signature of BIDDER

By

- b. (If a corporation)

(Affix Seal)

Signature of BIDDER

By

Attested By Secretary

Incorporated under the laws of the State of .

BID PRICES WITHOUT THE MANUAL SIGNATURE OF AN AUTHORIZED AGENT OF THE BIDDER SHALL BE REJECTED AS NON-RESPONSIVE, NON-CONFORMING AND INELGIBLE FOR AWARD.



CERTIFICATE
(For Partnership)

I HEREBY CERTIFY that a meeting of the partners of _____, a Partnership under the laws of the State of _____ held on _____, 2021, the following resolution was duly passed and adopted:

"RESOLVED, that _____ as _____ of the Partnership, is hereby authorized to execute the Bid Form dated _____, 20____, between the Martin County School District, Florida, and this Partnership, and that the execution thereof, attested by the _____ of the Partnership be the official act and deed of this Partnership."

I further certify that said resolution is now in full force and effect.

IN WITNESS WHEREOF, I have hereunto set my hand this _____ day of _____, 2021.

Signature

Title

STATE OF FLORIDA

COUNTY OF _____

Sworn to and subscribed before me on this _____ day of _____, 2021 by _____ who is personally known to me or who has presented the following type of identification:

_____.

Signature of Notary Public, State of Florida

Notary seal (stamped in black ink)

OR

Printed, typed or stamped name of Notary and Commission Number



CERTIFICATE
(For Corporation)

I HEREBY CERTIFY that a meeting of the Board of Directors of _____, a corporation under the laws of the State of _____ held on _____, 2021, the following resolution was duly passed and adopted:

"RESOLVED, that _____, as _____ of the Corporation, is hereby authorized to execute the Bid Form dated _____, 20____, between the Martin County School District, Florida, and this Corporation, and that the execution thereof, attested by the Secretary of the Corporation and with corporate seal affixed, shall be the official act and deed of this Corporation".

I further certify that said resolution is now in full force and effect.

IN WITNESS WHEREOF, I have hereunto set my hand this ____ day of _____, 2021.

Secretary

STATE OF FLORIDA

COUNTY OF _____

Sworn to and subscribed before me on this ____ day of _____, 2021 by _____ who is personally known to me or who has presented the following type of identification: _____.

Signature of Notary Public, State of Florida

Notary seal (stamped in black ink)
OR
Printed, typed or stamped name of Notary and
Commission Number



BID BOND

STATE OF _____

COUNTY OF _____

KNOW ALL MY BY THESE PRESENTS that _____ as Principal, hereinafter called BIDDER and _____ as Surety, are held and firmly bound unto the Martin County School District, hereinafter called the DISTRICT in the penal sum of:

_____ Dollars \$_____

lawful money of the United States, for the payment of which sum will and truly to be made, we bind ourselves, our heirs, executors, administrators, and successors, jointly and severally, firmly by these presents.

THE CONDITIONS OF THIS OBLIGATION ARE SUCH, that whereas the BIDDER has submitted the accompanying Bid, dated _____, 20____, for:

PROJECT NAME _____

BID NO: _____

NOW, THEREFORE,

1. It is a condition precedent to the submission of said Bid that a certified check, cashiers check or bid bond in the amount of five percent (5%) of the base Bid be submitted with said Bid as a guarantee that BIDDER will, if awarded the contract, enter into a written contract with DISTRICT.
2. If the BIDDER shall not withdraw said bond within ninety (90) days after date of the same, and shall within fifteen (15) days after the prescribed forms are presented to him for signature, enter into a written contract with the DISTRICT in accordance with the Bid as accepted, and give bonds with good and sufficient surety or sureties, as may be required, for the faithful performance and proper fulfillment of such contract, then the above obligation shall be void and of no effect, otherwise the sum herein stated shall be due and payable to DISTRICT and the Surety herein agrees to pay said sum immediately upon demand of the DISTRICT in good and lawful money of the United States of America as liquidated damages for failure thereof of said BIDDER.

IN WITNESS WHEREOF, the above bounded parties executed this instrument under their several seals, this _____ day of _____, the name and corporate seal of each corporate party being hereto affixed and these presents duly signed by its undersigned representative, pursuant to authority of its governing body.



WITNESS: (If Sole Ownership or Partnership, two (2) Witnesses required. If Corporation, Secretary Only will attest and affix seal.)

WITNESSES:

_____ FIRM

_____ By Signature & Title

(AFFIX SEAL)

_____ Typed Name & Title Signed Above

ATTEST:

_____ CORPORATE SURETY (Affix Seal)

_____ Secretary

_____ By Signature & Title

_____ Typed Name & Title Signed Above

_____ Attorney in Fact (Affix Seal)

_____ Business Phone

_____ Business Address

_____ District

_____ State

(AFFIX SEAL)

_____ Name of Local Insurance Agency



CERTIFICATE AND AFFIDAVIT FOR BONDS (MUST BE SUBMITTED WITH ALL BONDS)

TO: THE MARTIN COUNTY SCHOOL DISTRICT BOARD

RE: Solicitation No: _____

Firm: _____

Name: _____

Address: _____

City/ State: _____ ZIP: _____

Phone: _____

Bond Amount: _____

SURETY BOND COMPANY:

Name: _____

Address: _____

City/ State: _____ ZIP: _____

Phone: _____

This is to certify that in accordance with Chapter 85-104, Laws of Florida (HB 1266) the insurer named above:

1. Holds a certificate of authority authorizing it to write surety bonds in the state of Florida;
2. Has twice the minimum surplus and capital required by the Florida Insurance Code; and
3. Holds a current valid certificate of authority issued by the United States Department of Treasury under Sections 9304 to 9308 of Title 31 of the United States Code.

Date

Agent and Attorney-in-Fact



QUALIFICATIONS STATEMENT

THE UNDERSIGNED GUARANTEES THE TRUTH AND ACCURACY OF ALL STATEMENTS AND ANSWERS HEREIN CONTAINED:

GENERAL INFORMATION: Contractor shall furnish the following information. Failure to comply with this requirement will render submittal non-responsive and shall cause its rejection. Additional sheets can be attached as required.

1. Contractor's Name, Principal Address, Phone Number, Fax Number, and email address as follows:

Contractor's Name and Principal Address: _____

Contact Person's Name and Title: _____

Contractor's Telephone, _____ Fax Number: _____

Contractor's Email address: _____

Contractor's License Number: _____
(Please attach certificate of status, competency, and/or state registration.)

Certification: [] MBE [] SFDB [] MWBE [] DVBE [] SBA [] Other
(Please attach certificate)

Contractor's Federal Identification Number: _____

2. Number of years your organization has been in business _____

State the number of years your firm has been in business under your present business name _____

State the number of years your firm has been in business in the work specific to this solicitation: _____

Names and titles of all officers, partners or individuals doing business under trade name:

3. How many years under a previous business name? List name(s) below.

4. Type of Business:

[] Sole Proprietorship [] Partnership [] Corporation [] Joint Venture

If a Corporation, answer this: _____

If a Partnership or Individual Proprietorship, answer this: _____

Date of incorporation: _____

Date of organization: _____

In what State: _____

If a partnership, state whether partnership is general, limited association: _____



5. Names and titles of all officers, partners or individuals doing business under trade name:

Name of Officers	Name and Address of Partners:
President:	
Vice President:	
Vice President:	
Secretary:	
Treasurer:	

**SUBSIDIARY OR AFFILIATED COMPANIES
IN WHICH PRINCIPALS HAVE FINANCIAL INTEREST**

NAME AND ADDRESS OF SUBSIDIARY OR AFFILIATED COMPANIES	EXPLAIN IN DETAIL THE PRINCIPAL'S INTEREST IN THIS COMPANY AND NATURE OF BUSINESS

6. Business Structure – Corporation, Joint Venture, or Partnership. Applicants submitting applications as joint ventures, shall submit a copy of their joint venture agreement. If a joint venture or prime/subcontractor arrangement of two (2) firms, indicate how the work will be distributed between the partners.

Business Structure	Indicate By (X)	Copy of Joint Venture Agreement Attached (Y/N)	If applicable, how will work be distributed between partners?
Corporation			
Joint Venture			
Partnership			

Length of time in business for separate Firms of a Joint Venture

Firm(s) Name	Length of Time in Business



7. Principal Office Location – Location of principal office, which will be responsible for implementation of this contract. Please list telephone number (s), facsimile number (s) and email address (s).

Form with two horizontal lines and a vertical line for inputting office location details.

8. Other Office Locations – Location of other offices from which resources may be drawn.

Form with four horizontal lines for inputting other office locations.

9. Firm is a certified Minority Business Enterprise as defined in Florida Statute 287.09431, and proof is attached.
Yes No

10. Have you, in the previous five years, been denied a contract award on which you submitted the low bid in competitive bidding, or been refused prequalification? If so, please list and describe

Horizontal line for inputting details for question 10.

11. Within the previous 5 years has your organization or predecessor organizations ever failed to complete a project? If so, state name of organization and reason thereof.

Horizontal line for inputting details for question 11.

12. Within the previous 5 years has your organization been involved in litigation? _____. If so, please list and explain nature and current status or resolution

Horizontal line for inputting details for question 12.

13. Within the last 10 years has your organization been convicted of a Public Entity Crime? If so, please explain.

Horizontal line for inputting details for question 13.

14. Is your organization currently pre-qualified with any governmental agency?_____ If so, please list.

Horizontal line for inputting details for question 14.

15. Name, address, and telephone number of surety company and agent who will provide the required bonds on this contract:

Horizontal line for inputting details for question 15.

16. What is the last project of this nature that you have completed?

Horizontal line for inputting details for question 16.

17. Have the Surety Company who will provide your bonds (said Surety Company must have an AM Best rating of Class XI A or better per the Supplementary Conditions, Section IV), provide you with written verification showing that your firm will be bonded for the amount of the contract. This must be submitted with your bid.



18. Have you personally inspected the proposed WORK and do you have a complete plan for its performance?

19. List three SIGNIFICANT SIMILAR PROJECTS (in scope and complexity) successfully completed within the past five (5) years.

Project No. 1	Location:	Your \$ Subcontract Amount:	\$ \$	Date Completed:
---------------	-----------	--	--------------	--------------------

Contracting Agency:	Contact Person:	Email: Tel: Fax:
---------------------	-----------------	------------------------

Project No. 2	Location:	Your \$ Subcontract Amount:	\$ \$	Date Completed:
---------------	-----------	--	--------------	--------------------

Contracting Agency:	Contact Person:	Email: Tel: Fax:
---------------------	-----------------	------------------------

Project No. 3	Location:	Your \$ Subcontract Amount:	\$ \$	Date Completed:
---------------	-----------	--	--------------	--------------------

Contracting Agency:	Contact Person:	Email: Tel: Fax:
---------------------	-----------------	------------------------

20. Give full information about all of your present contracts. In Column C insert "S" if a Subcontractor or "P" if a prime contractor, whether in progress or awarded but not yet begun; and regardless of with whom contracted.

A Project Description Location, Owner, Phone, Fax, email	B Design Architect And/Or Design Engineer	C Total Amount of Your Contract Or Subcontract)	D Amount In Column C Sublet To Others	E Uncompleted Amount of Contract
Total	Total	Total	Total	Total



21. List the pertinent experience of the key individuals of your organization assigned to this project.(continue on insert sheet, if necessary).

PRINCIPAL'S NAME	TITLE	YEARS OF CONSTRUCTION EXPERIENCE	IN WHAT CAPACITY AND WITH WHOM

SUPERVISORY PERSONNEL	TITLE	YEARS OF CONSTRUCTION EXPERIENCE	IN WHAT CAPACITY AND WITH WHOM

22. List your firm, licensing, type of work licensed for, and also the licensing and types of work the individual who will have personal supervision of the work is licensed for.

Name	License#	Type of Work

23. If subcontracting any part of this scope, list each subcontractor(s) on Item 7.6, Subcontractor List that will perform work.

24. What equipment do you own that is available for the WORK? (Attach additional sheets as necessary)

25. What equipment will you purchase for the proposed WORK? (Attach additional sheets as necessary)



26. What equipment will you rent for the proposed WORK? (Attach additional sheets as necessary)

27. List and describe all bankruptcy petitions (voluntary or involuntary) which have been filed by or against the Proposer, its parent or subsidiaries or predecessor organizations during the past five (5) years. Include in the description the disposition of each such petition.

28. List and describe all successful Bond claims made to your surety (ies) during the last five (5) years. The list and descriptions should include claims against the bond of the Proposer and its predecessor organization(s).

29. List all claims, arbitrations, administrative hearings and lawsuits brought by or against the Bidder or its predecessor organizations(s) during the three (3) years. The list shall include all case names; case, arbitration or hearing identification case or file numbers; the name of the engagement over which the dispute arose; and a description of the subject matter of the dispute, and the status or disposition of the reported action. For joint venture or team Bidders, submit the requested information for each member of the joint venture or team. Use additional paper if necessary.

30. List and describe all criminal proceedings or hearings concerning business related offenses in which the Bidder, its principals or officers or predecessor organization(s) were defendants.

31. Has the Firm, its principals, officers or predecessor organization(s) ever filed for bankruptcy? If so, provide details.

32. Principal Materials Manufacturer and Subcontractors. The Firm/Contractor who proposes to perform WORK specified and shown on the Drawings is submitting this Bid Form. The Schedule of Prices shown on the preceding pages(s) has been calculated and tabulated using basic material prices. The following is a list of material manufacturers and subcontractors whose materials and services said Contractor proposes to furnish and utilize if awarded a CONTRACT for the WORK specified herein and shown on the Plans. It is understood that the following list is not complete, but includes the names of manufacturers of the principal components and subcontractors supplying principal services to said project. It is also understood that if awarded a Contract, the Contractor will furnish the materials of the manufacturers and utilize the services of the subcontractors stated herein and that if for any reason whatsoever Contractor wishes to substitute materials or subcontractors Firm shall request permission in writing from the DISTRICT stating fully the reason for making such a request prior to ordering same.

All manufacturers or their authorized vendors have been made aware of all the appropriate portions of the solicitation Documents and agree that their materials will meet all of the requirements stated therein and deliveries will be scheduled so as not to impede the progress of the WORK.

Materials:

<u>Item</u>	:	<u>Manufacturer</u>
_____	:	_____
_____	:	_____
_____	:	_____



_____	:	_____
_____	:	_____
_____	:	_____
_____	:	_____
_____	:	_____
_____	:	_____
_____	:	_____
_____	:	_____
_____	:	_____
_____	:	_____

The Contractor acknowledges and understands that the information contained in response to this Qualification Statement shall be relied upon by DISTRICT in awarding the contract and such information is warranted by Firm to be true. The discovery of any omission or misstatement that materially affects the Contractor's qualifications to perform under the contract shall cause the DISTRICT to reject the Bid, and if after the award, to cancel and terminate the award and/or contract.

Print Name/Title

Date:

Signature

Email:



SUBCONTRACTOR LIST

The undersigned Contractor hereby designates, as follows, all major subcontractors whom he proposes to utilize for the major areas of work for the project. The Contractor is further notified that all subcontractors shall be properly licensed, bondable and shall be required to furnish the Owner with a certificate of insurance in accordance with Section VI, Special Conditions, and Insurance Requirements. Failure to furnish this information shall be grounds for rejection of the Contractor's submittal.

<u>Name, Address/ Phone#</u>	<u>License#</u>	<u>Specialty-Duties</u>	<u>Contract Amount \$</u>	<u>% of contract</u>
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
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_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____



The Firm acknowledges and understands that the information contained in response to this Qualification's Statement shall be relied upon by DISTRICT in awarding the contract and such information is warranted by Firm to be true. The discovery of any omission or misstatement that materially affects the Firm's qualifications to perform under the contract shall cause the DISTRICT to reject the Bid, and if after the award, to cancel and terminate the award and/or contract.

The Firm also acknowledges that all information listed above may be checked by the DISTRICT and authorizes all entities or persons listed above to answer any and all questions. Firm hereby indemnifies the DISTRICT and persons or entities listed above and hold them harmless from any claim arising from such authorization or the exercise thereof, including the dissemination of information requested above.

By _____
Signature

Date _____



WARRANTIES

In consideration of, and to induce the Award of **THE MARTIN COUNTY SCHOOL DISTRICT**, Construction Contract described in these Bid Documents, the Contractor represents and warrants to the Martin County School District:

1. The Contractor is financially solvent and sufficiently experienced and competent to perform all of the work required of the Contractor in the Construction Contract; and
2. That the facts stated in the Contractor's Bid and information given the Contractor pursuant to the request or proposal for Bids, instructions to Contractors and Specifications are true and correct in all respects; and
3. That the Contractor has read and complied with all of the requirements set forth in the request for Bids, instructions to Contractors and Specifications; and
4. That the Contractor warrants all materials supplied by it under the terms of the Construction Contract are delivered to the Martin County School District, free from any security interest, and other lien, and that the Contractor is a lawful owner having the right to sell the same and will defend the conveyance to the Martin County School District, against all persons claiming the whole or any part thereof; and
5. That the materials supplied to the Martin County School District, under the Construction Contract are free from the rightful claims of any persons whomsoever, by way of patent or trademark infringement or the like; and
6. That the materials supplied under the Construction Contract are merchantable within the meaning of the Uniform Commercial Code Section 2-314; and
7. That the materials supplied under the Construction Contract are free from defects in materials and workmanship under normal use and service and that any such materials found to be defective shall be replaced by the Contractor as per the attached Warranty.
8. That the materials supplied pursuant to the Construction Contract are fit for the purposes for which they are intended to be used; that under normal use and maintenance the material will continue to be fit for such purposes for the warranty period after delivery, provided that the District shall give the Contractor notice that the materials failed to fulfill the warranty; such notice shall state in what respect the materials have failed to fulfill the warranty, where upon the Contractor shall be allowed a reasonable time after receipt of such notice to correct the defect and the District agrees to cooperate in this regard. If the materials cannot be made to fulfill the Contract within the warranty period the Contractor will either furnish duplicate materials, or at its option refund the amount paid, which shall constitute a settlement in full for all damages occasioned by reason at this warranty of fitness; and
9. That this Warranty is included in exposures for which the Contractor has products liability and completed operations insurance, in minimum amounts of One Hundred Thousand (\$100,000.00) Dollars for property damage and Three Hundred Thousand (\$300,000.00) Dollars for personal injury as shown on the Certificates of such Insurance attached hereto, and the Contractor agrees to keep such insurance coverage during the period of this Warranty; and
10. That it is an express condition of this Warranty that the item(s) hereby warranted shall be operated and maintained by the District in accordance with the manufacturer's recommendations as to those portions of the item(s) that are not fabricated by the Contractor, and in accordance with the Contractor's recommendations, a copy of which has either been supplied to the District should maintain complete and accurate records made at the time of performance of maintenance showing compliance with such instructions, and by acceptance of this Warranty, the Martin County School District, agrees to present such records to the Contractor upon request in the event of a claim hereunder by the District;
11. The foregoing Warranties apply as a minimum and are supplemental to other Warranties offered. They are not substituted, but in addition to, any other Warranties offered; and



12. That it is agreed and understood by the Contractor that the Martin County School District, is induced to enter the Construction Contract in reliance upon this Warranty.

SIGNED, sealed and delivered on this _____ day of _____, 20____.

(SEAL)

CONTRACTOR:

By _____

ATTEST:

Secretary



REFERENCE CHECK QUESTIONNAIRE

PROJECT NO & NAME: _____

FIRM NAME: _____

BIDDERS COMPLETE THE FOLLOWING COMPANY INFORMATION IN TRIPLE-3 DIFFERENT FIRMS

Company Name:		Reference Contact:
Telephone:	Fax:	Email:

Please complete the following questionnaire below regarding services provided by the above listed firm and email to the Purchasing Department at bids@martinschools.org within 24 hours.

No.	Questions	Rating	Comments
1.	Was the Project completed within the promised time frame? If not, why?		
2.	Were change orders requested, what type, and were they granted, refused, and why?		
3.	Did the contractor provide enough labor to maintain the schedule?		
4.	Did the contractor provide on site supervision, and how much supervision was provided on a daily basis?		
5.	Did the contractor move his labor to other jobs and not work on your site during the course of the work?		
6.	What types of problems did you encounter, and how were they handled by the contractor?		
7.	Did they communicate well with staff?		
8.	Were pay requests timely, accurate, easy to read, and contain all required backup information?		
9.	Was the punchlist, and work required for substantial and full completion done efficiently? Were there any responsibility issues?		
10.	Would you consider using this firm again?		
11.	Any other comments you would like to make about the Firm		
Rating: 1=Poor 2=Fair 3=Average 4=Good 5=Excellent			

For internal use only (Staff Reviewer) _____



NON-COLLUSIVE AFFIDAVIT

STATE OF FLORIDA

COUNTY OF _____

_____ being first duly sworn, deposes and says that:

BIDDER is the _____,
(Owner, Partner, Officer, Representative or Agent)

BIDDER is fully informed respecting the preparation and contents of the attached BID and of all pertinent circumstances respecting such BID;

Such BID is genuine and is not a collusive or sham BID;

Neither the said BIDDER nor any of its officers, partners, owners, agents, representative, employees or parties in interest, including this affidavit, have in any way colluded, conspired, connived or agreed, directly or indirectly, with any other BIDDER, firm or person to submit a collusive or sham BID in connection with the Contract for which the attached BID has been submitted; or to refrain from bidding in connection with such Contract; or have in any manner, directly or indirectly, sought by agreement or collusion, or communications, or conference with any BIDDER, firm, or person to fix the price or prices in the attached BID or any other BIDDER, or to fix any overhead, profit, or cost element of the BID Price or the BID Price of any other BIDDER, or to secure through any collusion conspiracy, connivance, or unlawful agreement any advantage against (Recipient), or any person interested in the proposed Contract;

The price of items quoted in the attached BID are fair and proper and are not tainted by collusion, conspiracy, connivance, or unlawful agreement on the part of the BIDDER or any other of its agents, representatives, owners, employees or parties in interest, including this affidavit.

By _____

Subscribed and sworn to before me this _____ day of _____, 20____ by _____ who
 is personally known to me or who has presented the following type of identification: _____.

SEAL

Notary Public (Signature), State of Florida

My Commission Expires: _____



DISCLOSURE OF POTENTIAL CONFLICT OF INTEREST AND CONFLICTING EMPLOYMENT OR CONTRACTUAL RELATIONSHIP

In accordance with Instructions to Bidder's, each BIDDER must disclose, in its submittal, the names of any employees who are employed by BIDDER who are also an employee of MCSB. Persons identified below may have obligations and restrictions applicable to them under Chapter 112, Florida Statutes.

Name of Bidder's Employee	MCSB Title or Position of Bidder's Employee	MCSB Department/ School of Bidder's Employee
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

Check one of the following and sign:

- I hereby affirm that there are no known persons employed by BIDDER who are also an employee of MCSB.
- I hereby affirm that all known persons who are employed by BIDDER, who are also an employee of MCSB, have been identified above.

Signature

Company Name

Name, Title of Official

Business Address, City, State, Zip Code



DRUG FREE WORKPLACE CERTIFICATION

IDENTICAL TIE RFPS: Preference shall be given to businesses with drug-free workplace programs. Whenever two or more bids which are equal with respect to price, quantity, and service are received by the State or by any political subdivision for the procurement of commodities or contractual services, an ITB received from a business that certifies that it has implemented a drug-free workplace program shall be given preference in the award process. Established procedures for processing tie ITBs will be followed if none of the tied vendors have a drug-free workplace program (Florida Statutes Section 287.087). In order to have a drug-free workplace program, a business shall:

1. Publish a statement notifying employees that the unlawful manufacture, distribution, dispensing, possession, or use of a controlled substance is prohibited in the workplace and specifying the actions that will be taken against employees for violations of such prohibition.
2. Inform employees about the dangers of drug abuse in the workplace, the business's policy of maintaining a drug-free workplace, and available drug counseling, rehabilitation, and employee assistance programs, and the penalties that may be imposed upon employees for drug abuse violations.
3. Give each employee engaged in providing the commodities or contractual services that are under ITB a copy of the statement specified in subsection (1).
4. In the statement specified in subsection (1), notify the employees that, as a condition of working on the commodities or contractual services that are under ITB, the employee will abide by the terms of the statement and will notify the employer of any conviction of, or plea of guilty or nolo contendere to, any violation of Chapter 893 or of any controlled substance law of the United States or any state, for a violation occurring in the workplace no later than five (5) days after such conviction.
5. Impose a sanction on, or require the satisfactory participation in a drug abuse assistance or rehabilitation program if such is available in the employee's community, by any employee who is so convicted.
6. Make a good faith effort to continue to maintain a drug-free workplace through implementation of this section.

As the person authorized to sign the statement, I certify that this firm complies fully with the above requirements.

Signature

(Print or Type Name)



SWORN STATEMENT ON PUBLIC ENTITY CRIMES

THIS FORM MUST BE SIGNED IN THE PRESENCE OF A NOTARY PUBLIC OR OTHER OFFICER AUTHORIZED TO ADMINISTER OATHS.

1. I understand that a "public entity crime" as defined in Paragraph 287.133(1)(g), Florida Statutes, means a violation of any state or federal law by a person with respect to and directly related to the transaction of business with any public entity or with any agency or political subdivision of any other state or with the United States, including, but not limited to, any bid or contract for goods or services to be provided to any public entity or an agency or political subdivision of any other state or of the United States and involving antitrust, fraud, theft, bribery, collusion, racketeering, conspiracy, or material misrepresentation.
2. I understand that "convicted" or "conviction" as defined in Paragraph 287.133(1)(b), Florida Statutes, means a finding of guilt or a conviction of the public entity crime, with or without an adjudication of guilt, in any federal or state trial court of record relating to charges brought by indictment or information after July 1, 1989, as a result of a jury verdict, nonjury trial, or entry of a plea of guilty or nolo contendere.
3. I understand that an "affiliate" as defined in Paragraph 287.133(1)(a), Florida Statutes, means:
 - a. A predecessor or successor of a person convicted of a public entity crime; or
 - b. An entity under the control of any person who is active in the management of the entity and who has been convicted of a public entity crime. The term "affiliate" includes those officers, directors, executives, partners, shareholders, employees, members, and agents who are active in the management of an affiliate. The ownership by one person of shares constituting a controlling interest in another person, or a pooling of equipment or income among persons when not for fair market value under an arm's length agreement, shall be a prima facie case that one controls another person. A person who knowingly enters into a joint venture with a person who has been convicted of a public entity crime in Florida during the preceding 36 months shall be considered an affiliate.
4. I understand that a "person" as defined in Paragraph 287.133(1)(e), Florida Statutes means any natural person or entity organized under the laws of any state or of the United States with the legal power to enter into a binding contract and which bids or applies to bid on contracts for the provision of goods or services let by a public entity, or which otherwise transacts or applies to transact business with a public entity. The term "person" includes those officers, directors, executives, partners, shareholders, employees, members, and agents who are active in management of an entity.
5. Based on information and belief, the statement that I have marked below is true in relation to the entity submitting this sworn statement. (Indicate which statement applies.)
 - Neither the entity submitting this sworn statement, nor any officers, directors, executives, partners, shareholders, employees, members or agents who are active in management of the entity, nor any affiliate of the entity have been charged with and convicted of a public entity crime subsequent to July 1, 1989.
 - The entity submitting this sworn statement, or one or more of the officers, directors, executives, partners, shareholders, employees, members, or agents who are active in management of the entity, or an affiliate of the entity has been charged with and convicted of a public entity crime subsequent to July 1, 1989.
 - The entity submitting this sworn statement, or one or more of the officers, directors, executives, partners, shareholders, employees, members, or agents who are active in management of the entity, or an affiliate of the entity has been charged with and convicted of a public entity crime subsequent to July 1, 1989. However, there has been a subsequent proceeding before a Hearing Officer of the State of Florida, Division of



Administrative Hearings and the Final Order entered by the Hearing Officer determined that it was not in the public interest to place the entity submitting this sworn statement on the convicted vendor list. (Attach a copy of the final order)

I UNDERSTAND THAT THE SUBMISSION OF THIS FORM TO THE CONTRACTING OFFICER FOR THE PUBLIC ENTITY IDENTIFIED IN PARAGRAPH 1 (ONE) ABOVE IS FOR THAT PUBLIC ENTITY ONLY AND, THAT THIS FORM IS VALID THROUGH DECEMBER 31 OF THE CALENDAR YEAR IN WHICH IT IS FILED. I ALSO UNDERSTAND THAT I AM REQUIRED TO INFORM THE PUBLIC ENTITY PRIOR TO ENTERING INTO A CONTRACT IN EXCESS OF THE THRESHOLD AMOUNT PROVIDED IN SECTION 287.017, FLORIDA STATUTES FOR CATEGORY TWO OF ANY CHANGE IN THE INFORMATION CONTAINED IN THIS FORM.

(Signature)

STATE OF FLORIDA
COUNTY OF _____

Sworn to and subscribed before me on this ____ day of _____, 20____ by _____ who is personally known to me or who has presented the following type of identification: _____.

Signature of Notary Public, State of Florida

Notary seal (stamped in black ink)
OR
Printed, typed or stamped name of Notary and Commission Number



STATEMENT OF NO BID

Please complete and return this form prior to ITB opening date.

ITB NAME: _____

ITB NO: _____

COMPANY NAME: _____

PHONE NO: _____

We have declined to submit on this solicitation for the following reasons:

Specifications too "restrictive", i.e., geared toward one brand or manufacturer (Please explain below)

Insufficient time to respond to solicitation

We do not offer this product/service or equivalent

Our project schedule would not permit us to perform

Unable to meet specifications, please explain _____

Unable to meet requirements, please explain _____

Specifications unclear, please explain _____

Other, please specify _____

REMARKS:

WE UNDERSTAND THAT IF THE "NO BID" LETTER IS NOT EXECUTED AND RETURNED; OUR NAME MAY BE DELETED FROM THE LIST OF QUALIFIED BIDDERS FOR THE MCSD FOR FUTURE PROJECTS.

Typed Name

Title

Signature

Date



SECTION VIII
MCS D PROJECT MANUAL SPECIFICATIONS & PLANS

ATTACHMENT A
ATTACHMENT B
ATTACHMENT C
ATTACHMENT D

CITRUS GROVE ELEMENTARY SCHOOL
INDIANTOWN MIDDLE SCHOOL
J.D. PARKER ELEMENTARY SCHOOL
WARFIELD ELEMENTARY SCHOOL

ATTACHMENT A

CITRUS GROVE ELEMENTARY SCHOOL

2527 SW Citrus Blvd, Palm City, FL 34990

Cover Sheet	G-001
Overall Plan	A-101
Demolition Plan	A-102
Proposed Floor Plan	A-103
Elevations & Detail	A-104
Details & Schedules	A-105
General Structural Notes	S-101
Foundation & Canopy Framing Details	S-201
Mechanical Legend & General Notes	M0.1
First Floor HVAC Plan- New Work	M1.1
Electrical Notes & Legend	E0.1
Electrical Plan Overall	E1.1
Lighting Plan Demolition	E2.1
Lighting Plan-New Work	E2.2
Power & Systems Plan-Demolition	E3.1
Power & Systems Plan-New Work	E3.2
Electrical Risers & Schedules	E4.1
Electrical Details	E5.1

**PROJECT MANUAL
SPECIFICATIONS**



OWNER:
**MARTIN COUNTY SCHOOL
DISTRICT**

Citrus Grove Elementary School
Enhanced Security Project A2
2527 SW Citrus Blvd., Palm City, Florida 34990

HJ COMM. NO: 16025.20

DATE OF ISSUE: JULY 23, 2020

HARVARD JOLLY, INC.

2047 VISTA PARKWAY, SUITE 100
WEST PALM BEACH, FLORIDA 33411
561-478-4457

HARVARD • JOLLY
ARCHITECTURE

PROJECT MANUAL SPECIFICATIONS

Martin County School District

Citrus Grove Elementary School

Enhanced Security Project A2

2527 SW Citrus Blvd., Palm City, Florida 34990

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ARCHITECT:

HARVARD JOLLY ARCHITECTURE

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West Palm Beach, Florida 33411
Phone: 561-478-4457

MECHANICAL/ELECTRICAL/PLUMBING/FIRE PROTECTION ENGINEERS:

JOHNSON, LEVINSON, RAGAN, DAVILA, INC.

1450 Centrepark Blvd., Suite 350
West Palm Beach, Florida 33401
Phone: 561-689-2303

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1

GENERAL CONDITIONS

SECTION 01 10 00 – SUMMARY

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. The provisions of the General Conditions, Supplementary Conditions, Drawings, Specifications, and the Sections included under Division 1, General Requirements and References are included as a part of this Section as though bound herein.

1.2 SUMMARY

- A. Section Includes:
1. Project information.
 2. Work covered by Contract Documents.
 3. Access to site.
 4. Coordination with occupants.
 5. Work restrictions.
 6. Specification and drawing conventions.
 7. Miscellaneous provisions.

1.3 PROJECT INFORMATION

- A. Project Identification: Citrus Grove Elementary School Enhanced Security Project A2.
1. Project Location: 2527 SW Citrus Blvd., Palm City, Florida 34990
- B. Owner: Martin County School District, 1939 SE Federal Highway, Stuart, Florida 34994
1. Owner's Representative: Mark Sechrist; sechrim@martin.k12.fl.us; Phone: 772.219.1200 ext. 221
- C. Architect: Harvard Jolly Architecture.
- D. Architect's Consultants: The Architect has retained the following design professionals who have prepared designated portions of the Contract Documents:
1. JLRD, Inc.
1450 trepark Blvd. Suite 350
West Palm Beach, Florida 33401
561-689-2303.

1.4 WORK COVERED BY CONTRACT DOCUMENTS

- A. The Work of Project is defined by the Contract Documents and consists of the following:

1. Minor construction that consists of converting an exterior window to a storefront assembly door and building a new vestibule with impact resistant glass storefront assembly. A new reception desk shall be furnished and installed.

B. Type of Contract:

1. Project will be constructed under a single prime contract.

- C. In the event of conflicts between the Contractor Contract with the Owner and requirements as stipulated in Division 01 Requirements the Contractor /Owner Contract shall govern.

1.5 DOCUMENT PRIORITIES

- A. Anything shown on the drawings and not mentioned in the specifications or mentioned in the specifications and not shown on the drawings shall have the same effect as if shown or mentioned respectively in both.

- B. Detail drawings take precedence over general drawings. Any work shown on one drawing shall be construed to be shown in all drawings and the Contractor will coordinate the work and the drawings.

- C. If any portion of the Contract Documents shall be in conflict with any other portion, the various documents comprising the Contract Documents shall govern in the following order of precedence:

1. The Owner-Contractor Agreement
2. Modifications
3. Addenda
4. Supplementary Conditions
5. General Conditions
6. Specifications
7. Drawings
8. Between schedules and information given on Drawings, the schedules shall govern.
9. Between figures given on Drawings and the scaled measurements, the figures shall govern.
10. Between large-scale Drawings and small scale Drawings, the larger scale shall govern.

- D. Any such conflict or inconsistency between or in the drawings shall be submitted to the Design Consultant whose decision thereon shall be final and conclusive.

1.6 ACCESS TO SITE

- A. General: Contractor shall have limited use of Project site for construction operations as indicated on Drawings by the Contract limits and as indicated by requirements of this Section.

- B. Use of Site: Limit use of Project site to work in areas indicated. Do not disturb portions of Project site beyond areas in which the Work is indicated.

1. Driveways, Walkways and Entrances: Keep driveways parking areas and entrances serving premises clear and available to Owner, Owner's employees, and emergency vehicles at all times. Do not use these areas for parking or storage of materials.
 - a. Schedule deliveries to minimize use of driveways and entrances by construction operations.
 - b. Schedule deliveries to minimize space and time requirements for storage of materials and equipment on-site.
- C. Condition of Existing Building: Maintain portions of existing building affected by construction operations in a weathertight condition throughout construction period. Repair damage caused by construction operations.

1.7 COORDINATION WITH OCCUPANTS

- A. Full Owner Occupancy: Owner will occupy site and existing or adjacent building(s) during entire construction period. Cooperate with Owner during construction operations to minimize conflicts and facilitate Owner usage. Perform the Work so as not to interfere with Owner's day-to-day operations. Maintain existing exits unless otherwise indicated.
 1. Maintain access to existing walkways, corridors, and other adjacent occupied or used facilities. Do not close or obstruct walkways, corridors, or other occupied or used facilities without written permission from Owner and approval of authorities having jurisdiction.
 2. Notify Owner not less than 72 hours in advance of activities that will affect Owner's operations.

1.8 WORK RESTRICTIONS

- A. Work Restrictions, General: Comply with restrictions on construction operations.
- B. Comply with limitations on use of public streets and with other requirements of authorities having jurisdiction.
- C. On-Site Work Hours: Limit work to normal business working hours of 7:00 a.m. to 5:00 p.m., Monday through Friday, unless otherwise indicated.
- D. Existing Utility Interruptions: Do not interrupt utilities serving facilities occupied by Owner or others unless permitted under the following conditions and then only after providing temporary utility services according to requirements indicated:
 1. Notify and obtain written permission from the Architect not less than 72 hours in advance of proposed utility interruptions.
- E. Noise, Vibration, and Odors: Coordinate operations that may result in high levels of noise and vibration, odors, or other disruption to Owner occupancy with Owner.

1. Notify and obtain written permission from the Architect not less than 72 hours in advance of proposed disruptive operations.
- F. Controlled Substances: Use of tobacco products and other controlled substances on Project site is not permitted.
- G. Employee Identification: Provide identification tags for Contractor personnel working on Project site. Require personnel to use identification tags at all times.
- H. Employee Screening: Comply with requirements for drug and background screening of Contractor personnel working on Project site.
 1. Maintain list of approved screened personnel with Owner's representative.

1.9 SPECIFICATION AND DRAWING CONVENTIONS

- A. Division 01 General Requirements: Requirements of Sections in Division 01 apply to the Work of all Sections in the Specifications.
- B. Drawing Coordination: Requirements for materials and products identified on Drawings are described in detail in the Specifications. One or more of the following are used on Drawings to identify materials and products:
 1. Terminology: Materials and products are identified by the typical generic terms used in the individual Specifications Sections.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION (Not Applicable)

END OF SECTION 01 10 00

SECTION 01 25 13
PRODUCT SUBSTITUTION PROCEDURES

PART 1 GENERAL

1.1 SCOPE OF WORK

- A. Administrative and procedural requirements for consideration of request for substitution during the design and construction phases.
- B. Substitution Request Form.

1.2 REFERENCES

- A. Section 01 33 00 – Submittal Procedures.
- B. Section 01 42 00 – References.
- C. Section 01 45 00 – Quality Control.
- D. Section 01 78 00 – Closeout Submittals.

1.3 SUBMITTAL PROCEDURES

- A. Transmit each substitution request on company letterhead with completed Form 01 25 00 A. Form is as indicated in Para. 3.02.
 - 1. During bidding phase, substitution requests shall be directed to Project Architect.
 - 2. During construction phase substitution requests shall be directed to Contractor/CM.
- B. Substitution Form shall identify project, Contractor/CM and Architect during bidding phase plus Subcontractor or supplier during construction phase indicating Specification Section and Paragraph number of specified material and pertinent drawing and detail numbers, as appropriate.
- C. Include complete information as required in the Substitution Form. Incomplete information will result in automatic rejection of the substitution request.
- D. Apply contractor's stamp, signed or initialed certifying that review, approval, verification of products required, field dimensions, adjacent construction work, and coordination of information are in accordance with the requirements of the work and contract documents.
- E. Schedule submittals to expedite the project, and deliver to Architect or Contractor/CM at business address. Coordinate submission of related items.
- F. For each submittal for review, allow 15 days excluding delivery time to and from Architect or CM/Contractor.
 - 1. Identify variations from contract documents and product or system limitations, which may be detrimental to successful performance of the completed work.
 - 2. Provide space for Contractor/CM and Architect review stamps.
 - 3. When revised for resubmission, identify all changes made since previous submission.
 - 4. Distribute copies of reviewed submittals as appropriate. Instruct parties to promptly report any inability to comply with requirements.
 - 5. Submittals not requested will not be recognized or processed.

1.4 SUBSTITUTION REQUESTS

- A. Requests for substitutions shall be made not later than ten (10) calendar days prior to bid date by prospective bidders, or time set by Owner for receipt of GMP (Guaranteed Maximum Price) from CM. Requests received after the above dates may not be considered.

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PART 2 PRODUCTS

2.1 Not Used.

PART 3 EXECUTION

3.1 FORM EXECUTION

- A. Contractor/CM shall submit Product Substitution Request on Form 01 25 00A on following page with transmittal letter and self-addressed stamped envelope for Architect's use in returning response to substitution request.

3.2 SUBSTITUTION FORM 01 25 13A - PRODUCT SUBSTITUTION REQUEST

A. Specified Product _____

B. Sheet No./Specification Section and Paragraph _____

C. Contractor/CM has reviewed and approved proposed substitution?

Yes _____ No _____

D. Requested Product Substitution: _____

E. Does Product Meet or Exceed Specified Product Requirements? Yes ___ No ___
(If answer is no, explain.) _____

F. Does Product Substitution affect dimensions shown on Drawings? Yes ___ No ___
(If answer is no, explain.) _____

G. Reason for Requested
Substitution: _____

H. Cost Difference between Product Specified and Product Proposed:
Add \$ _____ Subtract \$ _____

I. Electrical Requirements equal to Specified Product: Yes ___ No ___ N/A ___
(If No or N/A,
explain): _____

J. Plumbing Requirements equal to Specified Product: Yes ___ No ___ N/A ___
(If No or N/A,
explain): _____

K. Mechanical Requirements equal to Specified Product: Yes ___ No ___ N/A ___
(If No or N/A,
explain): _____

L. Does the Product Substitution have any effect on other trades? Yes ___ No ___
(If yes, explain): _____

M. Contractor/CM agrees to pay for changes in building design, including engineering and
detailing costs, caused by requested product substitution. Yes ___ No ___

N. Signature of Bidder/Contractor/CM shall indicate function, appearance and quality of proposed
substitution is equivalent or superior to specified item.

O. Contractor/CM assumes responsibility for delay or claims arising from review and evaluation of
requested product substitution.

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P. Approval of proposed substitution shall have no effect on coordination and installation of work in accord with contract documents.

Submitted by:

For Use by the Architect and Owner:

Contractor/CM

_____ Received Too Late

Firm

_____ Not Accepted

_____ Approved As Noted

Submittal of Information in
Accord with this Section

_____ Approved For Bidding Only,
Final Approval Contingent Upon Address

Date

Architect

Date

Owner

Date

END OF SECTION

SECTION 01 29 00
PAYMENT PROCEDURES

PART 1 GENERAL

1.1 SCOPE OF WORK

- A. Procedures for preparation and submittal of Applications for Payment.
- B. Unit pricing shall be in conformance with 2007 Edition of AIA A201 General Conditions of the Contract and as amended by Owner on July 13, 2009. Copy is included in Division 1, Section 00 72 00 – General Conditions.

1.2 RELATED SECTIONS

- A. Section 01 22 00 – Unit Prices.
- B. Section 01 33 00 – Submittal Procedures.
- C. Section 01 78 00 – Closeout Submittals.

1.3 FORMAT

- A. Payment format shall in accord with AIA G702 - Application and Certificate for Payment and AIA G703 - Continuation Sheets.
- B. Contractor/CM's AIA G702/703 equivalent forms including continuation sheets may be substituted for AIA Payment Forms if preapproved by Owner's Project Manager.

1.4 PREPARATION OF APPLICATIONS

- A. Present handwritten pre-application draft payment forms to Owner for review before submitting applications for payment.
- B. After revising draft payment forms, prepare and submit six typewritten copies or on electronic media printout Pay Application as preapproved by Owner.
- C. Execute certification by signature of authorized officer.
- D. Use data from Owner preapproved Schedule of Values. Provide dollar value in each column for each line item for portion of work performed and for stored products.
- E. List each authorized Change Order as extension on AIA G703 - Continuation Sheet, listing Change Order number and dollar amount as for original item of Work.
- F. Prepare Application for Final Payment as specified in Section 01 78 00 – Closeout Submittals.

1.5 SUBMITTAL PROCEDURES

- A. Submit six copies of each Application for Payment.
- B. Submit an updated construction schedule with each Application for Payment.
- C. Payment Period: Submit at monthly intervals not later than the fifteenth of the month unless otherwise stipulated in the Agreement.
- D. Submit Release of Liens waivers with each Application for Payment.

1.6 SUBSTANTIATING DATA

- A. When Architect or Owner requires substantiating information, submit data justifying dollar amounts.
- B. Provide one copy of data with cover letter for each copy of submittal. Show application number and date, and line item by number and description.
- C. Include following data with application.
 - 1. Partial release of liens from major subcontractors and vendors.
 - 2. Affidavits attesting to off-site stored products.
 - 3. Construction progress schedule, revised and corrected to reflect project status at time of payment application.

1.7 PAYMENTS

- A. Payments may be made for materials stored off-site if preapproved by Owner's Project Manager and off-site facility is insured and bonded air conditioned warehouse, and only if project site doesn't allow storage or protection for equipment and supplies.
- B. Payments will normally be made to Contractor/CM by 10th of each month, if copies are preapproved by Owner's Project Manager and received by 25th of previous month, unless otherwise stipulated in Agreement.

PART 2 PRODUCTS (Not Used)

PART 3 EXECUTION (Not Used)

END OF SECTION

SECTION 01 31 00
PROJECT MANAGEMENT AND COORDINATION

PART 1 GENERAL

1.1 SCOPE OF WORK

- A. Project management, coordination of construction activities, interface with Owner's staff for existing facilities and project conditions related to project for new and existing facilities.
- B. Meetings for field engineering and project coordination, preconstruction, construction procedures, pay application and progress meetings, pre installation and project closeout meetings.
- C. Site mobilization, materials and equipment storage, site cleanup and demobilization.

1.2 RELATED SECTIONS

- A. Section 01 25 13 – Product Substitution Procedures.
- B. Section 01 29 00 – Payment Procedures.
- C. Section 01 33 00 – Submittal Procedures.
- D. Section 01 35 53 – Security.
- D. Section 01 42 00 – References.
- E. Section 01 45 00 – Quality Control.
- F. Section 01 66 00 – Project Storage and Handling Requirements.
- G. Section 01 78 00 – Closeout Submittals.
- H. Section 01 91 00 – Commissioning.

1.3 COORDINATION AND PROJECT CONDITIONS

- A. Coordinate scheduling, submittals, and to ensure efficient and orderly sequence of installation of interdependent construction elements, with provisions for accommodating Owner's occupancy of completed portions of project or existing building on site, and items to be furnished or installed by Owner.
- B. Verify utility requirements and characteristics of operating equipment are compatible with building utilities. Coordinate work of various sections having interdependent responsibilities for installing, connecting to, and placing in service, such equipment.
- C. Coordinate space requirements, supports and installation of mechanical and electrical work that is indicated diagrammatically on Drawings. Follow routing shown for pipes, ducts, and conduit, as closely as practicable; place runs parallel with line of building. Utilize spaces efficiently to maximize accessibility for other installations, for maintenance, and for repairs.
- D. In finished areas, except as otherwise indicated, conceal pipes, ducts, and wiring within the construction. Coordinate locations of fixtures and outlets with finish elements.
- E. In finished areas with exposed ceilings, piping and conduits shall either concealed or be run at right angles and be attached to underside of floor or deck above. Wiring shall not be exposed. Exposed ductwork shall be painted spiral duct.
- E. Coordinate completion and clean up of Work of separate sections in preparation for Substantial Completion and for portions of Work designated for Owner's partial occupancy.
- F. After Owner occupancy of premises, coordinate access to site for correction of defective Work and Work not in accord with Contract Documents, to minimize disruption of Owner's activities.

- G. Owner will not consider change orders for extra work required by Contractor due to his inadequate coordination.

1.4 FIELD ENGINEERING FOR PROJECT LAYOUT

- A. Employ Land Surveyor registered in State of Florida acceptable to Owner's Project Manager.
- B. Locate and protect survey control and reference points.
- C. Control datum for survey is that established by Owner's provided survey.
- D. Verify setbacks and easements; confirm drawing dimensions and elevations.
- E. Provide field engineering services. Establish elevations, lines, and levels, utilizing recognized engineering survey practices.
- F. Submit copy of site drawing and certificate signed by Land Surveyor that elevations and locations of Work are in accord with Contract Documents.

1.5 FLOOR SLAB VERIFICATION SURVEY

- A. Separate from Field Engineering noted above, Contractor/CM shall provide topographic survey of building floor slabs on grade to indicate that finish floor elevations and slab locations are per contract documents, water management and building department requirements.
- B. Survey shall be submitted upon completion of slabs on grade. Remaining work shall not proceed until Owner's Project Manager has reviewed survey information and verified that floor slabs are constructed at proper elevation and locations.
- C. Survey shall be prepared, signed and sealed by Florida licensed surveyor, other than the surveyor noted in Para. 1.04 Field Engineering.
- D. Surveyor shall be selected from one of Owner's annual surveying vendors. List may be obtained from Owner's Project Manager.

1.6 PRECONSTRUCTION MEETING

- A. Owner's Project Manager will schedule pre construction conference after Notice to Proceed.
- B. Attendance Required: Owner, Architect, and Contractor/CM.
- C. Agenda:
 - 1. Execution of Owner-Contractor Agreement, if not executed.
 - 2. Submission of executed bonds and insurance certificates.
 - 3. Distribution of Contract Documents.
 - 4. Submission of list of Subcontractors, list of Products, schedule of values, and progress schedule.
 - 5. Designation of personnel representing the parties in Contract, and Architect.
 - 6. Procedures and processing of field decisions, submittals, substitutions, applications for payments, proposal request, Change Orders and Contract closeout procedures.
 - 7. Scheduling.
 - 8. Scheduling activities of Geotechnical Engineer.
 - 9. Issuance of Notice to Proceed.
- D. Record minutes and distribute copies within two days after meeting to participants, with copies to Architect, Owner, participants, and those affected by decisions made.

1.7 SITE MOBILIZATION MEETING

- A. Owner will schedule meeting at Project site prior to Contractors start of work.

- B. Attendance Required: Owner, Architect, Special Consultants, and Contractor, Contractor's Superintendent, and major Subcontractors.
- C. Agenda:
 - 1. Use of premises by Owner and Contractor.
 - 2. Owner's requirements and partial occupancy.
 - 3. Construction facilities and controls provided by Owner.
 - 4. Temporary utilities provided by Owner.
 - 5. Survey and building layout.
 - 6. Security and housekeeping procedures.
 - 7. Schedules.
 - 8. Application for payment procedures.
 - 9. Procedures for testing.
 - 10. Procedures for maintaining record documents.
 - 11. Requirements for start-up of equipment.
 - 12. Inspection and acceptance of equipment put into service during construction period.
- D. Record minutes and distribute copies within two days after meeting to participants, with copies to Architect, Owner, participants, and those affected by decisions made.

1.8 PROGRESS MEETINGS

- A. Schedule and administer meetings throughout progress of work at weekly intervals. Less frequent meetings may be requested for projects or work stages if requested in writing to the Owner's Project Manager.
- B. Make arrangements for meetings, prepare agenda with copies for participants, and preside meetings.
- C. Attendance Required: Job superintendent, major Subcontractors and suppliers, Owner's Project Manager, Architect, as appropriate to agenda topics for each meeting.
- D. Agenda:
 - 1. Review minutes of previous meetings.
 - 2. Review previous Work progress.
 - 3. Field observations, problems, and decisions.
 - 4. Identification of problems that impede planned progress.
 - 5. Review of submittals schedule and status of submittals.
 - 6. Review of off-site fabrication and delivery schedules.
 - 7. Maintenance of progress schedule.
 - 8. Corrective measures to regain projected schedules.
 - 9. Planned progress schedule during succeeding work period.
 - 10. Coordination of projected progress.
 - 11. Maintenance of quality and work standards.
 - 12. Effect of proposed changes on progress schedule and coordination.
 - 13. Other business relating to work.
- E. Record minutes and distribute copies within two days after meeting to participants, with copies to Architect, Owner, participants, and those affected by decisions made.

1.9 PREINSTALLATION MEETINGS

- A. When required in individual specification section, convene pre-installation meeting at site prior to commencing work of section.
- B. Require attendance of parties directly affecting, or affected by, work of specific section.
- C. Notify Owner and Architect five working days in advance of meeting date.

- D. Prepare agenda and preside at meeting:
 - 1. Review conditions of installation, preparation and installation procedures.
 - 2. Review coordination with related work.
- E. Record minutes and distribute copies within two days after meeting to participants, with copies to Architect, Owner, participants, and those affected by decisions made.

PART 2 PRODUCTS

2.1 EQUIPMENT ELECTRICAL CHARACTERISTICS AND COMPONENTS

- A. Motors: Refer to Electrical Sections for specific motor types.
- B. Wiring Terminations: Provide terminal lugs to match branch circuit conductor quantities, sizes, and materials indicated. Size terminal lugs to NFPA 70, include lugs for terminal box.
- C. Cord and Plug: Provide minimum 6' cord and plug including grounding connector for connection to electric wiring system. Cord of longer length is specified in individual specification sections.

PART 3 EXECUTION

3.1 EXISTING BUILDING PROJECT PROCEDURES

- A. Materials: As specified in Product sections; match existing Products and work for patching and extending work.
- B. Employ skilled and experienced installer to perform alteration work.
- C. Close openings in exterior surfaces to protect existing work from weather and extremes of temperature and humidity.
- D. Remove, cut and patch Work in manner to minimize damage and to provide means of restoring Products and finishes to original or specified condition.
- E. Refinish existing visible surfaces to remain in renovated rooms and spaces, to specified condition for each material, with neat transition to adjacent finishes.
- F. Where new Work abuts or aligns with existing, provide smooth and even transition. Patch Work to match existing adjacent Work in texture and appearance.
- G. When finished surfaces are cut so that a smooth transition with new Work is not possible, terminate existing surface along a straight line at natural line of division and submit recommendation to Architect for review.
- H. Where change of plane of 1/4" or more occurs, submit recommendation for providing a smooth transition to Architect for review.
- I. Patch or replace portions of existing surfaces, which are damaged, lifted, discolored, or showing other imperfections.
- J. Work that penetrates fire or smoke rated partitions or floors shall be repaired to provide original fire or smoke rating.
- K. Finish surfaces as specified in individual Product Specification Sections.

END OF SECTION

SECTION 01 32 16
CONSTRUCTION PROJECT SCHEDULE

PART 1 GENERAL

1.1 SCOPE OF WORK

- A. Preparation of preliminary Construction Schedule, Contractor's/CM/GC final master Construction Schedule, hereinafter called the Construction Schedule, Short Interval Schedules (look ahead), and monthly updates.
- B. Scope of work and project completion are as indicated. Bidders shall include with their bid, a proposed project schedule indicating each item of work in CSI numbering format showing each work division in CPM (Critical Path Method) work sequencing. Schedule shall base critical path on Owner's providing pre purchase of long lead items, and assuming that those products and services are delivered to the Contractor/CM on time for meeting proposed project schedule.

1.2 SUBMITTALS

- A. Submit schedule in accord with Section 01 33 00 – Submittal Procedures.
- B. Preliminary Project Schedule:
 - 1. Purpose of preliminary schedule is to determine Bidder's intent as to how work can be prosecuted to allow project completion in specified time frame.
 - 2. Bidder's shall comply with "The Use of CPM in Construction – A Manual for General Contractors" published by Associated General Contractors of America, Inc. Schedules shall utilize nationally recognized scheduling format such as Primavera or Microsoft Project. Software version selected shall be compatible with Owner's Microsoft Word or Office software so that schedule can be reviewed and saved in Owner's computer system.
 - 3. Schedule shall be on 11" x17" paper indicating project activities, duration, start and finish dates of each activity, float or slack time, critical path, and total number of days for project.
 - 4. Include float or slack time in Schedule. Float is defined as amount of time between earliest start date and latest start date or days between earliest end date and latest end date.
 - 5. Construction schedule shall begin based on Owner's intent to issue Notice to Proceed Letter to Contractor/CM and be completed within "x" Calendar Days from NTP. Substantial Completion is "date", with "x" calendar days to Final Completion or "date".
 - 6. Preliminary Project Schedule shall be submitted with Bid Proposal. Failure to do so will be grounds for rejection of the Bid Proposal.

1.3 COORDINATION AND PROJECT CONDITIONS

- A. Bidders are responsible for verification of existing conditions to the extent that they are observable and can be inferred by visual inspection.
- B. Verify utility requirements and characteristics of operating equipment are compatible with building utilities. Coordinate work of various sections having interdependent responsibilities for installing, connecting to, and placing in service, such equipment.

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- C. Coordinate space requirements, supports and installation of mechanical and electrical work that is indicated diagrammatically on Drawings. Follow routing shown for pipes, ducts, and conduit, as closely as practicable; place runs parallel with line of building. Utilize spaces efficiently to maximize accessibility for other installations, for maintenance, and for repairs.
- D. In finished areas, except as otherwise indicated, conceal pipes, ducts, and wiring within the construction. Coordinate locations of fixtures and outlets with finish elements.
- E. In finished areas with exposed ceilings, piping and conduits shall either concealed or painted and be run at right angles, and attached to underside of floor or deck above. Wiring shall not be exposed. Exposed ductwork shall be painted.
- F. Coordinate scheduling to allow time for submittals, Owner's approval, Building Dept. review, permitting and inspections to ensure efficient and orderly sequence of installation of interdependent construction elements. Schedule shall provide for accommodating Owner's occupancy of other buildings on site, and items to be furnished or installed by Owner.
- G. Owner will not consider change orders for extra work required by Contractor due to his inadequate coordination.

PART 2 NOT USED

PART 3 NOT USED

END OF SECTION

SECTION 01 33 00
SUBMITTAL PROCEDURES

PART 1 GENERAL

1.1 SCOPE OF WORK

- A. Administrative and procedural requirements for processing of submittals during construction process. Submittals may include the following:
1. Proposed Products Lists.
 2. Proposed Vendor List.
 3. Product Data.
 4. Shop Drawings.
 5. Samples.
 6. Design Data.
 7. Field Test Reporting.
 8. Quality Control Reporting.
 9. Certificates.
 10. Manufacturer's Installation, Handling and Storage Instructions.
 11. Manufacturer's Field Reports.
 12. Erection Drawings.
 13. Closeout Documents
 14. Warranties.
 15. Scheduling of Work.
 16. Construction Progress Schedule.
 17. Submittals Schedule.
 18. Survey and Layout Data.
 19. Construction Progress Reporting.
 20. Periodic Work Observation.
 21. Photographic Documentation.
 22. Purchase Order Tracking.
 23. Operation and Maintenance Documentation.

1.2 RELATED SECTIONS

- A. Section 01 29 00 – Payment Procedures.
- B. Section 01 31 12 – Project Coordination.
- C. Section 01 42 00 – References.
- D. Section 01 45 00 – Quality Control.
- E. Section 01 66 00 – Product Storage and Handling Requirements.
- F. Section 01 78 00 – Closeout Submittals.

1.3 SUBMITTAL PROCEDURES

- A. Submittal Procedures shall be in conformance with AIA A201 General Conditions of the Contract and as amended by Owner on July 13, 2009. Copy is included in Division 1, Section 00 72 00 – General Conditions.
- B. Transmit each submittal with AIA Form G810-2001 or Owner's Standard Transmittal form.
- C. Sequentially number each transmittal forms. Revise submittals with original number and a sequential alphabetic suffix.

- D. Identify project, Contractor/CM, subcontractor or supplier pertinent drawing and detail number, and specification section number, as appropriate.
- E. Apply Contractor/CM's stamp, signed or initialed certifying that review, approval, verification of products required, field dimensions, adjacent construction work, and coordination of information are in accord with requirements of the work and contract documents.
- F. Schedule submittals to expedite the project and deliver to Engineer and Contractor/CM at business address. Coordinate submission of related items.
- G. For each submittal for review, allow 15 days excluding delivery time to and from the Contractor/CM.
- H. Identify variations from contract documents and product or system limitations, which may be detrimental to successful performance of the completed work.
- I. Provide space for Contractor/CM and Engineer review stamps.
- J. When revised for resubmission, identify all changes made since previous submission.
- K. Distribute copies of reviewed submittals as appropriate. Instruct parties to promptly report any inability to comply with requirements.
- L. Submittals not requested will not be recognized or processed.

1.4 PROPOSED PRODUCTS LIST

- A. Within 15 work days after date of Notice to Proceed, submit list of major products proposed for use, with name of manufacturer, trade name, and model number of each product.
- B. For products specified only by reference standards, give manufacturer, trade name, model or catalog designation, and reference standards.

1.5 PRODUCT DATA

- A. Product Data for Review:
 - 1. Submit to Engineer for review for purpose of checking for conformance with information given and design concept expressed in Contract Documents.
 - 2. After review, provide copies and distribute per Submittal Procedures article above and for record documents purposes described in Section 01 78 00 – Closeout Submittals.
- B. Product Data for Information:
 - 1. Submittal for Engineer's knowledge as contract administrator or for Owner.
- C. Product Data for Project Close-out:
 - 1. Submit for Owner's benefit during and after project completion.
- D. Submit number of copies required by Contractor/CM plus two copies for transmittal to Engineer and two copies for transmittal to Owner's Project Manager.
- E. Mark each copy to identify applicable products, models, options, and other data.
- G. Supplement manufacturers' standard data to provide information unique to project.
- H. Indicate product utility and electrical characteristics, utility connection requirements, and location of utility outlets for service for functional equipment and appliances.
- I. After review, distribute in accord with Submittal Procedures article above and provide copies for record documents described in Section 01 78 00 - Closeout Documents.

1.6 CONSTRUCTION SUBMITTALS

- A. Submit one copy of Building Permit, Site Permits, Environmental Permits, or other permits required for construction of work.
- B. Submit Payment Applications to Engineer for review for purpose of checking conformance with information given and design concept expressed in Contract Documents.

- C. Shop Drawings: Provide following information:
1. Fabrication and installation Drawings and details.
 2. Template placement diagrams.
 3. Manufacturer's installation instructions.
 4. Product patterns and colors.
 5. Coordination Drawings.
 6. Schedules.
 7. Product mix formulae.
 8. Product design or engineering calculations.
 9. Other information as required by project.
 10. After review, produce copies and distribute per Submittal Procedures article above and for record documents purposes described in Section 01 78 00 – Closeout Submittals.
 11. Submit to Engineer for purpose of checking conformance with information given and design concept and Owner's Project Manager.
- D. Project Closeout Documents:
1. Indicate special utility and electrical characteristics, utility connection requirements, and location of utility outlets for service for functional equipment and appliances.
 2. Submit number of copies required by Contractor, plus one copy for Engineer and two copies for Owner.
 3. Submit to Engineer for Owner's benefit during and after project completion.
 - a. Indicate special utility and electrical characteristics, utility connection requirements, and location of utility outlets for service for functional equipment and appliances.
 - b. Submit one copy and one reproducible copy required by Contractor/CM, plus one copy for Engineer and two copies for Owner.
- E. Product Samples
1. Submit to Engineer for purpose of checking conformance with information given and design concept expressed in the documents.
 2. After review, Engineer shall submit color board to Owner's Project Manager per Submittal Procedures.
 3. Sample finishes and colors shall be from full range of manufactures' standard colors, textures, and patterns for Engineer's selection and preparation of color board for Owner's approval.
 4. After review and approval by Owner, provide duplicates and distribute per Submittal Procedures.
 5. Submit samples to illustrate functional and aesthetic characteristics of the product, with integral parts and attachment devices. Coordinate sample submittals for interfacing work.
 6. Include identification on each sample, with full project information.
 - a. Submit number of samples specified in specification, one of which Engineer shall retain.
 - b. Reviewed samples may be used in work, if indicated.
- F. Product Design Data and Test Reports:
1. Submit to Engineer as contract administrator and for Owner's Project Manager for purpose of checking conformance with information given and completed work on project.
- G. Certificates:
1. When specified, submit certification by manufacturer, installation/application subcontractor, or contractor to Engineer, in quantities specified for Product Data.
 2. Indicate material or Product conforms to or exceeds specified requirements.
 3. Submit supporting reference date, affidavits, and certifications as appropriate.
 4. Certificates may be recent or previous test results on material or Product, but must be acceptable to Engineer.

H. Manufacturer's Instructions:

1. When specified, submit printed instructions for delivery, storage, assembly, installation, start-up, adjusting, and finishing, to Engineer for delivery to Owner in quantities specified for Product Data.
2. Indicate special procedures, perimeter conditions requiring special attention, and special environmental criteria required for application or installation.
3. Refer to Section 01 45 00 – Quality Control for quality assurance requirements.

J. Manufacturer's Field Reports:

1. Submit reports to Engineer and Owner's Project Manager.
2. Submit report within 30 days of observation to Engineer.
3. Submit for information for purpose of assessing conformance with information given and design concept expressed in Documents.

K. Erection Drawings:

1. Submit drawings to Engineer and Owner's Project Manager.
2. Submit for information for purpose of assessing conformance with information given and design concept expressed in Documents.
3. Data indicating inappropriate or unacceptable work is subject to rejection by Engineer or Owner.

PART 2 PRODUCTS (Not Used)

PART 3 EXECUTION (Not Used)

END OF SECTION

SECTION 01 35 53
SECURITY PROCEDURES

PART 1 GENERAL

1.1 SCOPE OF WORK

- A. Development of site security program, project entry control procedures, personnel screening and identification in compliance with Florida Statute FS1012.465 – Jessica Lunsford Act for vendors, and Contractor/CM's.

1.2 RELATED SECTIONS

- A. Section 01 31 00 – Project Management and Coordination.
- B. Section 01 33 00 – Submittal Procedures.
- C. Section 01 56 00 – Temporary Barriers and Enclosures.

1.3 JESSICA LUNSFORD ACT

- A. Contractor/CM, his subcontractors, vendors and suppliers who are to be permitted access to school grounds while students are present, or have direct contact with students or have access to or control of school funds shall obtain Level 2 background screening in accord with Florida Statute FS1012.465 – Jessica Lunsford Act.
 - 1. Level 2 screening excludes personnel working on school district property where students are present who have criminal records that include sexual offender, sexual misconduct with developmentally disabled or mental health patients, terrorism, murder, kidnapping, lewd, lascivious or indecent acts or exposure, incest, child abuse or neglect.
 - 2. Persons screened as noted above with other types of criminal history may be allowed on school grounds provided under following conditions:
 - a. Contractor/CM, subcontractors, vendors and suppliers shall be under continuous direct supervision of school district employee or Level 2 screened and cleared employee as noted above.
 - b. Contractor/CM, subcontractors, vendors and suppliers may be allowed on a student occupied site if area of construction is isolated from students by continuous six foot high chain link fence separating work area and school.
 - c. Persons with current Level 2 clearance who are subsequently arrested for disqualifying offenses shall be disqualified from access to school sites and shall immediately surrender their Photo ID Badge to their employer who shall be responsible for returning badge to Martin County School District's Department of Human Resources within 48 hours of arrest or notice of arrest or criminal offense.
 - d. Persons failing to notify their employer and Martin County School District's Department of Human Resources within 48 hours of arrest will be charged with 3rd degree felony, punishable by up to five years imprisonment and \$1,000 fine.
 - e. Employers of persons having been arrested for disqualifying offenses who subsequently allows said employee to continue working on school property may also be charged with 3rd degree felony, punishable by up to five years imprisonment and \$1,000 fine.
- B. Contractor/CM, his subcontractors, vendors and suppliers working on school board sites shall be fingerprinted and obtain work badges.
 - 1. Contractor/CM, his subcontractors, vendors and suppliers have worked and obtained in other school districts must be screened to obtain new badges.

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2. Questions regarding fingerprinting or identification badge processing may be directed to District Personnel Department at (772)219-1200, Ext. 30296.
 3. Fingerprinting services are provided by private vendor through Florida Dept. of Education. DOE sponsored website will direct individuals to nearest fingerprinting location.
 4. Cost of fingerprinting is (Check with the School District) per person and shall be prepaid either by money order to (Check with the School District) or by credit card payment via Internet. Website is <http://www.flprints.com>. For information, telephone (877) 357-7456.
 5. Money orders shall be made out to 3M Cogent. Money order must be brought to appointment.
 6. Individuals shall register online prior to their appointment:
 - a. Navigate to https://www.cogentid.com/fl/index_fdoe.htm and select "register online".
 - b. For County select Martin County from pull-down box.
 - c. For CRI Literal select: FL931392Z Contractors & Vendors.
 - d. Fill out remaining information and submit.
 - e. Use Internet Explorer.
 7. Individuals being fingerprinted shall provide valid, government issued driver's license, identification card or passport.
 8. After fingerprinting and criminal background check is complete, individuals shall make appointment for photo ID's by making appointments at Martin County School District Personnel Department located in Building 20 at School District Administration Center, 500 E. Ocean Blvd., Stuart, FL 34994.
 9. Appointments for ID photo badges shall be made after completion of fingerprinting with Martin County School District Personnel Department by phone at (772) 219-1200, Ext. 30296
 10. Photo ID applicants shall have registration confirmation receipt with them when they arrive for appointment.
 11. Cost of Photo ID's is (Check with the School District). Payment may be made with company check, money order or personal check. Checks shall be made payable to Martin County School District.
- C. Non-Instructional Contractors with current Martin County School District ID Photo Badges shall update their badges to the State Uniform Badge required by Florida Statute 1012.467, effective July 1, 2014.
1. There is no cost for individuals with current Martin County School District ID Photo Badges to upgrade their badges.
 2. Badges from other individual School Districts are no longer accepted on school sites in Florida.
 3. New state wide badges are accepted in any School District regardless of where it was issued.
 4. Non-Instructional Contractors and their employees working on School sites shall apply for State-Wide Badges as noted above.
 5. Non-Instructional Contractors shall submit lists of their badged employees via email to Eileen Loreti at the Martin County School District Personnel Department at loretie@martin.k12.fl.us.

1.4 SECURITY PROGRAM

- A. Protect new work, existing facilities and grounds from damage, theft, vandalism, and unauthorized entry.
- B. Initiate security program in coordination with Owner's existing security system at time of project mobilization to ensure safety of students, faculty and visitors to the unaffected portions of the school facilities.

- C. No student contact is permitted between the Contractor's personnel and students. Any breach of this requirement will result in the immediate removal of the personnel from the job site upon direction by the Owner.
- D. Smoking is not allowed on School Board property. Any breach of this restriction will result in immediate removal of personnel from the site upon direction by Owner's Project Manager.
- E. Maintain security program throughout construction period until Owner's project acceptance.

1.5 ENTRY CONTROL

- A. Restrict entrance of persons and vehicles into Project site and existing facilities as indicated by Owner approved security plan.
 - 1. Allow entrance only to authorized persons with proper identification.
 - 2. Maintain log of workers and visitors, make available to Owner on request.
 - 3. Coordinate access of Owner's personnel to site in coordination with Owner's security forces.

1.6 PERSONNEL IDENTIFICATION

- A. Contractor/CM on-site staff, subcontractors and vendors on site shall wear identification badges at all times on site.
- B. Identification badges shall be current at time of project and shall be reverified and reissued yearly if project extends past original badge expiration date.

1.7 SUBMITTALS

- A. Comply with Section 01 33 00 – Submittal Procedures.
- B. Provide list of personnel proposed to be used on project for fingerprinting and background checks (only required for existing school projects).
- C. Contractor/CM shall submit initial list of accredited persons and provide monthly updated lists to Owner.
- D. Provide security plan to Owner indicating how construction site is to be secured and separated from existing school and its operations including normal and emergency egress and exiting from the operational portion of school and for new additions and existing portion under construction.

PART 2 PRODUCTS

2.1 Not Used.

PART 3 EXECUTION

3.1 Not Used.

END OF SECTION

SECTION 01 42 00
REFERENCE STANDARDS

PART 1 GENERAL

1.1 REFERENCE STANDARDS

- A. Reference and design standards referenced in Florida Building Code and Florida Fire Prevention Code, 6th Editions are applicable.
- B. Documents listed shall be standard references currently in effect at time of project building permitting.
- C. American Society of Testing Materials (ASTM):
 - 1. See individual product specification sections for applicable ASTM standards.
- D. American National Standards Institute (ANSI)/Underwriters Laboratories (UL):
 - 1. See individual product specification sections for applicable ANSI standards.
- E. Underwriters Laboratories (UL) – Fire Resistance Directory.
- F. Warnock-Hersey – Product Directory.
- G. Building Industry Consulting Services International (BICSI):
 - 1. BICSI-568-2001: Installing Commercial Building Telecommunications Cabling.
 - 2. BICSI Telecommunications Distribution Methods Manual (TDMM).
 - 3. BICSI Telecommunications Cabling Installation Manual (TCIM).
 - 4. BICSI Outside Plant Design Reference Manual, 5th Edition.
- H. FCC (Federal Communications Commission) Rules.
- I. National Electrical Code (NEC):
 - 1. NFPA 70 National Electrical Code, 2008 Edition.
- J. National Fire Protection Association (NFPA):
 - 1. NFPA 101: Life Safety Code - National Fire Protection Association (NFPA).
 - 2. NFPA 70: National Electrical Code - National Fire Protection Association (NFPA).
- K. Occupational Health and Safety (OSHA): State and Federal Requirements.
- L. Telecommunications Industry Association (TIA)/Electronics Industry Association (EIA):
 - 1. TIA/EIA-568-B.1 and addenda: Commercial Building. Telecommunications Cabling Standard - Part 1: General Requirements.
 - 2. TIA/EIA-568-B.2 and addenda: Commercial Building Telecommunications Cabling Standard - Part 2: Balanced Twisted-Pair.
 - 3. TIA/EIA-568-B.2-1: Transmission Performance Specifications for 4-Pair 100 Ohm Category 6 Cabling.
 - 4. TIA/EIA-568-B.3 and addenda: Commercial Building Telecommunications Cabling Standard - Part 3: Optical Fiber Cabling and Components Standard.
 - 5. TIA/EIA-568-B.3-1: Additional Transmission Performance Specifications for 50/125 ohm Optical Fiber Cables.
 - 6. TIA/EIA-569-A and Addenda: Commercial Building Standard for Telecommunications Pathways and Spaces, CSA T530.
 - 7. TIA/EIA-606-A and Addenda: Administration Standard for Telecommunications Infrastructure of Commercial Buildings, CSA T528.
 - 8. ANSI-J-STD-607-A and Addenda: Commercial Building Grounding (Earthing) and Bonding Requirements for Telecommunications, CSA T530.
 - 9. TIA/EIA-526-7 and Addenda: Measurement of Optical Power Loss of Installed Single-Mode Fiber Cable Plant.
 - 10. TIA/EIA-526-14A and Addenda: Optical Power Loss Measurements of Installed Multimode Fiber Cable Plant.

11. TIA/EIA-758: Customer Owned Outside Plant Telecommunications Cabling Standard.
- M. International Electrical Code (IEC):
 1. TR3 61000-5-2 - Ed. 1.0 and amendments: Electromagnetic compatibility (EMC) - Part 5: Installation and mitigation guidelines – Section 2: Earthing and Cabling”.
 2. ISO/IEC 11801: 2000 Edition, 1.2 and amendments: Information Technology – Generic cabling for customer premises.
- N. International Standards Organization (ISO/IEC): 11801: 2000 Ed. 1.2 and amendments: Information technology - Generic cabling for customer premises.
- O. NACE (National Association of Corrosion Engineers) - Industrial Maintenance Painting.
- P. NPCA (National Paint and Coatings Association) - Guide to U.S. Government Paint Specifications.
- Q. PDCA (Painting and Decorating Contractors of America) - Painting - Architectural Specifications Manual.
- R. SSPC (Steel Structures Painting Council) - Steel Structures Painting Manual.
 1. SSPC-SP 1 – Solvent Cleaning.
 2. SSPC-SP 2 – Hand Tool Cleaning.
 3. SSPC-SP 3 – Power Tool Cleaning.
 4. SSPC-SP 13 – Nace No 6 Surface Preparation for Concrete.
- S. WDMA (Window and Door Manufacturer’s Association) I.S. 1-A-2004.

1.2 DEFINITIONS

- A. Communication Definitions:
 1. ITS: Information Transport System: Copper cabling or optical fiber for transmission of information on School District property. Transmission includes data, video, voice, fire alarm, security, access control, and other low-voltage networks. Information Transport System is not limited to School District-owned cabling, but includes copper and optical fiber, and equipment owned by outside providers carrying School District’s information. Pathways are not limited by School District’s ownership, but include those owned by third parties. Information Transport System may be referred to as “the network” within project documents.
 2. ICP: Inside Cable Plant: Part of Information Transport System running within buildings. ICP elements include workstation outlet assembly, cabling to the workstation from network rooms, backbone cabling within building, backbone cabling running between physically contiguous buildings, network racks and hardware (routers, switches, hubs, firewalls, etc.), patch panels, punch blocks, fiber distribution panels, patch cords, and cross-connect cables/wires.
 3. OCP: Outside Cable Plant: Part of Information Transport System running between buildings, from building to definable exterior point, between definable exterior points, or from non-School District source to School District building or definable exterior point. OCP includes termination punch blocks, fiber distribution panels, interior splices for outside to inside optical fiber transition, and other initial device into which outside cable attaches. OCP does not include backbone cable running between physically contiguous buildings unless cabling enters OSP pathway element (e.g. OSP conduits, maintenance holes, etc.). OCP includes underground cabling and aerial cabling.
 4. Cable: An assembly of one or more insulated conductors or optical fibers, within an enveloping sheath.
 5. DP: Dead pairs: Unused copper pairs terminating within splice case, but without being splices to outgoing cable.

6. GP: Grounding electrode: Conductor (rod, pipe or plate or group of conductors) in direct contact with earth for purpose of providing low-impedance connection to earth.
 7. GEC: Grounding electrode conductor: Conductor used to connect grounding electrode to equipment grounding conductor, or to grounded conductor of circuit at service equipment, or at source of separately derived system.
 8. Handbox: Rectangular or square underground pathway element similar to small maintenance hole, which cannot be fully entered, that allows for pulling point or splice point in power, security or communications pathway.
 9. Handhole: A round underground pathway element similar to a handbox, which cannot be fully entered, that allows for a pulling point in a pathway.
 10. Identifier: An item of information that links a specific element of the Information Transport System infrastructure with its corresponding record.
 11. Infrastructure (Information Transport System): A collection of those Information Transport System components, excluding equipment, that together provides the basic support for the distribution of all information within a building or campus.
 12. Linkage: A connection between a record and an identifier or between records.
 13. Maintenance (man) holes: Underground pathway element large enough for person to fully enter work, used to provide access to underground cable to pull, splice, and maintain.
 14. Media (Information Transport System): Wire, cable, or conductors used for Information Transport System.
 15. OB: Outlet box: Metallic or nonmetallic box used to hold Information Transport System outlets/connectors or transition devices.
 16. Outlet (Connector) (Information Transport System): Connecting device in work area on which horizontal cable or outlet cable terminates.
 17. Pathway: Facility for the placement of Information Transport System cable.
 18. Record: Collection of detailed information related to specific element of Information Transport System infrastructure.
 19. Report: Presentation of collection of information from various records.
 20. Space (Information Transport System): Area used for housing installation and termination of Information Transport System equipment and cable, e.g., equipment rooms, network rooms, work areas, and maintenance holes/handboxes/handholes.
 21. Splice: Joining of conductors in splice closure, meant to be permanent.
 22. Splice box: Box, located in pathway run, intended to house cable splice.
 23. Splice closure: Device used to protect splice.
 24. Termination position: Discrete element of termination hardware where information Transport System conductors are terminated.
 25. Work Area (work station): Building space where occupants interact with Information Transport System terminal equipment.
- B. Painting Definitions:
1. ASTM D16 - Definitions of Terms Relating to Paint, Varnish, Lacquer, and Related Products for interpretation of terms used herein.

1.3 ABBREVIATIONS AND ACRONYMS

- A. Abbreviations noted in Florida Building Code, Chapter 2 are applicable.
- B. General Abbreviations:
1. AC: Above Counter/Air Conditioning.
 2. ACR: Attenuation-to-Crosstalk Ratio.
 3. ADA: Americans with Disabilities Act.

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4. AFF: Above finished floor.
5. AFG: Above finished grade.
6. ANSI: American National Standards Institute.
7. ARCH: Architect or Architectural.
8. ASTM: American Society for Testing and Materials (ASTM International).
9. AWG: American Wire Gauge.
10. BD: Building distributor (replacing main-cross connect and MDF as “building service” room identifiers).
11. BICSI®: Building Industry Consulting Service International, Inc.
12. BTU: British Thermal Unit.
13. CAT6: Category 6 cable.
14. CATV: Community Antenna Television (cable television).
15. CD: Campus distributor (replacing main-cross connect and MDF as “campus-wide service” room identifiers). Also, compact disk for storage of audio or video information.
16. CO: Communications Outlet.
17. COAX: Coaxial Cable.
18. CP: Communications Panel.
19. dB: Decibel.
20. EMS: Energy Management System or Emergency Management System.
21. EMT: Electrical metallic tubing.
22. ENT: Electrical nonmetallic tubing.
23. EDPM: Ethylene-polypropylene-diene membrane.
24. EF: Entrance Facility.
25. EIA: Electronic Industries Alliance.
26. ELFEXT: Equal Level Far-End Crosstalk.
27. EMC: Electromagnetic Compatibility.
28. EMI: Electromagnetic Interference.
29. ER: Equipment Room. Replacing “TR”
30. FMC: Flexible metallic conduit.
31. FCC: Federal Communications Commission.
32. FD: Floor distributor (replacing network room, intermediate and horizontal cross-connect, and telecommunications as “building service” room identifiers). Also, Floor Drain as part of building plumbing system.
33. FDDI: Fiber Distribution Data Interface.
34. FEXT: Far-End Crosstalk.
35. FO: Fiber Optic.
36. Freq: Frequency.
37. GE: Grounding equalizer (replacing TBBIBC).
38. Gnd: Ground.
39. HB: Handbox. Also, hose bibb for water supply part of plumbing system.
40. HC: Horizontal Cross-Connect (replaced by floor distributor “FD”).
41. HH: Handhole.
42. HVAC: Heating, Ventilation, and Air Conditioning.
43. Hz: Hertz.
44. IC: Intermediate Cross-Connect (replaced by building distributor “BD”).
45. IDC: Insulation Displacement Connectors.
46. IDF: Intermediate Distribution Frame (replaced by “BD” or “FD”).
47. IEEE: Institute of Electrical and Electronics Engineers.
48. IMC: Intermediate metal conduit.
49. IN: Inches.

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50. ISO: International Organization for Standardization.
51. ISP: Inside Cable Plant.
52. JB: Junction Box.
53. LBS: Pounds.
54. LED: Light Emitting Diode.
55. LFMC: Liquidtight flexible metal conduit.
56. LFNC: Liquidtight flexible nonmetallic conduit.
57. Mbps: Megabits per second.
58. MC: Main Cross-Connect (replaced by campus distributor “CD”).
59. MDF: Main Distribution Frame (replaced by “CD” or “BD”).
60. MER: Main Equipment Room.
61. MH: Maintenance Hole.
62. MHz: Megahertz.
63. NBR: Acrylonitrile-butadiene rubber.
64. NEC: National Electrical Code, NFPA 70.
65. NEMA: National Electrical Manufacturers Association.
66. NESC: National Electric Safety Code, C2-1997.
67. NFPA: National Fire Protection Association.
68. NIC: Not in Contract.
69. NR: Network Room.
70. #: Number.
71. OFCI: Owner Furnished Contractor Installed.
72. OFOI: Owner Furnished Owner Installed.
73. OSHA: Occupational Safety and Health Administration.
74. OCP: Outside Cable Plant.
75. OTDR: Optical Time Domain Reflectometer.
76. PR: Pair.
77. PVC: Polyvinyl Chloride.
78. RCDD®: Registered Communications Distribution Designer.
79. RFI: Radio Frequency Interference.
80. RGC or GRC: Rigid Galvanized Conduit.
81. RH: Relative Humidity.
82. RNC: Rigid nonmetallic conduit.
83. SCS: Structured Cabling System.
84. SS: Stainless Steel.
85. SM: Single Mode.
86. TIA/EIA: Telecommunications Industry Association/Electronic Industry Association.
87. TBB: Telecommunication Bonding Backbone.
88. TBBIBC: Telecommunication Bonding Backbone Interconnecting Bonding Conductor (replaced by grounding equalizer “GE”).
89. TE: Telephone Equipment (Wall Mounted Equipment Rack).
90. TEL: Telephone.
91. TGB: Telecommunications Grounding Buss bar.
92. TMGB: Telecommunications Main Grounding Buss bar.
93. TR: Telecommunications Room. (Replaced with Main-MDF or Intermediate-IDF Distribution Frame Locations).
94. TYP: Typical.
95. UL: Underwriters Laboratory.
96. UPS: Uninterruptible Power Supply.
97. UTP: Unshielded Twisted Pair.

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- 98. V: Volt.
- 99. WAO: Work Area Outlet.

1.4 UNITS OF MEASURE

- A. Weights and Measures shall be as identified by Weights and Measures Division, NIST, U. S. Department of Commerce, 100 Bureau Dr., Stop 2600, Gaithersburg, MD 20899-2600.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION

SECTION 01 45 00
QUALITY CONTROL

PART 1 GENERAL

1.1 SCOPE OF WORK

- A. Quality assurance procedures to control labor and product installation including tolerances, adherence to references and standards.
- B. Construction of mockups and field samples to set standard of quality for product installation.
- C. Independent inspecting and testing laboratory services for quality control and adherence to contract documents.
- D. Manufacturers' field services for quality control and adherence to contract documents.
- E. Work shall be in conformance with 2007 Edition of AIA A201 General Conditions of the Contract and as amended by Owner on July 13, 2009. Copy is included in Division 1, Section 00 72 00 – General Conditions.

1.2 RELATED SECTIONS

- A. Section 01 22 00 – Unit Prices.
- B. Section 01 29 00 – Payment Procedures.
- C. Section 01 31 00 – Project Management and Coordination.
- D. Section 01 33 00 – Submittal Procedures.
- E. Section 01 42 00 – References.
- F. Section 01 66 00 – Product Storage and Handling Requirements.
- G. Section 01 78 00 – Closeout Submittals.
- H. Section 01 91 00 – Commissioning.
- I. Section 23 05 93 – Testing, Adjusting and Balancing of HVAC.
- J. Section 23 08 00 – Commissioning of HVAC.

1.3 COORDINATION AND PROJECT CONDITIONS

- A. Coordinate scheduling, submittals, and work to ensure efficient and orderly sequence of installation of interdependent construction elements, with provisions for accommodating items installed later.
- B. Verify utility requirements and characteristics of operating equipment are compatible with building utilities. Coordinate work of various sections having interdependent responsibilities for installing, connecting to, and placing in service, such equipment.
- C. Coordinate space requirements, supports and installation of mechanical and electrical work that is indicated diagrammatically on Drawings. Follow routing shown for pipes, ducts, and conduit, as closely as practicable; place runs parallel or perpendicular with line of building. Conduits and piping shall be spaced neatly, consistently and uniformly when in groupings. Utilize spaces efficiently to maximize accessibility for other installations, for maintenance, and for repairs.
- D. In finished areas, except as otherwise indicated, conceal pipes, ducts, and wiring within the construction. Coordinate locations of fixtures and outlets with finish elements.
- E. Coordinate completion and clean up of Work of separate sections in preparation for Substantial Completion and for portions of Work designated for Owner's partial occupancy.

- F. After Owner occupancy of premises, coordinate access to site for correction of defective Work and Work not in accordance with Contract Documents, to minimize disruption of Owner's activities.
- G. Owner will not consider change orders for extra work required by Contractor/CM due to improper or untimely coordination.

1.4 FIELD ENGINEERING

- A. Employ a Land Surveyor registered in the State of Florida, acceptable to Architect and Owner for construction layout.
- B. Contractor/CM shall locate and protect survey control and reference points.
- C. Control datum for survey is that established by Owner provided survey.
- D. Verify setbacks and easements; confirm drawing dimensions and elevations.
- E. Provide field engineering services. Establish elevations, lines, and levels, utilizing recognized engineering survey practices.
- F. Upon completion of project, surveyor noted above, shall prepare and submit copy of site drawing and certificate signed by Land Surveyor that elevations and locations of Work are in accord with Contract Documents.

1.5 QUALITY ASSURANCE

- A. Monitor quality control over suppliers, manufacturers, products, services, site conditions, and workmanship, to produce work of specified quality.
- B. Comply fully with manufacturers' instructions, including each step in sequence.
- C. Should manufacturers' instructions conflict with contract documents, request clarification from Architect before proceeding, and document any instructions or directions that may invalidate warranty.
- D. Comply with specified standards as a minimum quality for work except when more stringent tolerances, codes, or specified requirements indicate higher standards or more precise workmanship.
- E. Perform work by persons qualified to produce workmanship of specified quality.
- F. Verify that field measurements are as indicated on shop drawings or as instructed by manufacturer.
- G. Secure products in place with positive anchorage devices designed and sized to withstand stresses, vibration, physical distortion or disfigurement.
- H. Schedule work so no absorbent materials are installed and no concealed areas are closed up until building is dried-in and permanent doors and windows are installed to prevent development of mold or entrapment of mold or moisture inside concealed spaces or moisture absorption into interior materials.
- I. See Section 01 31 00 – Project Management and Coordination for services of Florida licensed land surveyor to verify locations and elevation of floor slabs after floor slab placement and before continuation of construction activities.

1.6 TOLERANCES:

- A. Monitor fabrication and installation tolerance control of products to produce acceptable work. Do not permit tolerances to accumulate.
- B. Comply with manufacturers' tolerances. Should manufacturers' tolerances conflict with contract documents, most stringent tolerance shall prevail.
- C. Adjust products to appropriate dimensions; position before securing products in place.

1.7 REFERENCES AND STANDARDS:

- A. Comply with Section 01 42 00 – References for reference standards, definitions, abbreviations and acronyms applicable to project.
- B. Workmanship shall comply with requirements of standards specified by product or trade association, or other consensus standards of specified products, except when applicable code requirements are more stringent.
- C. Use current reference standard(s) in effect at time of contract execution.
- D. Obtain copies of standards where required by product specification sections.
- E. Contractual relationships, duties, nor responsibilities of parties in Contract nor those of Architect shall be altered from contract documents by mention or inference otherwise in reference documents.

1.8 MOCKUPS AND FIELD STANDARDS:

- A. Comply with Section 01 43 39 – Mockups general requirements and individual product sections for specific requirements. Construct mockups as indicated for review by Architect and Owner's Project Manager.
- B. Assemble and erect specified items with required attachment and anchorage devices, flashings, seals, and finishes.
- C. Accepted mock-ups shall be basis of work quality standard for work.
- D. Where Architect accepts mockups as quality standard of work required, maintain mockups until work is complete.
- E. Upon Architect's approval mockups and work samples may be incorporated in completed work. Otherwise, remove mock-up and clear area.

1.9 TESTING SERVICES:

- A. Owner will appoint and pay for services specified for independent firm to perform testing.
- B. Independent firm will perform tests and other specified services as outlined in individual specification sections and as required by Owner.
- C. Testing and quality control may occur on or off project site.
- D. Independent firm shall submit reports to Owner and Architect and Contractor/CM, indicating observations and results of tests and compliance or non-compliance with contract documents.
- E. Cooperate with independent firm; furnish samples of materials, design mix, equipment, tools, storage, safe access, and assistance by incidental labor as requested.
 - a. Notify Owner, Architect and independent firm 24 hours prior to expected time for operations requiring services.
 - b. Make arrangements with independent firm and pay for additional samples and tests required for Contractor's use.
 - c. Testing does not relieve Contractor to perform work per contract requirements.
 - d. As directed by Architect, independent testing firm shall re-test as result of non-conformance with requirements. Contractor shall pay for re-testing cost by deducting testing charges from the Contract Sum/Price.

1.10 BUILDING INSPECTION SERVICES:

- A. Owner will employ in-house Building Official, or hire independent Building Official and Construction Inspectors as required to perform Document review and approval, and on-site building inspections in accord with Florida Building Code, Section 423 State Requirements for Educational Facilities and other applicable codes.
- B. Building Official and Inspectors will perform code interpretation, document review, project inspections, and other services specified and required in individual specification sections, and shall be paid by Owner.
- C. Inspections firm will conduct inspections and observations of work, indicate compliance or non-compliance with applicable codes and contract documents, and will submit reports to Architect, Contractor/CM and Owner.
- D. Cooperate with inspection firm; provide safe access and assistance by incidental labor as requested.
- E. Notify Owner and Architect and inspection firm 24 hours prior to expected time for operations requiring services.
- F. Inspection of work does not relieve Contractor of performing work in accord with contract requirements.

1.11 MANUFACTURERS' FIELD SERVICES:

- A. Where specified, require material or product suppliers or manufacturers to provide qualified staff personnel to observe site conditions, conditions of surfaces and installation, quality of workmanship, start-up of equipment, test, adjust and balance of equipment and as applicable, and to initiate instructions when necessary.
- B. Submit qualifications of observer to the Architect 30 days in advance of required observations, the observer is subject to Owner's approval.
- C. Report observations and site decisions or instructions given to applicators or installers that are supplemental or contrary to manufacturers' written instructions.
- D. Comply with Section 01 33 00 – Submittal Procedures.

1.12 COMMISSIONING

- A. Comply with Section 01 91 00 – Commissioning for training of Owner's personnel in operation and maintenance of equipment identified in this Section.

PART 2 PRODUCTS (Not Used)

PART 3 EXECUTION

3.1 EXAMINATION:

- A. Verify that existing site conditions and substrate surfaces are acceptable for subsequent work, beginning new work means acceptance of existing conditions.
- B. Verify that existing substrate is capable of structural support or attachment of new work.
- C. Examine and verify specific conditions described in individual specification sections. Immediately notify AE or Owner's Project Manager of conditions that would prevent meeting contractual requirements.
- D. Verify that utility services are available, of correct characteristics, and in correct locations.

3.2 PREPARATION:

- A. Clean substrate surfaces prior to applying next material or substance.
- B. Seal cracks or openings of substrate prior to applying next material or substance in manner approved by product manufacturer.
- C. Apply manufacturer's required or recommended substrate primer, sealer, or conditioner prior to applying any new material or substance in contact or bond.

3.3 CLEANING AND WASTE MANAGEMENT

- A. Comply with Section 01 74 00 – Cleaning and Waste Management.

END OF SECTION

SECTION 01 66 00
PRODUCT STORAGE AND HANDLING REQUIREMENTS

PART 1 GENERAL

1.1 SCOPE OF WORK

- A. Packaging and transportation, delivery and receiving, product handling, storage, conditions and location, maintenance, protection, repair and replacement of products damaged while handling or in storage.

1.2 RELATED DOCUMENTS

- A. Section 01 31 00 – Project Management and Coordination.
- B. Section 01 33 00 – Submittal Procedures.
- C. Section 01 35 53 – Security Procedures.
- D. Section 01 45 00 – Quality Control.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION

3.1 TRANSPORTATION AND HANDLING

- A. Packaging and Transportation:
 - 1. Supplier shall package finished products in boxes or crates to provide protection during shipment, handling and storage at site.
 - 2. Products shall be protected against exposure to outside storage against damage due to weather conditions.
 - 3. Protect products sensitive to damage against impact, abrasion, puncture and other damage during handling and transport to project.

3.2 DELIVERY AND RECEIVING

- A. Arrange deliveries of products in accord with project schedule to allow installation and project completion per approved project schedule.
- B. Prior to project commencement, Contractor's personnel shall meet with Owner's Project Manager and School staff for renovation and new construction to delineate areas for materials storage lay-down areas.
- C. Restrict access of persons to storage areas in accord with Section 01 35 33 – Security Procedures.
- D. Material deliveries to Owner occupied sites shall be coordinated with Owner's Project Manager to ensure availability of personnel and handling equipment for safe and secure unloading and storage of equipment.
- E. Deliver products in undamaged, dry condition, in original unopened containers or packaging with identifying labels intact and legible.
- F. Clearly mark partial deliveries of component parts of equipment to identify equipment and contents, to permit easy accumulation of parts, and to facilitate assembly.
- G. Upon delivery, Contractor/CM shall inspect shipments for following items:
 - 1. Products received match reviewed submittals and Contract Documents.

2. Correct quantities.
 3. Accessories and installation hardware are included.
 4. Containers and packages are intact and labels are legible.
 5. Products are adequately protected for conditions and are undamaged.
- H. Product Handling:
1. Provide equipment and personnel to handle products to prevent product damage.
 2. Handle products to avoid bending, flexing or overstressing.
 3. Lift large or heavy components by using designated lifting points in accord with manufacturers written directions.

3.3 STORAGE AND PROTECTION

- A. General Requirements:
1. Store products immediately upon delivery in accord with manufacturers written directions.
 2. Arrange for storage location to allow access, maintenance and inspection of products.
 3. Stored products shall not conflict with work conditions. construction is contiguous to or within existing school, Provide demising walls to physically separate new or renovation work from existing on-going school operations.
- B. Enclosed Storage:
1. Store products subject to damage by weather in weathertight enclosure.
 2. Maintain temperature and humidity within ranges stated in manufacturer's instructions.
 4. Provide temperature and humidity control within ranges stated in manufacturer's instructions.
 5. Store unpacked or loose products on shelves, in bins, or in neat groups of like items.
- C. Exterior Storage:
1. Provide platforms, blocking or skids to support fabricated products above ground, and sloped to allow drainage.
 2. Protect products to avoid soiling or staining.
 3. Provide product cover to prevent water or condensation on product while allowing ventilation.
 4. Store loose granular materials on clean, solid surfaces such as pavement or on rigid sheet materials to prevent mixing with foreign matter.
 5. Provide for surface drainage to prevent humidity, mold or algae growth.
- D. Maintenance of Storage:
1. Periodically inspect stored products on scheduled basis.
 2. Verify storage facilities and environmental conditions are in compliance with manufacturer's written requirements.
 3. Verify that product surfaces exposed to weather are undamaged, stolen, or have otherwise been adversely affected.
- E. Maintenance of Equipment Storage:
1. Stored mechanical and electrical equipment shall comply with manufacturer's written service instructions for each item, with notice of instructions attached to each item of equipment.
 2. Stored equipment shall be serviced on regular basis, maintaining log of services, and submitted to Architect in accord with Section 01 78 00 – Submittal Procedures as part of Project Record Documents.
- F. Storage of Owner's Salvaged Furnishings and Equipment:
1. Contractor/CM shall provide temporary storage facilities for items to be salvaged and reinstalled.

3.4 PROTECTION OF FINISHED WORK

- A. Protect finished surfaces, including doors, door jambs, soffits of openings used as passageways, through which equipment and materials are handled.
- B. Protect finished floor surfaces in traffic areas prior to allowing equipment or materials to be moved.
- C. Keep finished surfaces clean, unmarked, and suitably protected until Owner's project acceptance.

3.5 REPAIRS AND REPLACEMENTS

- A. Promptly replace or repair damaged equipment or building surfaces caused by moving equipment at no additional cost to Owner.
- B. Additional time required to repair or replace damaged equipment or building surfaces shall not be grounds for Contract time extension or Contractor's additional expense, unless Owner specifically authorizes time extension or additional costs.

END OF SECTION

SECTION 01 74 00
CLEANING AND WASTE MANAGEMENT

PART 1 GENERAL

1.1 SCOPE OF WORK

- A. Administrative and procedural requirements for waste management and cleaning during construction and final cleaning at Substantial Completion.
- B. Development and implementation of Waste Management Plan to indicate following procedures:
 - 1. Limiting amount of project waste through planning, scheduling, and project management.
 - 2. Recycling demolished structures and construction and waste materials, and reuse of recycled or salvaged materials whenever possible.
 - 3. Procedures to reduce construction noise, fumes, vibration, dust or other airborne contaminants.
 - 4. Adherence to Federal, State and local environmental and anti-pollution regulations and ordinances.
 - 5. Waste materials shall be suitably disposed off site in approved landfill sites.
 - 6. Development of contamination containment plan to include procedures for addressing volatile and hazardous materials or their waste products, cleaning materials and residue.
- C. Cleaning and Protection:
 - 1. Development of daily and periodic construction cleaning and protection of products stored on site or erected in project, and shall include sequence and frequency policy and schedule for project duration.
 - 2. Development of evacuation, fire and life safety plan, staff training procedures in handling and disposal of materials deleterious to human contact or exposure.
 - 3. Final cleaning leaving project ready for Owner's acceptance.

1.2 RELATED SECTIONS

- A. Section 01 31 00 – Project Management and Coordination.
- B. Section 01 33 00 – Submittal Procedures.
- C. Section 01 42 00 – References.
- D. Section 01 66 00 – Product Storage and Handling Requirements.
- E. Section 01 78 00 – Closeout Submittals.

1.3 SUBMITTALS

- A. Comply with Section 01 33 00 – Submittal Procedures.
- B. Submit MSDS sheets for products requiring special care or handling in storage, application or cleanup.
- C. Submit Waste Management and Cleaning Plans identifying and providing operational procedures for each item noted in Scope of Work.

1.4 COORDINATION

- A. Coordinate scheduling and implementation of Waste Management and Cleaning Plans with each trade on site.

- B. Ensure enforcement to promote efficient and orderly sequence of installation of interdependent construction elements, with intent to reduce waste maximize efficient and safe work environment.
- C. Coordinate periodic and final clean up of Work of each trade in preparation for Substantial Completion and for portions of Work designated for Owner's partial occupancy.

1.5 QUALITY ASSURANCE

- A. Monitor each trade, product suppliers, product deliveries, waste generation, site conditions, and workmanship, to minimize waste and maximize recycled materials and reuse of retained materials.

PART 2 PRODUCTS

NOT USED (See individual product specifications for cleaning products recommended by manufacture.)

PART 3 EXECUTION

NOT USED (See individual product specifications for written cleaning procedures and instructions recommended by manufacture.)

END OF SECTION

SECTION 01 78 00
CLOSEOUT SUBMITTALS

PART 1 GENERAL

1.1 SCOPE OF WORK

- A. Closeout procedures.
- B. Final cleaning.
- C. Adjusting.
- D. Project record documents.
- E. Operation and maintenance data.
- F. Spare parts and maintenance Products.
- G. Warranties and bonds.
- H. Maintenance service.
- I. Training.

1.2 RELATED SECTIONS

- A. Section 01 29 00 – Payment Procedures.
- B. Section 01 33 00 – Submittal Procedures.
- C. Section 01 91 00 – Commissioning.
- D. Section 27 60 00 – Integrated Audio System.

1.3 CLOSEOUT PROCEDURES

- A. Submit written certification that contract documents were reviewed, work inspected, and that work is complete in accord with contract documents and ready for Owner's Project Manager and AE's review.
- B. Provide submittals to AE and Owner's Project Manager that are required by building and fire authorities.
 - 1. Submit final application for payment identifying total adjusted contract sum, previous payments, and sum remaining due.
 - 2. Owner may opt to occupy all or portions of completed facilities upon substantial completion of those portions of work.
 - 3. Contractor/CM shall provide punch list to AE identifying items remaining to be completed.
 - 4. AE shall inspect project to determine completion of punch list and project compliance with Contract Documents.

1.4 FINAL CLEANING

- A. Execute final cleaning prior to final project assessment.
- B. Clean interior and exterior surfaces exposed to view; remove temporary labels, stains and foreign substances.
- C. Clean equipment and fixtures to sanitary condition with cleaning materials per manufacturer's written recommendations.
- D. Remove waste and surplus materials, rubbish, and construction facilities from the site.

1.5 ADJUSTING

- A. Adjust operating products and equipment to ensure smooth and unhindered operation.

1.6 PROJECT RECORD DOCUMENTS

- A. Maintain on site one set of record documents, recording accurate field revisions to contract documents to include:
 - 1. Drawings/specifications and addenda.
 - 2. Change orders and other modifications to work.
 - 3. Reviewed shop drawings, product data, and samples.
 - 4. Manufacturer's instruction for assembly, installation, and adjusting.
- B. Ensure entries are complete and accurate, enabling ready access and reference by Owner's Project Manager.
- C. Store record documents separate from documents used for construction.
- D. Record information concurrent with construction progress.
- E. Specifications shall be legibly marked and recorded for each product used indicating the following:
 - 1. Manufacturer's name, product model and number.
 - 2. Product substitutions or alternates utilized.
 - 3. Changes made by addenda and modifications.
- F. Record drawings and shop drawings shall be legibly marked with each item recorded to indicate actual construction as follows:
 - 1. Measured depths of foundations in relation to finish first floor datum.
 - 2. Measured horizontal and vertical locations of underground utilities and appurtenances, referenced to permanent surface improvements.
 - 3. Measured locations of internal utilities and appurtenances concealed in construction, referenced to visible and accessible features of the work.
 - 4. Field changes of dimension and details.
 - 5. Details not on original contract drawings.
- H. Upon project completion, transfer project record drawing information to Autocad (2010 or later format) files and provide four copies of CD's to Architect for review and transmitted to Owner, prior to claim for final Application for Payment.
 - 1. Contractor/CM shall also submit two hard copies of record drawings and project manual maintained during project to Owner's Project Manager.
 - 2. Owner will be responsible for making prints from CD's and for their distribution to Owner's user groups.

1.7 OPERATION AND MAINTENANCE DATA

- A. Submit documentation as noted in individual product specifications and as noted herein.

1.8 SPARE PARTS AND MAINTENANCE PRODUCTS

- 1. Provide spare parts, maintenance, and extra products in quantities specified in specification.
- 2. Deliver to Owner; obtain receipt prior to final payment.

1.9 WARRANTIES

- A. Submit documentation as noted in individual product specifications and as noted herein.
- B. Provide duplicate notarized copies.
- C. Execute and assemble transferable warranty documents from subcontractors, suppliers, and manufacturers.
- D. Provide Table of Contents and assemble in D-side 3-ring white binders with typed title sheet of contents inside durable plastic front cover.
- E. Submit prior to final application for payment.
- F. For items of work delayed beyond date of substantial completion, provide updated submittal within ten days after acceptance, listing date of acceptance as start of warranty period.

1.10 MAINTENANCE SERVICE

- A. Furnish service and maintenance of components indicated in specification sections for one-year from date of project substantial completion.
- B. Examine, clean, adjust, and lubricate system components as required for reliable operation.
- C. Include systematic examination, adjustment, and lubrication of components repairing or replacing parts as required with parts produced by the manufacturer of the original component.
- D. Owner shall approve in writing of transfers or reassignments of maintenance service tasks.

1.11 ASBESTOS CERTIFICATION

- A. Provide notarized letter from Contractor/CM certifying that “to the best of his/her knowledge no asbestos containing building materials were used as a building material in the project”, per FS 255.40.

1.12 PROJECT CLOSE-OUT PROCEDURES

- A. Items are to be submitted to the School District’s Construction Manager’s Office once the request for final payment has been submitted.
 - 1. ____ 4 Copies: AIA Application For Payment, Signed and Sealed, Noted as Final Payment.
 - 2. ____ Consent of Surety to make final payment.
 - 3. ____ Release of Lien from all Sub-Contractors or Laborers who have filled an Intent to Lien.
 - 4. ____ Warranty/Guarantee from Construction Manager for one-year from the date of Substantial Completion.
 - 5. ____ Warranty/Guarantee from each Sub-Contractor for one-year from the date of Substantial Completion.
 - 6. ____ Copy of the approval by the Architect-Engineer and the transmittal to the end user of manuals, shop drawings, as-builds, brochures, warranties, list of sub-contractors with phone numbers, addresses and contact persons.
 - 7. ____ Verification that all applicable district personnel have been trained in the operation of their new equipment (per system: HVAC, controls, etc.)

8. ____ Executed Roof Warranty in the name of the Martin County School District.
9. ____ 4 Copies: OEF Form 209, Certificate of Final Inspection.
10. ____ 4 Copies: Completed Punch-list.
11. ____ SREF 4.2(3)(e) Architect's Certificate of Specification of Asbestos Containing Materials.
12. ____ SREF 4.2(3)(e) Contract's Certificate of Asbestos Use.
13. ____ SREF 4.2(3)(d) Threshold inspector's statement that building complies with Threshold Plan.
14. ____ 4 Copies: OEF Form 110B, Certificate of Occupancy.
15. ____ OEF Form 564 for new construction or additions to existing schools only (Return to Director's Secretary)
16. ____ Inspection Log Book

PART 2 PRODUCTS

2.1 APPROVED PRODUCTS

- A. Use only cleaning and maintenance products approved for use in Florida Educational Facilities.

PART 3 EXECUTION

- 3.1 Not used.

END OF SECTION

SECTION 01 91 00
COMMISSIONING

PART 1 GENERAL

1.1 SCOPE OF WORK

- A. Administrative and procedural requirements for commissioning facilities and facility systems.
- B. Demonstration and training.
- C. Starting systems.
- D. Demonstration and instructions.

1.2 RELATED SECTIONS

- A. Section 01 31 00 – Project Coordination.
- B. Section 01 78 00 – Closeout Documents.
- C. Section 23 05 93 – Testing, Adjusting, and Balancing HVAC.
- D. Section 23 08 00 – Commissioning of HVAC.

1.3 STARTING SYSTEMS

- A. Coordinate schedule for start-up of various equipment and systems.
- B. Notify Architect and Owner seven days prior to startup of each item.
- C. Verify that each piece of equipment or system has been checked for proper lubrication, drive rotation, belt tension, control sequence, or other conditions which may cause damage.
- D. Verify that tests, meter readings, and specified electrical characteristics agree with those required by the equipment or system manufacturer.
- E. Verify wiring and support components for equipment are complete and tested. Execute startup under supervision of responsible Contractors' personnel in accordance with manufacturers' instructions.
- F. When specified in individual specification sections, require manufacturer to provide authorized representative to be present at site to inspect, check and approve equipment or system installation prior to startup, and to supervise placing equipment or system in operation.
- G. Submit written reports per section 01 78 00 - Execution and Closeout Documents that equipment or system is installed and functioning correctly.

1.4 DEMONSTRATION AND INSTRUCTIONS

- A. Demonstrate operation and maintenance of Products to Owner's personnel two weeks prior to date of Substantial Completion.
- B. Demonstration of equipment shall be performed by qualified manufacturers' representative who is knowledgeable about the Project and equipment.
- C. For equipment or systems requiring seasonal operation, perform demonstration for other season within six months.
- D. Utilize operation and maintenance manuals as basis for instruction. Review contents of manual with Owners' personnel in detail to explain all aspects of operation and maintenance.
- E. Demonstrate start-up, operation, control, adjustment, trouble-shooting, servicing, maintenance, and shutdown of each item of equipment at agreed-upon times, at equipment location.
- F. Prepare and insert additional data in operations and maintenance manuals when need for additional data becomes apparent during instruction.

- G. Amount of time required for instruction in each piece of equipment and system is indicated in individual equipment and system specification sections.

1.5 TESTING, ADJUSTING, AND BALANCING

- A. Contractor/CM shall employ, and pay for commissioning services other than TAB firm to perform testing, adjusting and balancing of other systems as indicated or require for fully functional systems
- B. Independent TAB firm shall perform services specified in section 23 05 93 – Testing, Adjusting, and Balancing for HVAC system(s).
- C. The Contractor/CM shall submit reports to Architect indicating observations, results of tests and compliance or non-compliance with specified requirements and with requirements of contract documents.

PART 2 PRODUCTS

- 2.1 Not Used.

PART 3 EXECUTION

3.1 LIST OF EQUIPMENT TO BE COMMISSIONED:

- A. Communications System
- B. Fire Alarm System
- C. Intercom System
- D. Kitchen Equipment
- E. HVAC Equipment.
- F. Gymnasium Equipment including bleachers, scoreboards, basketball backstops, sound system, playcourt surface, equipment with floor inserts
- G. Lighting Systems
- H. Stage, Auditorium, Gym and Instructional Spaces Sound Reinforcement Systems
- I. Irrigation System
- J. Fire Protection System
- K. Movable Interior Partitions
- L. Emergency Generator

3.2 EQUIPMENT COMMISSIONING REQUIREMENTS

- A. Comply with individual specification sections for equipment start-up, operation and training.

END OF SECTION

SECTION 01 91 01
COMMISSIONING OF HVAC

PART 1 GENERAL

1.1 SCOPE OF WORK

- A. Independent commissioning of heating, ventilation, and air conditioning in accord with project documents and include:
 - 1. Evaluate proposed HVAC and electrical systems design and control system documents.
 - 2. Review and document HVAC and Electrical control interface systems interface.
 - 3. Coordinate start-up of HVAC and Electrical systems.
 - 4. Coordinate and review operation, training procedures, demonstration and instructions for HVAC equipment use by Owner.
 - 5. Review, evaluate, and document HVAC equipment operation and performance.
- B. Work with TAB contractor for testing, adjusting, and balancing to ensure HVAC system performance is maximized for operational efficiency.
- C. Coordinate HVAC Commissioning scheduling and activities with GC/CM.
- D. Commissioned Systems Include:
 - 1. HVAC components and equipment.
 - 2. HVAC interaction of cooling, heating, and comfort delivery systems.
 - 3. Building Automation System (BAS): control hardware and software, sequences of operation, and integration of factory controls with BAS.
 - 4. Plumbing: Domestic hot water systems.
 - 5. Lighting Control System with interface with daylighting.

1.2 RELATED SECTIONS

- A. Section 01 31 00 – Project Coordination.
- B. Section 01 33 00 – Submittal Procedures.
- C. Section 01 42 00 – References.
- D. Section 01 45 00 – Quality Control.
- E. Section 01 78 00 – Closeout Submittals.
- F. Section 01 91 00 – Commissioning
- G. Section 23 05 93 – Testing, Adjusting and Balancing For HVAC.

1.3 REFERENCES

- A. See Section 01 42 00 – References for additional reference standards, definitions, abbreviations and acronyms.
- B. American Society of Heating, Refrigeration and Air Conditioning Engineers (ASHRAE):
 - 1. ASHRAE Guideline 0-2005 with Amendments a, b, c & d - The Commissioning Process.
 - 2. ASHRAE Guideline 1.1-2007, The HVAC Commissioning Process.
 - 3. ASHRAE 110-95 – An Introduction to Laboratory Fume Hood Performance Testing.
- C. NEBB Whole Building Systems Commissioning of New Construction, 2009 (3rd Edition).
- D. American National Standards Institute/American Industrial Hygiene Association/American Society of Safety Engineers (ANSI/AIHA/ASSE):
 - 1. ANSI/AIHA/ASSE Z9.5-2012 – American National Standard for Laboratory Ventilation.

1.4 DEFINITIONS

A. Definition of terms used are as follows:

1. Acceptance Phase: Phase of construction after initial start-up and check-out when functional performance testing, operational training, and operating and maintenance documentation development and review occurs.
2. Basis of Design: Documentation of primary thought processes and assumptions for design decisions made to meet Owner's Project Requirements as reflected in construction documents (drawings and specifications). Basis of design describes intent of project, systems, components, conditions, and methods chosen to meet Owner's Project Requirements. Design professionals (Architect and Engineer) are responsible for interpretation of the basis of design.
3. Commissioning Provider: Independent entity, not otherwise associated with design team or Contractor/CM, who directs and coordinates day-to-day commissioning activities. Commissioning Provider does not have construction oversight or design role.
4. Commissioning Plan: Overall plan providing structure, schedule, and coordination planning for commissioning process.
5. Commissioning Team: Group responsible for accomplishing commissioning process.
6. Data Logging: Monitoring flows, currents, status, and pressures of equipment using stand-alone recording equipment, separate from control system. Additional monitoring may be provided through capabilities of control system.
7. Deferred Functional Performance Tests: Functional tests performed after date of substantial completion due to partial occupancy, equipment and seasonal testing requirements, design or other site conditions precluding testing of system or piece of equipment during normal commissioning sequence.
8. Owner's Project Requirements: Documents prepared by Owner providing explanation of concepts, criteria, and work scope critical to Owner's expectations.
9. Factory Testing: Testing of equipment at factory (or on-site) by factory personnel in Owner's representative and commissioning agent's presence.
10. Functional Performance Tests: Tests of dynamic function and operation of equipment and systems using manual (direct observation) or monitoring methods. Functional testing is dynamic testing of systems (rather than just components) under full operation. Systems are tested under various modes, such as during low cooling or heating loads, high loads, component failures, unoccupied modes, varying outside air temperatures, fire alarm modes, and power failure. Systems are run through control system's sequences of operation and components are verified to respond properly. Commissioning Provider develops Functional Performance Test procedures in sequential written form, coordinates, oversees and documents actual testing performed by GC/CM. Functional Performance Tests are performed after Test and Balance, pre-functional checklists and start-up is complete.
11. Indirect Indicators: Indicators of response or condition, such as reading from control system screen reporting damper to be 100% closed.
12. Manual Tests: Using hand-held instruments, immediate control system read-outs or direct observation to verify performance (contrasted to analyzing monitored data taken over time to make observations).
13. Monitoring: Recording of parameters (flow, current, status, or pressure) of equipment operation using data loggers or trending capabilities of control systems.

14. Over-written Value: Writing over sensor value in control system to determine response of system (e.g., changing outside air temperature value from 50°F to 75°F to verify economizer operation). See “Simulated Signal.
15. Owner-contracted Tests: Tests paid by Owner outside GC/CM’s contract and for which Commissioning Provider does not oversee. Tests shall not be repeated during functional testing if properly documented.
16. Phased Commissioning: Commissioning completed in phases (by floors, for example) due to size of structure or other scheduling issues, to minimize total construction time.
17. Pre-functional Checklists: Lists of items to inspect and elementary component tests to conduct to verify proper installation of equipment, provided by GC/CM to Commissioning Authority who shall review and approve scope of tests. Pre-functional checklists are primarily static inspections and procedures to prepare equipment or system for initial operation (e.g., belt tension, oil levels, labels affixed, gauges in place, sensors calibrated). Some pre-functional checklist items may entail simple testing of function of components, piece of equipment or systems. Pre-functional refers to testing to be accomplished prior to formal functional testing of installed equipment. Pre-functional checklists augment and may be combined with manufacturer’s start-up checklist. GC/CM shall execute checklists.
18. Sampling: Functional Performance Testing of fraction of total number of identical or near identical pieces of equipment. Sampling population is at discretion of commissioning firm and is subject to modification based upon sampling results (i.e. will be expanded if initial results warrant).
19. Simulated Condition: Condition created for purpose of testing response of system (e.g., blowing hair dryer on space sensor to determine response of variable volume terminal unit).
20. Simulated Signal: Disconnecting sensor and using signal generator to send amperage, resistance or pressure to transducer and control system to simulate sensor value.
21. Start-up: Initial starting or activating of dynamic equipment, including executing pre-functional checklists.
22. Test, Adjust, and Balance: Process of measuring actual flows of air and hydronic systems, adjusting flows to required values, and documenting results.
23. Trending: Monitoring of equipment performance over time, using data logging equipment or building control system.

1.5 QUALITY ASSURANCE

- A. Supervision, coordination, and documentation of commissioning process shall be responsibility of Commissioning Provider.
- B. Commissioning Provider shall become familiar with Owner's Project Requirements, Basis of Design documentation, project documents, and shall assume responsibility for overall system commissioning effort.
- C. Acceptable Commissioning Firms:
 1. OCI Associates, Inc., 181 Melody Lane, Ft. Pierce, FL 34905; Tel: 772-465-1165; Fax: 772-466-1134; Website: www.ociassociates.com
 2. Johnson, Levinson, Ragan, Davila, Inc., 1450 Centrepark Blvd., Suite 350, West Palm Beach, FL 33401; Tel: 561-689-2303; Fax: 561-689-2302; Website: www.jlrdinc.com.
 3. TLC Engineering, 874 Dixon Blvd., Cocoa, FL 32922; Tel: 321-636-0274; Fax: 321-639-8986; Website: www.tlc-eng.com.

1.6 COORDINATION:

- A. Commissioning Provider will be hired by Owner. Commissioning Provider shall direct and coordinate activities of commissioning team.
- B. Commissioning team shall consist of Commissioning Provider, Owner, GC/CM, and associated subcontractors.
- C. Scheduling: Commissioning Provider shall schedule commissioning activities of and shall coordinate schedule with GC/CM. Commissioning Provider shall generally provide not less than two (2) weeks notice to GC/CM of commissioning activities, except where retesting is required or commissioning activities have been delayed by no fault of commissioning firm.

1.7 COMMISSIONING PROCESS:

- A. Commissioning Provider shall develop and coordinate execution of commissioning plan; observe and document installation, check-out, start-up, and equipment and system testing to establish that equipment and systems are functioning in accord with project requirements, and to assist in developing correct and complete documentation of construction effort.
- B. Commissioning Provider shall not be responsible for design concept, design criteria, compliance with codes, design, construction scheduling, cost estimating, construction management, or construction supervision.
- C. Commissioning Provider may assist design team with problem-solving, or GC/CM with correction of non-conformance items or deficiencies.
- D. Commissioning Provider is not responsible for providing tools required to start, check-out and perform functional tests of equipment and systems, except for specified testing with supplemental portable data-loggers, which shall be supplied and installed by Commissioning Provider.
- E. Work Required during Construction Phase:
 - 1. Ensure compliance with construction documents, and achieve following objectives:
 - 2. Review the engineer of records basis of design as well as the project design documents and make comments pertaining to the execution of commissioning.
 - 3. Develop commissioning plan and distribute to GC/CM, Owner and Engineer.
 - 4. Coordinate commissioning activities during construction with GC/CM and ensure that commissioning activities are included in master project schedule.
 - 5. Review submittals applicable to systems being commissioned, including GC/CM proposed detailed start-up procedures, concurrent with Engineer's reviews and provide review comments to Engineer and Owner.
 - 6. Commissioning provider's review shall be for compliance with commissioning needs, and to aid in development of functional testing procedures and only secondarily to review for compliance with equipment specifications. Design professional remains responsible for interpretation of compliance with contract requirements.
 - 7. Request and review additional information as required to perform assigned commissioning tasks, including review of operations and maintenance materials, and GC/CM's start-up and check-out procedures.
 - 8. Develop specific Functional Performance Test procedures and forms to document proper operation of equipment and system.
 - 9. Submit proposed functional tests to Engineer for review and general conformance to requirements of contract documents and provide copy of proposed functional

- performance test procedures to GC/CM who shall review proposed tests for feasibility, safety, equipment and warranty protection.
10. Required performance testing includes control system trending, stand-alone data logger monitoring, or manual logging of system operation to demonstrate proper operation. Functional Performance Test forms shall include following information:
 - a. Date.
 - b. Project name.
 - c. System and equipment or component name(s).
 - d. Equipment location and identification number.
 - e. Test identification number, and reference to pre-function checklist and start-up documentation identification numbers for each piece of equipment.
 - f. Participating parties.
 - g. Reference to specification describing specific sequence of operations or parameters being tested or verified.
 - h. Formulae used in calculations.
 - i. Required pre-test field measurements.
 - j. Instructions for setting up test.
 - k. Special cautions or alarm limits.
 - l. Specific step-by-step procedures to execute test, in clear, sequential, and repeatable format.
 - m. Acceptance criteria of proper performance with provisions for clearly indicating whether or not proper performance of each part of test was achieved.
 - n. Section for comments.
 - o. Signature and date block for Commissioning Provider and participating parties.
 11. Review GC/CM start-up and pre-functional testing reports and provide on-site observation of start-up and pre-functional testing as specified herein.
 12. Review proposed testing, adjusting, and balancing execution plan for completeness and requirements of commissioning process and provide comments to GC/CM, Engineer, and Owner.
 13. Perform site visits, monthly until pre-functional testing of equipment and systems begins, and then weekly throughout Project, to review component and system installations. Concurrently, schedule and conduct commissioning planning and coordination meetings to review construction progress and to assist in resolving discrepancies or issues relating to commissioning process.
- F. Acceptance Phase: Demonstrate that performance of equipment and systems installed during construction phase meets requirements of construction documents. Notify Owner and Engineer of deficiencies in results or procedures. Commissioning activity shall achieve following objectives:
1. Coordinate, witness, and approve functional tests of equipment and systems performed by GC/CM. Review functional test reports and analyze trend logs, data logger reports, and other monitoring data to evaluate equipment and system performance.
 2. Document performance of functional testing and provide comparison to required performance, as defined by project documents.
 3. Coordinate retesting as necessary until satisfactory performance is demonstrated.
 4. Maintain master deficiency and resolution log, separate testing record log, and provide written progress reports and test results with recommended corrective actions for observed deficiencies.
 5. Compile and submit commissioning report to Owner and Engineer documenting results

- of the Start-Up, Pre-Functional Performance Testing, and Functional Performance Testing.
- 6. Review GC/CM's proposed training of Owner's operating personnel and provide comments to Engineer and Owner.
- 7. Coordinate and attend GC/CM provided training sessions. Verify approved training has been properly completed.
- G. Warranty period: assist Owner in identifying defects in installed equipment or system operation to accomplish following objectives:
 - 1. Review equipment warranties to ensure that Owner's responsibilities are clearly defined.
 - 2. Verify that warranty items have been corrected properly.
 - 3. Coordinate and supervise required seasonal or deferred testing and deficiency corrections, as specified or required by commissioning plan.
 - 4. Return to site, approximately 10 months into warranty period and review with Owner building operation and condition of outstanding issues related to original and seasonal commissioning.
 - 5. Assist Owner in reviewing failure and repair records of equipment during warranty period and in evaluation of GC/CM's corrective actions. Identify areas that may come under warranty or under original construction contract.
 - 6. Interview Owner and identify problems or concerns regarding operating building as originally intended and shall make suggestions for improvements.
 - 7. Assist the Owner in developing reports, documents, and requests for services to remedy outstanding problems.

PART 2 PRODUCTS

- 2.1 Not Used.

PART 3 EXECUTION

3.1 REPORTING:

- A. Provide final commissioning report to Owner with following reports:
 - 1. Copies of periodic commissioning reports.
 - 2. Copies of Pre-Functional Performance Test reports.
 - 3. Copies of Functional Performance Test reports.
 - 4. Copies of the Training Report.

3.2 SYSTEMS TO BE COMMISSIONED:

- A. As defined previously herein under item 1.1, F.

3.3 START-UP, PREFUNCTIONAL CHECKLISTS, AND INITIAL CHECK-OUT:

- A. GC/CM shall be responsible for initial check-out and pre-functional testing of installed equipment and systems.
- B. Commissioning Provider shall monitor activities of parties responsible for executing required start-up, and pre-functional testing, as identified in commissioning plan.
- C. Commissioning Provider shall review GC/CM furnished documentation of start-up, initial check-out, and pre-functional test procedures for equipment and systems to ensure that there

- is written documentation that each manufacturer-recommended procedure has been completed.
- D. Observe first pre-functional test procedures for each type and size equipment to ensure that approved procedures are being followed.
 - 1. For lower-level components of equipment, (e.g., variable volume terminal units, sensors, controllers), observe sampling of pre-functional and start-up procedures.
 - 2. In no case, shall number of units witnessed be less than 20% of total number of identical or very similar units.

3.4 FUNCTIONAL PERFORMANCE TESTING:

- A. Functional Performance Testing of equipment or systems shall be conducted only after pre-functional testing and start-up has been satisfactorily completed. Schedule functional tests with GC/CM. Direct, witness, and document Functional Performance Testing of equipment and systems to be commissioned. GC/CM shall be responsible for execution of Functional Performance Tests.
- B. Functional Performance Testing shall demonstrate that each item of equipment and each system is operating according to requirements of construction documents as defined by A/E. Each item of equipment and system undergoing Functional Performance Testing shall be operated through all modes of operation where there is required system response. Verify each action required in sequences of operation has been accomplished according to requirements, or A/E shall revise sequences as deemed appropriate.
- C. Functional Performance Testing shall proceed from components to subsystems to systems. When proper performance of interacting individual systems has been achieved, interface or coordinated responses between systems shall be tested.
- D. Proper and accurate operation of control system shall be proven by functional testing and approved by Commissioning Provider before it may be used for testing, adjusting and balancing activities or to verify performance of other components or systems. If authorized by Commissioning Provider, portions of control system may be tested and approved before functional testing of the entire system is completed.
- E. Air and water balancing shall be completed and corrected as necessary before Functional Performance Testing of air-related or water-related equipment or systems.
- F. Test Methods:
 - 1. Functional Performance Testing and verification shall be achieved by manual testing (direct manipulation of equipment and observation of its response and performance) or by monitoring performance using control system's trend log capabilities.
 - 2. Functional Performance Test procedures shall specify which methods shall be used for each test. Determine which method is most appropriate for tests that do not have method specified.
 - 3. Commissioning Provider may substitute specified methods or require additional method to be executed, other than that specified, if required to demonstrate proper operation of equipment or system being tested.
 - 4. Develop Functional Performance Testing plans that define allowable sampling procedures and that specify procedures to be followed in case of observed discrepancies or failures in sample chosen for functional testing.
 - 5. AHU operation (leaving air temperature, VFD speed) shall be trend logged with VAV box and air valve flow rates, as well as space temperatures to demonstrate modulation of system components with changing loads, as well as occupied/non-occupied status and

control strategies such as optimum static pressure reset and temperature set-up/set-back.

6. Sampling: Multiple identical pieces of non-life-safety or otherwise non-critical equipment may be functionally tested using sampling strategy, as defined in functional test procedures.
 - a. Significant application differences and significant sequence of operation differences in otherwise identical equipment invalidates their common identity.
 - b. Small size or capacity difference, alone, does not constitute difference.
 - c. The following equipment may be sample tested: Reheat coils, terminal boxes, occupancy sensors, and lighting controls.
7. If 10% or 3 or more identical pieces of equipment (size alone does not constitute a difference) fail to perform to requirements of project documents (mechanically or substantively) due to manufacturing defects or application error not allowing it to meet performance specifications, identical units may be considered unacceptable by Commissioning Provider. In such case, GC/CM shall provide Commissioning Provider with the following:
 - a. Within 1 week of notification from Commissioning Provider, GC/CM or manufacturer's representative shall examine other identical units making record of findings. Findings shall be provided to Commissioning Provider within 2 weeks of original notice.
 - b. Within 2 weeks of original notification, GC/CM shall provide signed and dated, written explanation of problem, cause of failures, and proposed solution, including full equipment submittals for corrective or replacement equipment, if appropriate. Proposed solutions shall meet requirements of original installation.
 - c. Commissioning Provider shall evaluate proposed solution and submit recommendation of approval or disapproval to Owner and Engineer.
 - d. When approved, 2 examples of proposed solution shall be installed by GC/CM and Commissioning Provider shall schedule and conduct functional testing of proposed solution. Upon completion of functional testing of proposed solution, Commissioning Provider shall recommend acceptance or disapproval of proposed solution to Owner.
 - e. Upon acceptance of proposed solution by Owner, GC/CM shall replace or repair identical items and extend warranty accordingly, if original equipment warranty had begun. Replacement/repair work shall proceed with reasonable speed beginning within 2 weeks of approval of proposed solution.
8. Ensure that each Functional Performance Test is performed under conditions that simulate actual operating conditions as closely as is practically possible.
9. Simulation of operating conditions (not by overwritten value) may be allowed, at Commissioning Provider's discretion. Simulation of conditions shall be accomplished by subjecting the equipment to actual operating conditions by artificial means whenever possible.
10. Where actually achieving simulated operating condition is impractical, as determined by Commissioning Provider or as identified in Functional Performance Test procedure, use of signal generators to create simulated signal may be used to test and calibrate transducers and DDC constants instead of using sensor to act as signal generator via simulated conditions or overwritten values. Signal generators or simulators shall be provided by GC/CM.
11. Overwriting sensor values to simulate conditions, such as overwriting outside air temperature reading in control system to be different than it really is, may be allowed if approved by Commissioning Provider. Simulation of operating conditions is preferable.

12. Altering setpoints: rather than overwriting sensor values, and when simulating conditions is difficult, altering setpoints shall be used to test sequences.
13. Indirect indicators: relying on indirect indicators for responses or performance may be allowed only after the Commissioning Provider has visually and directly verified that indirect readings represent actual conditions and responses over range of test parameters.

3.5 RETESTING OF EQUIPMENT AND/OR SYSTEMS:

- A. Prior to retesting of functional performance tests found to be deficient, submit data indicating that deficient items have been completed and corrected to Commissioning Provider.
- B. After review of submitted data, if corrective measures are acceptable, Commissioning Provider shall schedule and conduct recheck.
- C. If during retesting it becomes apparent that deficient items have not been completed and corrected as indicated in data provided by GC/CM, retesting shall be stopped. Costs for commissioning team to further supervise retesting of Functional Performance Test shall be the responsibility of GC/CM.

3.6 DOCUMENTATION, NONCONFORMANCE, AND APPROVAL OF TESTS:

- A. Documentation: Witness and document results of functional tests using specific procedural forms developed for that purpose. Deficiencies or nonconformance issues shall be noted and reported with test results. Include completed test forms in final commissioning report.
- B. As Functional Performance Testing progresses and deficiencies are identified, discuss issues and attempt to resolve discrepancies with GC/CM.
- C. Approval: Note each satisfactorily demonstrated function on functional test form. Formal approval of functional tests shall be made after review of test reports by Commissioning Provider and Owner. Recommend acceptance of each test to the Owner using standard form. Owner shall give final approval on each test using same form, providing signed copy to Commissioning Provider and GC/CM.

3.7 DEFERRED TESTING:

- A. Deferred testing: If required pre-functional or functional test cannot be completed as scheduled, execution of checklists and functional testing may be delayed upon approval of Commissioning Provider and Owner. Deferred tests shall be conducted in same manner as seasonal tests as soon as possible.
- B. Schedule and coordinate any required seasonal testing, tests delayed until weather or other conditions are suitable for demonstration of equipment or system's performance. Seasonal testing shall be executed, documented, and deficiencies corrected as specified herein for functional testing. Adjustments or corrections to operations and maintenance manuals and record documents due to test results of shall be made before seasonal testing process is considered complete. Schedule deferred testing with GC/CM and Owner.

3.8 OPERATION AND MAINTENANCE MANUALS:

- A. Prior to beginning specified training programs, review draft operations and maintenance manuals, equipment documentation, and as-installed drawings for systems that were commissioned and verify compliance with documents. Communicate deficiencies in documents to Owner and Contractor. When identified deficiencies have been corrected, recommend approval and acceptance of operations and maintenance manuals to Owner. Review equipment warranties and verify that requirements needed to keep warranty valid are clearly identified.
- B. Ensure that Owner's Project Requirements, basis of design, are included in the first section of operations and maintenance manuals. Narrative sections shall be updated by responsible parties to record status.

END OF SECTION

DIVISION

2

SITE CONSTRUCTION

SECTION 02 41 13
SELECTIVE DEMOLITION

PART 1 GENERAL

1.1 RELATED DOCUMENTS

- A. The provisions of the General Conditions, Supplementary Conditions, Drawings, Specifications and the Sections included under Division 1, General Requirements and References are included as a part of this Section as though bound herein.

1.2 SECTION INCLUDES

- A. Provide labor, materials, services, and equipment necessary to furnish and install work as indicated and as specified herein, which includes, but is not limited to:
 - 1. Required demolition of designated existing elements
 - 2. Salvage of designated items

1.3 REFERENCES

- A. Comply with NFPA 1 – Chapter 29 and NFPA 241 Standard for Safeguarding Construction Alteration and Demolition Operation 2000 Edition
- B. Florida Building Code – FBC

1.4 NOTIFICATION OF OWNERS OF UTILITY LINES AND EQUIPMENT

- A. Notify the Owner or local authority owning any conduits, wires, pipes, or equipment affected by demolition work.
- B. Arrange for removal or relocation of affected items and pay fees or costs in conjunction with removal or relocation, except as otherwise noted.

1.5 PROTECTION

- A. Prior to starting any work on site, provide a safety plan as outlined in Section 453 FBC to the Building Department for approval.
- B. Coordinate the implementation of the safety plan with the Building Department, Campus Police, School Representative, and Program Management.
- C. Prior to starting demolition operations, provide necessary protection of existing spaces and items to remain.
- D. Owner may be continuously occupying areas of the building immediately adjacent to areas of selective demolition. If Owner continues to occupy the facility comply with the following:
 - 1. Conduct demolition work in a manner that will minimize need for disruption of the Owners normal operations.
 - 2. Provide protective measures as required to provide free and safe passage of Owner's personnel and public to and from occupied portions of the facilities.
 - 3. Provide minimum of 72 hours advance notice to Owner of demolition activities that will impact Owners normal operations.
 - a. Obtain specific approval from Owner for impact.
- E. Owner assumes no responsibility for actual condition of items to be demolished.
 - 1. Owner will maintain conditions at time of commencement of contract insofar as practical.

- F. Protect any exposed existing finish work that is to remain during demolition operations.
- G. Erect and maintain dust proof partitions, closures, and ventilator system as required preventing the spread of dust or fumes to occupied portions of the building.
 - 1. Take whatever precautions necessary to minimize impact on occupied areas.

1.6 REGULATORY REQUIREMENTS

- A. Conform to applicable codes for demolition of structures, safety of adjacent structures, dust control, runoff, and erosion control, and disposal of demolished materials.
- B. Obtain required permits from authorities having jurisdiction.
- C. Notify affected utility companies before starting work and comply with their requirements.
- D. Do not close or obstruct roadways, sidewalks, and hydrants, without permits.
- E. Conform to applicable regulatory procedures when discovering hazardous or contaminated materials.
 - 1. Contact the Architect and Owner immediately.
- F. Test soils around buried tanks for contamination.
- G. No demolition will occur during school hours without the written permission of the Owner.

1.7 EXPLOSIVES

- A. The use of explosives is strictly prohibited.

PART 2 PRODUCTS - (Not applicable)

PART 3 EXECUTION

3.1 PREPARATION

- A. Verify the proper disconnection and capping of all abandoned utilities.
- B. Verify that required barricades and other protective measures are in place.
- C. Provide necessary shoring, bracing, and other precautions required for proper support of existing structure during cutting and demolition operations.
- D. Photograph existing conditions of structure, surfaces, equipment and surrounding spaces that could be misconstrued as damage resulting from selective demolition work; submit photographs and written report of existing damage to Architect prior to starting work.
 - 1. Contractor shall repair damage caused to existing facilities at no cost to Owner unless they can provide documentation is indicating pre-existing damage.

3.2 DEMOLITION OPERATIONS

- A. Cut and remove elements and equipment as designated on Drawings.
 - 1. Remove elements in their entirety unless otherwise indicated.
- B. Execute demolition in a careful and orderly manner with least possible disturbance or damage to adjoining surfaces and structure.
- C. Exercise extreme caution in cutting and demolition of portions of existing structure.
 - 1. Obtain approval of Architect prior to cutting or removing structural members for any reason.
- D. Avoid excessive vibrations in demolition procedures that may transmit through existing structure and finish materials.

- E. If hazardous materials are encountered during demolition operations, comply with applicable regulations, laws, and ordinances concerning assessment, removal, handling, and protection against exposure or environmental pollution and immediately contact the District's ECO.

3.3 DISPOSAL

- A. Materials, equipment, and debris resulting from demolition operations shall become property of Contractor.
 - 1. Remove demolition debris at least once each day in accordance with applicable City, State, and Federal Laws.
- B. Cover debris in trucks with approved netting to prevent spillage during transportation.
- C. Do not store except in approved containers or burn materials on site.
 - 1. Remove combustible waste materials in a manner approved by local Fire Department.
 - 2. Remove, handle, and dispose of any hazardous waste and debris in accordance with applicable City, State, and Federal Laws.
- D. Transport demolition debris to off-site disposal area and legally dispose of debris.
- E. Use street routes specifically designated by City for hauling debris.
- F. When possible dispose of material to recycling centers.

3.4 CLEANING AND REPAIR

- A. Leave building broom clean and free of debris, ready to receive new work.
- B. Repair demolition performed in excess of that required.
 - 1. Return structures and surfaces to remain to condition existing prior to commencement of selective demolition.

END OF SECTION

DIVISION

3

CONCRETE

SECTION 03 00 00
CONCRETE

PART 1 GENERAL

1.1 RELATED DOCUMENTS

- A. Work of this section shall conform to the requirements of the Contract Documents, including the General Conditions, Supplementary General Conditions, Special Conditions, and Division 1 General Requirements.

1.2 DESCRIPTION

- A. Work Included: The extent of the concrete work is indicated on drawings and specified herein. Concrete Work includes, but is not limited to, the following:

1. Cast-in-place stone concrete.
2. Reinforcing steel.
3. Concrete admixtures.
4. Formwork.
5. Curing of concrete.
6. Finishing of concrete.
7. Protection of concrete.
8. Plastic water-stops.
9. Expansion Joint Fillers.

1.3 QUALITY ASSURANCE

- A. Codes and Standards: Comply with the provisions of the following codes, specifications and standards, except where more stringent requirements are shown or specified:

1. ACI 301 "Specifications for Structural Concrete for Buildings".
2. ACI 318 "Building Code Requirements for Reinforced Concrete".
3. Concrete Reinforcing Steel Institute, "Manual of Standard Practice".

- B. For any item not specifically covered in these specifications, ACI 301-81 "Structural Concrete for Buildings" will govern.

1.4 SUBMITTALS

- A. Product Data: Submit manufacturer's product data with applications and installation instruction for materials and items, including but not limited to, reinforcement and forming accessories, admixtures, water-stops, and others as requested.

- B. Shop Drawings: Reinforcement - Submit shop drawings for fabrication, bending, and placement of concrete reinforcement. Comply with ACI 315 "Manual of Standard Practice for Detailing Reinforced Concrete Structures" and as shown on the drawings, showing bar schedules, stirrup spacing, diagrams of bent bars, arrangement of concrete reinforcement. Include special reinforcement if required.

1. All reinforcing steel is to be precut off-site in an approved fabricating shop by an approved Subcontractor for reinforcing steel fabrication.
- C. Laboratory Test Reports: Submit laboratory test reports for mix designs as specified.
- D. Mix Design: This Contractor shall submit a mix design for each type of concrete required for approval by the Engineer. Refer to Part 4 of this Section for additional requirements.
- E. Material Certificates: Submit certificates for reinforcing steel as hereinafter specified.
- F. Admixture(s) Certification(s): Submit certifications(s) as hereinafter specified.

1.5 JOB CONDITIONS

- A. Time of Completion and Procedure of Construction: Time of Completion is a matter of utmost importance in connection with this Contract. By the submission of a bid, this Contractor agrees to diligently perform his work so as to assure completion within the time limits and Pre-Bid CPM Schedule.

PART 2 PRODUCTS

2.1 FORM MATERIALS

- A. Forms for Concrete: Construct all formwork for concrete surfaces with plywood, lumber, or metal. Provide lumber dressed on at least two (2) edges and one (1) side for tight fit. Provide form material with sufficient thickness to withstand pressure of newly-placed concrete without objectionable bow or deflection.
- B. Form Coatings: Provide commercial formulation form-coating compounds that will not bond with, stain, nor adversely affect concrete surfaces, and will not impair subsequent treatments of concrete surfaces.

2.2 REINFORCING MATERIALS

- A. Reinforcing Bars: Reinforcing steel must be correctly rolled to section and free from all surface defects and shall be in accordance with ASTM A-615, Grade 60, as evidenced by manufacturer's certificates. The grade of steel shall be intermediate, new billet stock. All bars shall be deformed and rolled with raised symbols to identify the manufacturer and the size of the bar.
- B. Tie wire shall be No. 18 U.S. Steel wire gauge black annealed wire.
- C. Supports for Reinforcement: Spacerbars, slab bolsters, chairs, wiring, nails, and other accessories shall be standard commercial metal supports and plastic where exposed to weather or where rust will impair architectural finish.

2.3 CONCRETE MATERIALS

- A. Portland Cement: ASTM C-150, Type 1.

- B. Supplementary Cementitious Materials:
 - 1. Fly Ash: ASTM C618, Type F may be used up to a maximum of 25% of the total cementitious content.
 - 2. Ground Granulated Blast-Furnace Slag: ASTM C989, Grade 100 or 120 may be used up to a maximum of 40% of the total cementitious content.
 - 3. The exact percentages used shall be based on a successful test placement on-site.
- C. Fine Aggregate: Clean, natural siliceous sand, consisting of hard, strong, durable, uncoated particles, and shall conform to the requirements of ASTM C-33.
- D. Coarse Aggregate: Clean, hard, uncoated, strong, durable gravel, or crushed stone, and shall conform to the requirements of ASTM C-33. The maximum size of coarse aggregate shall be 1 inch.
- E. Water: Potable for mixing and curing concrete and shall not contain amounts of impurities injurious to the concrete.
- F. Light Weight Aggregate: Conform to ASTM C-330.

2.4 ADMIXTURES

- A. General: No admixtures shall be used in concrete unless otherwise specified herein and except with the permission of the Structural Engineer and after laboratory design mix approval. This Contractor shall provide the services of the admixture manufacturer's representative to assure proper use of admixtures if required.
 - 1. Prohibited Admixtures: Calcium chloride, thiocyanates containing more than 0.05% chloride ions are not permitted. Admixtures containing more than 0.05% chloride ions are not permitted.
 - 2. Certification: Written conformance to the above-mentioned requirements and the chloride ion content of the admixture will be required from the admixture manufacturer prior to mix design review by the Engineer.
- B. Water Reducing Admixture: Conform to ASTM C-494, Type A. Provide one of the following products:
 - 1. W.R. Grace & Co. - "WRDA with Hycol"
 - 2. Master Builders - "Pozzolith 322N"
 - 3. The Euclid Chemical Company - "Eucon WR-75"
 - 4. Sika Chemical Corp - "Plastocrete 161"
- C. Accelerating Admixture: Non-chloride, non-corrosive and conform to ASTM C-494, Type C & E.

1. The Euclid Chemical Co. - "Accelguard 80"
 2. W.R. Grace & Co. - "Daraset"
 3. Master Builders - "Pozzolith 500A"
- D. Air Entraining Admixture: The air-entraining admixture shall conform to ASTM C-260 and shall be used where necessary to achieve the specified air content.
- E. Water Reducing Retarder Admixture: Conform to ASTM C-494, Type D.
1. The Euclid Chemical Co. - "Eucon Retarder-75"
 2. W.R. Grace & Co. - "Daratard-17"
 3. Sika Chemical Corp - "Plastocrete 161-R"
 4. Master Builders - "Pozzolith 100-XR"
- F. High Range Water Reducing Admixture: Conform to ASTM C-494, Type F. These admixtures shall be used in strict accordance with the manufacturer's recommendations. Provide one of the following products:
1. W.R. Grace & Co. - "Daracem - 100"
 2. Sika Chemical Corp - "Sikament"
 3. The Euclid Chemical Co - "Eucon-37"
 4. Master Builders - "Rheobuild 716"

2.5 RELATED MATERIALS

- A. Anchor Bolts: Anchor bolts shall be ASTM A-307. For size and length of anchor bolts refer to the Structural drawings.
- B. Joint Fillers: Expansion joint fillers shall be asphalt impregnated fiberboard conforming to ASTM D-1751. Joint fillers shall extend full depth of joint and be of thickness indicated on drawings.
- C. Water-stops: Provide flat, dumbbell type or center bulb type waterstops at construction joints and other joints as shown. Size to suit joints.
- D. Non-Shrink Grout: Pre-mixed non-shrink grout as called for on drawings shall be as manufactured by:
1. The Euclid Chemical Co. - "Euco N-S Grout" (All exposed grout).
 2. The Euclid Chemical Co. - "Firmix"

3. Master Builders - "Masterflow 713 Grout"
 4. U.S. Grout Corporation - "Five Star Grout"
 5. Lambert Corp. - "Vibropruf #11"
- E. Curing Compounds: Curing compounds shall be manufactured by:
1. "Super Floor Coat" or "Super Rez Seal" by the Euclid Chemical Company, "Masterseal" by Master Builders, or approved equal, for curing and sealing all garage, exterior exposed, and mechanical room floors. The compound shall be a clear styrene acrylate type, 30% solids content minimum moisture loss of 0.030 grams per sq. cm. when applied at a coverage rate of 300 sq. ft. per gallon. Manufacturer's certifications required.
 2. Other interior slabs shall be cured with the dissipating resin type compound, "Kurez DR" by The Euclid Chemical Company or approved equal. The compound shall conform to ASTM 309 and chemically break down in a two to four-week period. The curing compounds must be applied immediately after finishing and on formed surfaces following form removal.
- F. Plastic Reglets: Provide "Type A" prefilled P.V.C. reglets where indicated, made by Superior Concrete Accessories, Inc. Install in strict accordance with manufacturer's details and directions.
- G. Bonding Compound: The compound shall be polyvinyl acetate, rewettable type, "Euco Weld" by The Euclid Chemical Company or "Weldcrete" by The Larsen Company.
- H. Epoxy Adhesive: The compound shall be a two (2) component, 100% solids, 100% reactive compound suitable for use on dry or damp surfaces, "Euco Epoxy #463 or #615 " by The Euclid Chemical Company or "Sikadur Hi-Mod by Sika Chemical Corporation.
1. Polyvinyl chloride (PVC) water-stops: Corps of Engineers CRD-C 572.

2.6 CONCRETE PROPORTIONS

- A. All mix designs shall be proportioned in accordance with Section 4.3, "Proportioning on the Basis of Field Experience and/or Trial Mixtures" of ACI 318-83. Submit mix designs on each class of concrete for review. If trial batches are used, the mix design shall be prepared by an independent testing laboratory and shall achieve a compressive strength 1200 psi higher than the specified strength. This over-design shall be increased to 1400 psi when concrete strengths over 5000 psi are used. All proposed mixes shall be submitted for approval prior to the start of concrete operations.
- B. Cement, aggregate and other materials required for design or verification mixes by the laboratory shall be supplied by this Contractor.
- C. Measurements of fine and coarse aggregate shall be made separately by weight. The proportioning of aggregate for fractional sacks of cement will not be permitted unless the

- cement is weighed for each batch. Weighing equipment shall be arranged to permit making compensation for changes in the weight of moisture contained in the aggregate.
- D. Batching equipment shall be subject to inspection and approval.
- E. Design Mixes to provide normal weight concrete with the following properties, as indicated below, unless otherwise indicated on drawings and schedules.
1. Self-Consolidating Concrete: Use where indicated on the plans. Minimum flow of 20" or as required by the successful test placement. All self-consolidating concrete shall contain the specified high-range water-reducing admixture and viscosity-modifying admixture as required. Required workability, pumpability, surface finish, and setting time must be verified with a successful test placement onsite.
 2. "Quick Dry" Concrete: Maximum W/cm – 0.40, superplasticized, 3% maximum air content. The floor finish shall be as required by the manufacturer of the specified floor coating or covering.
- F. Water-Cement Ratio: Design mixes to provide normal weight concrete with the following properties, as indicated on drawings and schedules:
- 5000-psi, 28-day compressive strength; W/C ratio, 0.42 maximum (non-air-entrained), 0.32 maximum (air-entrained).
- 4000-psi, 28-day compressive strength; W/C ratio, 0.45 maximum (non-air-entrained), 0.35 maximum (air-entrained).
- 3500-psi, 28-day compressive strength; W/C ratio, 0.48 maximum (non-air-entrained), 0.40 maximum (air-entrained). Use for all steel troweled interior slabs subject to vehicular traffic. Include structural fibers in all loading dock slabs and toppings at the rate of 5 lbs. per cubic yard
- 3000-psi, 28-day compressive strength; W/C ratio, 0.52 maximum (non-air-entrained), 0.46 maximum (air-entrained).
- 2500-psi, 28-day compressive strength; W/C ratio, 0.54 maximum (non-air-entrained), 0.50 maximum (air-entrained).
- G. Lightweight Concrete - Proportion mix as specified. Design mix to produce strength and modulus of elasticity as noted on drawings, with a splitting tensile strength factor (Fct) of not less than 5.5 for 3000-psi concrete and a dry weight of not less than 95 lbs. or more than 110 lbs. after 28 days. Limit shrinkage to 0.03 percent at 28 days.
- H. Admixtures
1. Use water-reducing admixture or high range water-reducing admixture (super plasticizer) in all concrete.

2. Use accelerating admixture in concrete slabs placed at ambient temperatures below 50 deg. F. (10 deg. C.).
 3. Use air-entraining admixture in exterior exposed concrete unless otherwise indicated. Add air-entraining admixture at manufacturer's prescribed rate to result in concrete at point of placement having air content within following limits:
 - a. Concrete structures and slabs exposed to freezing and thawing or subjected to hydraulic pressure:
 - b. 3% to 5% for maximum 1" aggregate.
 4. Use admixtures for water-reducing and set-control in strict compliance with manufacturer's directions.
- I. Slump Limits: Proportion and design mixes to result in concrete slump at point of placement of 4 inches plus or minus 1 inch. Concrete containing HRWR admixture (superplasticizer): Not more than 8 inches.

2.7 MIXING

- A. Job Site Mixing: Mix materials for concrete in appropriate drum type batch machine mixer. For mixers of one cu. yd., or smaller capacity, continue mixing at least 1-1/2 minutes, but not more than 5 minutes after ingredients are in mixer, before any part of batch is released. For mixers of capacity larger than one cu. yd., increase minimum 1-1/2 minutes of mixing time by 15 seconds for each additional cu. yd., or fraction thereof.
1. Provide batch ticket for each discharged and used in work, indicating project identifications name and number, date, mix type, mix time, quantity, and amount of water introduced.
- B. Ready-Mix Concrete: Comply with requirements of ASTM C-94, and as herein specified.
1. During hot weather, or under conditions contributing to rapid setting of concrete, a shorter mixing time than specified in ASTM C-94 shall be required. When air temperature is between 85°F (30°C), reduce mixing and delivery time from 1-1/2 hours to 75 minutes, and when air temperature is above 90°F (32°C), reduce mixing and delivery time to 60 minutes.

PART 3 EXECUTION

3.1 FORMS

- A. Forms shall be so constructed that the finished concrete will conform to the shapes, lines, and dimensions shown on the Contract drawings. They shall be substantially built and sufficiently tight to prevent leakage of water or paste and securely braced in order to maintain their true position and shape. If any form loses its proper shape or position, it shall immediately be repaired to the satisfaction of the Architect or removed and replaced with a new form. Provide cleanout openings.

- B. Earth cuts shall not be used as forms for vertical surfaces.
- C. The design and engineering of the formwork, as well as its construction, shall be the sole responsibility of this Contractor.
 - 1. Formwork design, tolerances of finished lines, and camber to compensate for deflections due to weight of concrete shall conform to "Recommended Practice for Concrete Formwork (ACI-347)", or as otherwise noted.
- D. Form Ties
 - 1. Factory-fabricated, adjustable length, removable, or snap off metal form ties designed to prevent deflection and to prevent spalling concrete surfaces upon removal.
 - a. Provide ties so that portion remaining within concrete after removal of exterior parts is at least 1-1/2 inches from the outer concrete surfaces.
- E. Provisions for Other Trades: Provide openings in concrete formwork to accommodate work of other trades. Determine size and location of openings, recesses and chases from trades providing such items. Accurately place and securely support items built into forms.
- F. Cleaning and Tightening: Thoroughly clean forms and adjacent surfaces to receive concrete. Remove chips, woods, sawdust, dirt or other debris just before concrete is placed. Retighten forms and bracing after concrete placement is required to eliminate mortar leaks and maintain proper alignment.

3.2 PLACING REINFORCEMENT

- A. Reinforcement fabricated to the shapes and dimensions shown or required shall be placed where indicated on the Contract Documents.
- B. Before any reinforcement is placed, any loose rust of mill scale or coatings, including ice or oil, which would reduce or destroy the bond, shall be removed. Reinforcement materially reduced in section shall not be used.
- C. Concrete cover over steel reinforcement shall be as shown on the drawings.
- D. Bar reinforcement shall be carefully formed to the shapes shown and required to resist most effectively the stresses involved. Bars with kinks or bends not required shall not be used. The reinforcing shall not be bent or straightened in a manner which would injure the material. The heating or reinforcement for bending or straightening will not be permitted.
- E. Bends or hooks, unless otherwise shown or required, shall be cold formed around pins. Hooks shall be ACI Standard.
- F. Reinforcement shall be wired securely at intersections and shall be held in place with approved bars, spacers, chairs, high chairs, bolsters, or other supports so that it will not be dislocated or otherwise disturbed during the depositing of concrete.

- G. Steel reinforcement shall not be spliced at points of maximum stress. Laps in adjacent bars shall be staggered. Laps shall be tied and seized tight at both ends.
- H. All dowels shall be secured and tied in place before pouring concrete.
- I. Reinforcing steel shall be stored under cover and protected from rusting, oil, grease, or distortion.

3.3 CONSTRUCTION JOINTS

- A. Where indicated, construction joints shall be of the types and at the locations indicated on the drawings and specified hereinafter. All other construction joints shall be submitted to the Structural Engineer for approval.
- B. Construction joints shall be provided with adequate shear keys for succeeding placements and reinforcement shall be continuous through such joints. No bars shall be continuous through two construction joints.
- C. The Contractor shall have means at hand to bring any grade beam placement to an emergency construction joint provided with the proper shear key and/or dowels if an interruption in the supply of concrete or inclement weather makes such a procedure necessary.
- D. Water-stops as specified shall be provided at all construction joints in concrete work in elevator pit walls, piping pits, and where indicated on drawings.
- E. No horizontal joints will be permitted in walls and grade beams except as shown in the drawings.
- F. Unless otherwise noted, the maximum spacing of construction joints should be as follows:
 - 1. Foundation walls and grade beams - forty (40) feet.

3.4 INSTALLATION OF EMBEDDED ITEMS

- A. Provide anchor bolts for steel column template at correct elevations as shown on the drawings.
- B. Anchor bolts shall be set in location in plan and shall not exceed tolerances specified in AISC "Specifications for Design, Fabrication, and Erection of Structural Steel for Buildings", including the "Commentary" and Supplements thereto as issued.

3.5 CONVEYING AND PLACING

- A. Concrete shall be conveyed from the mixer to the forms as quickly as possible by a method which will prevent segregation and loss of materials.
- B. Delivery carts and/or buggies where used shall be kept on temporary runways built over the construction, and runway supports shall not bear upon reinforcing steel or fresh concrete.
- C. Belt conveyors, chutes or similar equipment will be permitted.

- D. Concrete shall not be placed on loose fill, mud or standing water.
- E. Concrete shall be deposited continuously. Deposit concrete as nearly as practicable to its final location to avoid segregation.
- F. Concrete shall not be incorporated in the work after it has attained its initial set not in any event more than one hour after water has been added to the aggregate.
This period may be reduced at the option of the Joint Venture if it develops that presetting is taking place, particularly in hot weather.
- G. Concrete shall be deposited in the forms as nearly as practicable in its final position to avoid re-handling. Special care shall be exercised to prevent splashing of forms or reinforcement with concrete in advance of pouring.
- H. Pumped Concrete - All concrete placed by pumping method shall be proportioned in accordance with the provisions of ACI 211.1 to meet the requirements of strength, slump, and air content in these specifications. Test cylinders for strength and tests for slump air content shall be taken at the point of discharge from the pumping line.
- I. Concrete shall not be allowed to drop freely more than 6 feet. Provide pour holes in formwork for placement of concrete where the drop exceeds 6 feet.
- J. Chute shall be thoroughly cleaned before and after each run. All waste materials and flushing water shall be discharged outside of the forms.
- K. After form removal, all tie holes and other repairable defective areas shall be immediately patched.

3.6 COMPACTION AND VIBRATION

- A. Concrete shall be compacted with the aid of mechanical internal vibrating equipment supplemented by hand spading, rodding and tamping to force out air pockets, to work the materials into the corners and around reinforcement and embedded items, and to eliminate honeycomb.

3.7 COLD WEATHER PLACEMENT

- A. In temperatures of 40 deg. F. and above, when it is not anticipated that temperatures will drop below 40 deg. F, comply with the requirements of ACI.
- B. For temperatures below 40 deg. F, concrete must be delivered to the project site between 55 deg. F. and 70 deg. F, comply with the requirements of ACI. Water shall not be heated over 180 deg. F.
- C. Use only the specified non-corrosive, non-chloride accelerator. Calcium Chloride, thiocyanates or admixtures containing more than 0.05% chloride ions are not permitted.

- D. All methods proposed for heating materials and protecting the concrete shall be subject to approval by the Structural Engineer. Concrete shall never be heated over 90 deg. F, nor will any other overheating which would produce a flash set be permitted.
- E. Do not place concrete on frozen subgrade or subgrade containing frozen materials, snow or ice.

3.8 WARM AND INCLEMENT WEATHER PLACEMENT

- A. During hot weather, the concrete shall be delivered to the forms at the coolest practicable temperature. In no case shall concrete above 90 deg. F. be placed. When high temperatures and/or placing conditions dictate, the Contractor shall use the water-reducing, retarding formulation (Type D) in lieu of the specified water-reducing admixture (Type A) as specified. Concrete shall not be placed when the sun, heat, wind, rain, sleet, or humidity would prevent proper placement.

3.9 CONCRETE FINISHES

- A. Troweled Finish: All concrete slabs, except as noted below, but including those that shall receive resilient flooring, tile with a thin set application, or carpet shall be screeded level to the established elevations, thoroughly consolidated and bull floated. When slabs have set sufficiently, machine float and then trowel with a steel trowel. Concrete shall be in condition acceptable to trades that will furnish and install the finish materials.
 - 1. During the floating and troweling operations, care shall be taken that no holes or depressions are left from the removal of coarse aggregate and that no excess moisture or bleed water is present on the surface. The trowel finished surface shall be level so that the surface conforms to an F25 number as measured by the "Dipstick" or an optical device approved by the Architect.
- B. Scratched Finish: For slab surfaces intended to receive bonded applied "mud set" cementitious applications, ceramic tile or quarry tile, etc., after concrete has been placed, struck-off consolidated and leveled, the surface shall be roughened with stiff brushes or rakes before final set.

3.10 FINISHES OTHER THAN FLOORS

- A. Smooth Finish: All vertical concrete surfaces that will be exposed as finished work shall receive a smooth finish. This shall be achieved by the use of steel forms or new smooth plywood. Sheets shall be as large as possible with smooth even edges and installed with close joints. Joint marks and fins shall be ground off and surfaces left smooth, dense, and free from honeycombing, prominent grain marking, and bulges or depressions more than 1/8" in 4 feet. Surfaces shall then be patched, leaving the surface finish uniformly smooth and washed clean.
- B. Rough Finish: Rough concrete finish shall be used for all other concrete for which no other finish is indicated or specified. Obtain by using clean, straight lumber, plywood, or metal forms. Concrete having a rough finish shall have honeycombing and minor defects patched.

3.11 CONCRETE CURING AND PROTECTION

- A. General: Protect freshly placed concrete from premature drying and excessive cold or hot temperatures.
 - 1. Start initial curing as soon as free water has disappeared from concrete surface after placing and finishing. Immediately after placing and finishing, concrete surfaces not covered by forms, or when forms are removed within three days of placement, shall be protected from the loss of surface moisture for a period of not less than seven days by covering with the curing compound specified.
 - 2. Begin final curing procedures immediately following initial curing and before concrete has dried. Continue final curing for at least 7 days in accordance with ACI 301 procedures. Avoid rapid drying at end of final curing period.

3.12 REPAIR OF DEFECTIVE AREAS

- A. All Structural repairs shall be made with prior approval of the Structural Engineer, as to method and procedure.

3.13 REDESIGN

- A. Changes or departures from the construction details shown on the drawings shall be made only with the approval of the Structural Engineer.
- B. Changes will not be allowed to be made on shop drawings that have been previously submitted for approval except for items that have been noted for corrections or coordination.

3.14 BONDING

- A. Before new concrete is deposited on or against concrete that has hardened, the form shall be retightened, the surfaces of the hardened concrete shall be roughened as required, thoroughly cleansed of foreign matter and laitance, and slushed with cement grout.

PART 4 QUALITY CONTROL TESTING

4.1 TESTING AND INSPECTION

- A. General: The Owner shall pay for the services of a test laboratory for selected by the Owner for concrete quality control as enumerated in this specification. The test laboratory shall submit proof that any concrete inspectors used on the project shall have taken and passed the ACI course in Concrete Inspection within the past five years. The test laboratory services shall include the following:
 - 1. The testing laboratory shall provide continuous inspection and testing of ingredients used in concrete.

2. The test laboratory shall keep a man on the job site for the full length of all concrete placements and if requested, shall check the batching plant quantities and measurements at the beginning of each day's placement.
 3. The test laboratory shall make tests during the progress of the work and shall check for adequate mixing of all concrete placed.
- B. Codes: The testing laboratory, will test the concrete for compliance with contract documents and all applicable ACI and ASTM codes and standards.
- C. Understrength Concrete: If test cylinders fail to meet the strength requirements and/or if, in the opinion of the Structural Engineer, the cylinders are not truly representative of the in-place concrete the Architect has right to request that cores be cut from the work affected. Such cores shall be not less than 3 in number and shall comply as to size and shape and shall be secured and tested in conformance with the requirements of ASTM C42. The cores shall be taken at points mutually agreeable to the Contractor and the Architect, and shall be tested at points mutually agreeable to the Contractor and the Architect, and shall be tested in the presence of the Architect by a laboratory approved by the Architect. If test results are not satisfactory to the Architect, this Contractor shall remove from the work all affected concrete and replace such defective work in a satisfactory manner, all without further compensation or time extension including the costs of coring, testing and all related architectural and engineering work.
- D. Contractor's Responsibility: The sole responsibility for producing concrete in the field having the strength required without causing excessive shrinkage cracks shall rest on the Contractor, regardless of the laboratory determination. If, in his opinion, the field conditions are such that a lower water-cement ratio is necessary to produce the required strength, he shall submit the mix he proposes to use to the Architect in writing. In no case will the Contractor be permitted to use a higher water-cement or lower cement factor than those used in the approved mix.
- E. Re-dosage with the high range water reducing admixture (superplasticizer) may be permitted with the approval of the Engineer as to methods and procedures.

4.2 TESTING DURING PROGRESS OF WORK

- A. If requested, batch plant inspection by the testing laboratory will include:
1. Attendance at the batching plant during all batching.
 2. Determination that all weighing and measuring equipment is in proper working order and that calibration certificates of scales are current.
 3. Determination that the truck mixers are regularly cleaned and maintained and that the drums revolve at the proper speeds. Provide the Joint Venture with a list of trucks certified in accordance with ASTM C-94. No mixers with accumulations of hardened concrete on the blades or with worn or defective blades shall be permitted on this project.
 4. Ascertain that only correct weights of cement and aggregate are used.

5. Ascertain that only those admixtures as specified and in proper qualities are used in the mix.
 6. Ensure that only the correct amount of mixing water is loaded into the tank of the truck.
 7. Ensure that only approved materials are used.
 8. Ascertain that aggregates and water are of the proper temperature.
 9. Make necessary tests of the aggregates to determine the moisture content so that the total water in the batch may be properly adjusted.
 10. Test of aggregates received at the batching plant for gradation and cleanliness.
 11. Check and sign delivery tickets issued by supplier that will identify each load of concrete dispatched to the project as having been inspected.
- B. Field Inspection by the Testing Laboratory will include:
1. Attendance at the project site during all concrete placing operations.
 2. Ascertain that concrete delivered to the site has been inspected by the batch plant inspector.
 3. Control the addition of mixing water in order to maintain the required water/cement ratio.
 4. Ascertain that the concrete is mixed in accordance with the specification requirements.
 5. Ensure that the concrete is conveyed from the mixer to the point of pour in accordance with specifications and good practice.
 6. Ensure that the concrete is of the proper temperature when placed.
 7. Air Content Tests - At least two tests shall be made for each day's placing or from each batch of concrete from which cylinders are cast. Tests shall be representative of each type of concrete.
 8. Slump Tests - At frequent intervals to properly control the consistency and at least one at time of casting each group of cylinders and at least one test for every 25 cubic yards.
- C. Concrete Compression Cylinders: Unless otherwise specified, there shall be taken from the concrete of each strength placed on any one day at least one set of five representative 6" x 12" test cylinders. For large placements on any one day there shall be taken not less than one set of five representative type cylinders for each 100 cubic yard of concrete of each strength placed. Two cylinders to be tested at 7 days, two at the age of 28 days and the fifth cylinder in reserve for further testing. Ascertain that the test specimens are properly protected until shipped to the testing laboratory. Record and identify each cylinder with the location of the concrete from which the specimen was taken. Keep marking in sequence.

- D. Additional Test Lab Responsibilities: Report any material or work performed that fails to meet the job specifications immediately with the Contractor, and then to the Architect. Work will be checked as it progresses. Failure to detect any defective work or materials shall not in any way prevent later rejections or obligate the Owner for final acceptance.
- E. Reports on Inspection: Submit reports on testing and inspection. Reports shall include detailed data with respect to all requirements of the specifications referenced. Materials or workmanship not meeting the requirements of the Contract Documents, either at the plant or project site, will be rejected by the Testing Laboratory and immediately reported to the Contractor and then to the Architect. In no case shall the laboratory recommend any method of adjustment or correction without obtaining prior approval of the Architect. Include in all reports and project title and number, location, Contractor's name, and date work was performed.
- F. Report Copies and Timing: Immediately after tests or inspections have been made and in no case late than seven (7) days after tests of inspection have been made, the laboratory shall furnish copies of all test and inspection reports.
1. One (1) copy to Architect.
 2. One (1) copy to the Contractor.
 3. One (1) copy to Master Consulting Engineers, Inc.
 4. One (1) copy to Concrete Contractor.
 5. One (1) copy to the Owner.
- G. Batch Plant Inspection Daily Report: The batch plant inspectors shall submit a daily report which shall contain the following data:
1. Concrete supplier.
 2. Weather conditions and air temperature (ranges).
 3. Type of concrete.
 4. Required strength of concrete.
 5. Total number of batches, batch weight, and identifying number of each batch and truck load.
 6. Basic control data concrete mix, indicating mix number source, and type of cement, source of aggregates, type of admixtures, basic quantities of cement, aggregates (dry), water and admixtures of concrete per cubic yard, required slump, required air entrainment and water/cement ratio.
 7. Actual data and quantities of concrete batch, indicating time of batching, actual quantities of cement, aggregates (moist) and admixtures, gallons of water added to plant; percent of total moisture in aggregates; temperature of aggregates and water, gallons of water to be added in transit or at site; time truck dispatched from plant.

8. Name of inspector, with time of arrival and departure from batch plant and total hours for day.
- H. Site Inspection Daily Report: The site inspectors shall submit a daily report which shall contain the following data:
1. Concrete supplier.
 2. Weather conditions and air temperature (ranges).
 3. Class and type of concrete placed.
 4. Location of placed concrete and time of starting and stopping of placement.
 5. Identification of truck loads.
 6. Time of dispatching truck from batching plant and receipt of delivery tickets. Indicate delivery ticket number.
 7. Amount of water added in transit or at site.
 8. Time of discharging concrete from truck.
 9. Temperature of concrete during discharging from truck and during placing.
 10. Slump test results, identifying truck load and cylinders made.
 11. Air entrainment test results, identifying truck load.
 12. Test cylinders cast, identifying cylinder number, design strength, time taken, slump, truck numbers from which taken and location of pours with yardage of concrete placed at each location.
 13. Weight per cubic foot of plastic concrete.
 14. Other pertinent data which may have bearing on quality or strength of concrete, placing of concrete, and also report if any concrete was rejected.
 15. Name of inspector, with time of arrival and departure from site and total hours for day.
- 4.3 **CONTRACTOR'S RESPONSIBILITIES AND OBLIGATIONS RELATIVE TO CONCRETE MIX DESIGNS**
- A. This Contractor shall submit preliminary mix designs for the concrete proposed on this project for review.
 - B. The preliminary mix design shall be prepared by a concrete test lab and shall be based on the actual materials used as submitted by this Contractor.

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- C. Furnish an insulated weatherproof box for storing field test.
 - D. The test lab cost for the above shall be borne by this Contractor.
- 4.4 THE TESTING LABORATORY SHALL FURNISH ALL REQUIRED CYLINDER MOLDS AND TAGS TO BE USED FOR MIX DESIGNS AND FIELD TESTS.

END OF SECTION

SECTION 03 54 16
HYDRAULIC CEMENT UNDERLAYMENT

PART 1 GENERAL

1.1 WORK SCOPE

- A. Floor leveling cement based underlayment and leveling coat over existing concrete flooring to receive finished flooring.

1.2 RELATED SECTIONS

- A. Section 01 25 12 – Product Substitution Procedures.
- B. Section 01 31 00 – Project Management and Coordination.
- C. Section 01 33 00 – Submittal Procedures.
- D. Section 01 42 00 – References.
- E. Section 01 45 00 – Quality Control.
- F. Section 01 66 00 – Product Storage and Handling Requirements.
- G. Section 01 74 00 – Cleaning and Waste Management.
- H. Section 01 78 00 – Closeout Submittals.
- I. Section 03 30 00 – Cast In-Place Concrete
- J. Section 09 65 19 – Resilient Tile Flooring
- J. Section 09 68 16 – Sheet Carpeting.

1.3 REFERENCES

- A. See Section 01 42 00 – References for additional reference standards, abbreviations, definitions and acronyms.
- B. American Society of Testing Materials (ASTM):
 - 1. ASTM C78/C78M-15a: Test Method for Flexural Strength of Concrete (Using Simple Beam with Third-Point Loading)
 - 2. ASTM C109/C109M-13e1: Standard Test Method for Compressive Strength of Hydraulic Cement Mortars (Using 2” [50 mm] cube specimens)

1.4 SUBMITTALS

- A. Submit in accord with Section 01 33 00 – Submittal Procedures.
- B. Product Data: Manufacturer's data sheets, including product specifications, test data, preparation instructions and recommendations, storage and handling requirements and recommendations, and installation methods.
- C. Maintenance instructions, including protection requirements after application.

1.5 QUALITY ASSURANCE

- A. Installer Qualifications: Applicator shall be experienced with installation of product and certified by manufacturer as authorized product applicator.
- B. Provide adequate number of skilled workers trained and familiar with application requirements.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Comply with Section 01 66 00 – Product Storage and Handling Requirements.
- B. Deliver product in factory numbered and sealed containers, protected from extreme temperatures and moisture.
- C. Store products in dry area in manufacturer's unopened containers until ready for installation with temperature maintained between 50° F (10° C) and 85° F (29° C). Protect from direct sunlight.
- D. Handle products in accord with manufacturer's printed recommendations.

1.7 WARRANTY

- A. Provide manufacturer's 10 year warranty that hydraulic cement underlayment over structurally sound concrete will not spall, crack or delaminate from concrete surface.

PART 2 PRODUCTS

2.1 APPROVED MANUFACTURERS

- A. ARDEX K15 Rapid Drying Self Leveling Sub-Floor Smoothing Compound as manufactured by Ardex Engineered Cements, 400 Ardex Park Drive, Aliquippa, PA 15001; Tel: 724-203-5000; Tel: 888-512-7339; Fax: 724-203-5001; Website: www.ardexamericas.com
- B. Henry 345 Premixed Patch n' Level as manufactured by W W Henry Co., 400 Ardex Park Drive, Aliquippa, PA 15001; Tel: 1-800-255-3924, 724-203-8499; Website: www.wwhenry.com.
- C. Requests for substitutions from other manufacturers will be considered in accord with Section 01 25 13 – Product Substitution Procedures.

2.2 PERFORMANCE AND PHYSICAL PROPERTIES

- A. Conforming with following values for material cured at 73° F +/-3° F (23° C +/- 2 C°) and +/-5% relative humidity:
 - 1. Application: barrel mix or pump.
 - 2. Flow time: 10 minutes.
 - 3. Initial Set: approximately 30 minutes.
 - 4. Final Set: approximately 90 minutes.
 - 5. Compressive Strength: 4100 psi at 28 days per ASTM C109/C109M13e1.
 - 6. Flexural Strength: 1000 psi at 28 days per ASTM C78/C78M-15a.
 - 7. VOC: 0 grams/liter, calculated per SCAQMD 1168.

2.3 MATERIALS

- A. Water shall be clean, potable, not exceeding 75° F (24° C).

PART 3 EXECUTION

3.1 EXAMINATION

- A. Inspect substrate prior to start of work. Notify Contractor/CM immediately of unsatisfactory surface preparation before proceeding.
- B. Proceeding with installation shall be deemed acceptance of surface substrate conditions.

3.2 PREPARATION

- A. Clean surfaces thoroughly prior to installation. Do not begin installation until substrates have been cleaned, free of oil, grease, dirt, curing compounds, or substances that may act as bond breaker. Mechanically clean, if required to remove foreign matter on concrete surface.
- B. Prepare surfaces using the methods recommended by underlayment manufacturer for achieving best result for substrate under project conditions.
- C. Subfloors shall be tested for excessive moisture content. Do not begin installation until substrate is cleaned and dry.
- D. Provide manufacturer's recommended flexible sealing compound at expansion or isolation joints, or joint filler at saw cuts and control joints.

3.3 INSTALLATION

- A. Install materials in accord with manufacturer's printed installation instructions.
- B. Applicator shall be authorized trained applicator of product. Provide written authorization from manufacturer.
- C. Do not install materials below 50° F (10° C). Apply product using steel trowel using sufficient pressure to achieve desired thickness up to 0.50" (12.7 mm) over large areas and to any thickness for filling holes or gouges in concrete slabs. Provide uniform leveling of surface. Feather product to zero edge thickness, as required.
- D. Coordinate installation with adjacent work to ensure proper sequence of construction. Prevent damage to and soiling of adjacent work.

3.4 PROTECTION

- A. Protect installed underlayment until application of floor finishes in accord with manufacturer's printed instructions.

END OF SECTION

DIVISION

4

MASONRY

SECTION 04 20 00
UNIT MASONRY

PART 1 GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 1 Specification sections, apply to work of this section.

1.2 QUALITY ASSURANCE

- A. Codes and Standards: Comply with governing codes and applicable provisions of the following:
1. National Concrete Masonry Association (NCMA), including "TEK Bulletins".
 2. American Concrete Institute (ACI), including ACI 531, ACI 531R and ACI 531.1.
 3. Portland Cement Association (PCA), "Concrete Masonry Handbook".
- B. Fire Performance Characteristics: Where fire-resistance ratings are indicated for unit masonry work, provide materials and construction which are identical to those of assemblies whose fire endurance has been determined by testing in compliance with ASTM E 119 by a recognized testing and inspecting organization or by another means, as acceptable to authority having jurisdiction.
- C. Field Construction Mock-Ups: Prior to installation of masonry work, erect sample wall representative of completed masonry work required for project with respect to qualities of appearance, materials and construction. Locate mock-ups during construction as standard for judging completed masonry work. Build mock-ups which are approximately 6' long by 4' high by full thickness. When directed, demolish mock-ups and remove from site.

1.3 SUBMITTALS

- A. Product Data: Submit manufacturer's product data for each type of masonry unit, accessory and other manufactured products, including certifications that each type complies with specified requirements.

1.4 JOB CONDITIONS

- A. Protection of Work: During erection, cover top of walls with waterproof sheeting at end of each day's work. Cover partially completed structures when work is not in progress.
- B. Extend cover a minimum of 24 inches down both sides and hold cover securely in place.
- C. Do not apply uniform floor or roof loading for at least 12 hours after building masonry walls or columns.

- D. Do not apply concentrated loads for at least 3 days after building masonry walls or columns.
- E. Staining: Prevent grout or mortar or soil from staining the face of masonry to be left exposed or painted. Remove immediately grout or mortar in contact with such masonry. Protect base of walls from rain-splashed mud and mortar splatter by means of coverings spread on ground and over all surface.
- F. Protect sills, ledges and projections from droppings of mortar.
- G. Cold Weather Protection
 - 1. Do not lay masonry units which are wet or frozen.
 - 2. Remove all masonry determined to be damaged by freezing conditions.
 - 3. No masonry work shall be performed when the air temperature is 38 deg. F. and falling.

PART 2 PRODUCTS

2.1 MASONRY UNITS - GENERAL

- A. Manufacturer: Obtain masonry units from one manufacturer, of uniform texture and color for each kind required, for each continuous area and visually related areas.
- B. Masonry Unit Characteristics: Provide units complying with standards referenced and requirements indicated.

2.2 CONCRETE MASONRY UNITS (CMU)

- A. Size: Manufacturer's standard units with nominal face dimensions of 16" long x 8" (15-5/8" x 7-5/8" actual), unless otherwise indicated.
- B. Special Shapes: Provide where required for lintels, corners, jambs, sash, control joints, headers, bonding and other special conditions.
- C. Hollow Load Bearing (HL) CMU: ASTM C 90 and as follows:
 - 1. Grade N.
- D. Weight Classification: Normal weight units unless otherwise indicated. (125 lbs. per cu. ft. or more, oven dry weight of concrete.)
- E. Cure units by atmospheric drying for not less than 30 days before installation, to comply with ASTM C 90, Type II.
- F. Exposed Faces: Provide manufacturer's standard color and texture, unless otherwise indicated.

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1. Where special finishes are indicated, provide units with exposed faces of the following general description matching color and texture as selected by Architect from manufacturers standard color and texture.
 - a. Standard aggregate, ground finish.
 - b. Standard aggregate, split face finish.
- G. Prefaced Concrete Block: Provide lightweight concrete units indicated below with manufacturer's standard smooth resinous tile facing complying with ASTM C744:
 1. For units on which prefaced surfaces are molded, comply with the following requirements:
 - a. Hollow Loadbearing Block: ASTM C90, Grade N, Type I.
 2. Size: Manufacturer's standard with nominal face dimensions of 16" long x 8" high (15-5/8" x 7-5/8" actual) x thickness indicated for units on which prefaced surfaces are molded; with 1/16" thick returns of facing to create 1/4" wide mortar joints with modular coursing.
- H. Color and Pattern: Match Architect's sample.
- I. Products: Subject to compliance with requirements, provide one of the following:
 1. "Astra-Glaze"; Nabco Glazed Products.
 2. "Spectra-Glaze II"; manufacturer approved by the Burns & Russell Co.

2.3 MORTAR MATERIALS

- A. Portland Cement: ASTM C 150, Type I, except Type III may be used for cold weather construction. Provide natural color or white cement as required to produce required mortar color.
- B. Masonry Cement: ASTM C 91.
- C. Hydrated Lime: ASTM C 207, Type S.
- D. Aggregate for Mortar: ASTM C 144, except for joints less than 1/4" use aggregate graded with 100% passing the No. 16 sieve.
- E. Aggregate for Grout: ASTM C 404.
- F. Water: Clean and potable.

2.4 MASONRY ACCESSORIES

- A. Horizontal Joint Reinforcing and Ties for Masonry: Provide welded wire units prefabricated in straight lengths of not less than 10', with matching corner ("L") and intersecting ("T")

units. Fabricate from cold-drawn steel wire complying with ASTM A 82, with deformed continuous side rods and plain cross rods, into units with widths of approximately 2" less than nominal width of walls and partitions as required to position side rods for full embedment in mortar with mortar coverage of not less than 5/8" on joint faces exposed to exterior and not less than 1/2" elsewhere. Provide the following type of joint reinforcing unless otherwise indicated.

1. Truss type with diagonal cross rods spaced not more than 16" o.c.
- B. Number of Side Rods: Single pair for single wythe masonry.
- C. Wire Sizes: Fabricate with 9-gage side and cross rods, unless otherwise indicated.
- D. Wire Finish: Provide manufacturer's standard mill galvanized finish except as otherwise indicated.
- E. For exterior walls hot-dip galvanized joint reinforcing after fabrication to comply with ASTM A 153, Class B-2 coating (1.5 oz. per sq. ft.).
- F. Steel Strap Anchors: Provide straps, bars, bolts and rods fabricated from not less than 16 ga. sheet metal or 3/8" diameter rod stock, unless otherwise indicated.
- G. Miscellaneous Masonry Accessories
 1. Reinforcing Bars: Deformed steel, ASTM A 615, Grade 60 for bars No. 3 to No. 18.

2.5 MORTAR AND GROUT MIXES

- A. Do not lower the freezing point of mortar by use of admixtures or anti-freeze agents.
- B. Do not use calcium chloride in mortar or grout.
- C. Mortar for Unit Masonry: Comply with ASTM C 270, Proportion Specification, for types of mortar required, unless otherwise indicated.
- D. Limit cementitious materials in mortar to portland cement - lime.
- E. Use Type N mortar for all interior masonry work.
- F. Use Type S mortar for all exterior masonry work.
- G. Grout for Unit Masonry: Comply with ASTM C 476 for grout for use in construction of unit masonry. Use grout of consistency indicated or if not otherwise indicated, of consistency (fine or coarse) at time of placement which will completely fill all spaces intended to receive grout.

PART 3 EXECUTION

3.1 INSTALLATION - GENERAL

- A. Thickness: Build masonry construction to the full thickness shown, except, build singlewythe walls (if any) to the actual thickness of the masonry units, using units of nominal thickness shown or specified.
- B. Build chases and recesses as shown and as required for the work of other trades. Provide not less than 8" of masonry between chase or recess and jamb of openings, and between adjacent chases and recesses unless otherwise noted.
- C. Cut masonry units with motor-driven saw designed to cut masonry with clean, sharp, unchipped edges. Cut units as required to provide pattern shown and to fit adjoining work neatly. Use full units without cutting wherever possible. Use dry cutting saws to cut concrete masonry units.
- D. Do not wet concrete masonry units.
- E. Pattern Bond: Lay exposed masonry in running bond vertical joint in each course centered on units in courses above and below except as otherwise noted.
- F. Layout walls in advance for accurate spacing of surface bond patterns with uniform joint widths and to properly locate openings, movement-type joints, returns and offsets. Avoid the use of less-than-half size units at corners, jambs and wherever possible at other locations.
- G. Lay-up walls plumb and with courses level, accurately spaced and coordinated with other work.
- H. Stopping and Resuming Work: Rack back 1/2-masonry unit length in each course; do not tooth. Clean exposed surfaces of set masonry, wet units lightly (if required to be wetted), and remove loose masonry units and mortar prior to laying fresh masonry.
- I. Built-In Work: As the work progresses, build-in items specified under this and other sections of these specifications. Fill in solidly with masonry around built-in items.
- J. Fill space between hollow metal frames and masonry solidly with mortar.
- K. Where built-in items are to be embedded in cores of hollow masonry units, place a layer metal lath in the joint below and rod mortar or grout into core.
- L. Fill CMU cores with grout 3 courses (24") under bearing plates, beams, lintels, posts and similar conditions unless otherwise indicated.
- M. Non-Loadbearing Interior Partition Walls: Build full height of story to underside of solid structure above, unless otherwise indicated.

3.2 MORTAR BEDDING AND JOINTING

- A. Lay hollow concrete masonry units with full mortar coverage on horizontal and vertical face shells. Bed webs in mortar in starting course on footings and foundation walls and in all courses of piers, columns and pilasters, and where adjacent to cells or cavities to be reinforced or to be filled with concrete or grout. For starting courses on footings where cells are not grouted, spread out full mortar bed including areas under cells.

- B. Joints: Maintain joint widths shown, except for minor variations required to maintain bond alignment. If not otherwise indicated, lay walls with 3/8" joints. Cut joints flush for masonry walls which are to be concealed or to be covered by other materials. Tool all exposed joints in masonry walls slightly concave using a jointer larger than joint thickness. Rake out mortar in preparation for application of caulking or sealants where shown.
- C. Remove masonry units disturbed after laying; clean and relay in fresh mortar. Do not pound corners at jambs to fit stretcher units which have been set in position. If adjustments are required, remove units, clean off mortar, and reset in fresh mortar.

3.3 HORIZONTAL JOINT REINFORCING

- A. Provide continuous horizontal joint reinforcing as shown and specified. Full embed longitudinal side rods in mortar for their entire length with a minimum cover of 5/8" on exterior side of walls and 1/2" at other locations. Lap reinforcement a minimum of 6". Do not bridge control and expansion joints with reinforcing, unless otherwise indicated. Provide continuity at corners and wall intersections by use of prefabricated "L" and "T" sections. Cut and bend units as directed by manufacturer for continuity at returns, offsets, pipe enclosures and other special conditions.
- B. Space conditions horizontal reinforcing as follows:
 - 1. For single wythe walls, space reinforcing at 16" o.c. vertically, unless otherwise indicated.
 - 2. Reinforce masonry openings greater than 1'-0" wide, with horizontal joint reinforcing placed in 2 horizontal joints approximately 8" apart, both immediately above lintels and below sills.
 - 3. Extend reinforcing a minimum of 2'-0" beyond jambs of the opening, bridging control joints where provided.

3.4 ANCHORING MASONRY WORK

- A. See Drawings.

3.5 LINTELS

- A. Provide masonry lintels where shown and wherever openings of more than 1'-0" are shown without structural steel or other supporting lintels. Provide precast or formed in place lintels. Cure precast masonry before handling or installing. Temporarily support formed-in-place lintels.
- B. Provide minimum bearing of 8" at each jamb, unless otherwise indicated.

3.6 REPAIR, POINTING AND CLEANING

- A. Remove and replace masonry units which are loose, chipped, broken, stained or otherwise damaged, or if units do not match adjoining units as intended. Provide new units to match adjoining units and install in fresh mortar or grout, pointed to eliminate evidence of replacement.
- B. Pointing: During the tooling of joints, enlarge any voids or holes, except weep holes, and completely fill with mortar. Point-up all joints at corners, openings and adjacent work to provide a neat, uniform appearance, properly prepared for application of caulking or sealant compounds.
- C. Clean exposed CMU masonry by dry brushing at the end of each day's work and after final pointing to remove mortar spots and droppings. Comply with recommendations in NCMA TEK Bulletin No. 28.

END OF SECTION

SECTION 04 20 30
REINFORCED UNIT MASONRY

PART 1 GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract, including General and Special Conditions and Division 1 Specification sections, apply to work of this section.

1.2 DESCRIPTION OF WORK

- A. Provide each type of reinforced unit masonry work as indicated on drawings and in schedules and specified herein.
- B. Requirements of Section 04 20 00, "Unit Masonry" apply to work of this section.

1.3 SUBMITTALS

- A. Shop Drawings: Submit shop drawings for fabrication, bending, and placement of reinforcement bars. Comply with ACI 315 "Manual of Standard Practice for Detailing Reinforced Concrete Structures". Show bar schedules, diagrams of bent bars, stirrup spacing, lateral ties and other arrangements and assemblies as required for fabrication and placement of reinforcement for unit masonry work.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. General: Refer to Section 04 20 00 for masonry materials and accessories not included in this section.
- B. Reinforcement Bars: Provide deformed bars of Grade 60 complying with ASTM A 615.
- C. Shop-fabricate reinforcement bars which are shown to be bent or hooked.

PART 3 - EXECUTION

3.1 PLACING REINFORCEMENT

- A. General: Clean reinforcement of loose rust, mill scale, earth, ice or other materials which will reduce bond to mortar or grout. Do not use reinforcement bars with kinks or bends not shown on drawings or final shop drawings, or bars with reduced cross-section due to excessive rusting or other causes.
- B. Position reinforcement accurately at the spacing indicated. Support and secure vertical bars against displacement. Horizontal reinforcement may be placed as the masonry work progresses. Where vertical bars are shown in close proximity, provide a clear distance between bars of not less than the nominal bar diameter or 1" (whichever is greater).

- C. Splice reinforcement bars where shown; do not splice at other points unless acceptable to the Architect. Provide lapped splices, unless otherwise indicated. In splicing vertical bars or attaching to dowels, lap ends, place in contact and wire tie.
- D. Embed prefabricated horizontal joint reinforcement as the work progresses, with a minimum cover of 5/8" on exterior face of walls and 1/2" at other locations. Lap units not less than 6" at ends. Use prefabricated "L" and "T" units to provide continuity at corners and intersections. Cut and bend units as recommended by manufacturer for continuity at returns, offsets, column fireproofing, pipe enclosures and other special conditions.

3.2 INSTALLATION - GENERAL

- A. Refer to Section 04 20 00 for general installation requirements of unit masonry.

3.3 INSTALLATION OF REINFORCED CONCRETE UNIT MASONRY

A. General

1. Do not wet concrete masonry units (CMU).
2. Lay CMU units with full-face shell mortar beds. Fill vertical head joints (end joints between units) solidly with mortar from face of unit to a distance behind face equal to not less than the thickness of longitudinal face shells. Solidly bed cross-webs of starting courses in mortar. Maintain head and bed joint widths shown, or if not shown, provide 3/8" joints.

B. Walls

1. Pattern Bond: Lay CMU wall units in 1/2 running bond with vertical joints in each course centered on units in courses above and below, unless otherwise indicated. Bond and interlock each course at corners and intersections. Use special-shaped units where shown, and as required for corners, jambs, sash, control joints, lintels, bond beams and other special conditions.
2. Maintain vertical continuity of core or cell cavities, which are to be reinforced and grouted, to provide minimum clear dimensions indicated and to provide minimum clearance and grout coverage for vertical reinforcement bars. Keep cavities free of mortar. Solidly bed webs in mortar where adjacent to reinforced cores or cells.
3. Where horizontal reinforced beams (bond beams) are shown, use special units or modify regular units to allow for placement of continuous horizontal reinforcement bars. Place small mesh expanded metal lath or wire screening in mortar joints under bond beam courses over cores or cells on non-reinforced vertical cells, or provide units with solid bottoms.

C. Grouting

1. Use "Fine Grout" per ASTM C 476 for filling spaces less than 4" in one or both horizontal directions.

2. Use "Course Grout" per ASTM C476 for filling 4" spaces or larger in both horizontal directions.

D. Low-Lift Grouting

1. Provide minimum clear dimension of 2" and clear area of 8 sq. in. in vertical cores to be grouted.
2. Place vertical reinforcement prior to laying of CMU. Extend above elevation of maximum pour height as required for splicing. Support in position at vertical intervals not exceeding 192 bar diameters nor 10 ft.
3. Lay CMU to maximum pour height. Do not exceed 5' height, or if bond beam occurs below 5' height stop pour at course below bond beam.
4. Pour grout using chute or container with spout. Rod or vibrate grout during placing. Place grout continuously; do not interrupt pouring of grout for more than one hour. Terminate grout pours 1-1/2" below top course of pour.
5. Bond Beams - Stop grout in vertical cells 1-1/2" below bond beam course. Place horizontal reinforcement in bond beams; lap at corners and intersections as shown. Place grout in bond beam course before filling vertical cores above bond beam.

END OF SECTION

DIVISION

6

WOODS, PLASTICS AND COMPOSITES

SECTION 06 10 00
ROUGH CARPENTRY

PART 1 GENERAL

1.1 RELATED DOCUMENTS

- A. The provisions of the General Conditions, Supplementary Conditions, Drawings, Specifications and the Sections included under Division 1, General Requirements and References are included as a part of this Section as though bound herein.

1.2 SECTION INCLUDES

- A. Provide labor, materials, services, and equipment necessary to furnish and install work as indicated and as specified herein, which includes, but is not limited to:
 - 1. Roof curbs, cants, blocking, nailers, structural framing, plywood sheathing and equipment mounting boards, furring, rough hardware, and light wood wall, and roof truss construction required or indicated for complete and functional systems.

1.3 RELATED WORK:

- A. Section 01 25 13 – Product Substitution Procedures.
- B. Section 01 33 00 – Submittal Procedures.
- C. Section 01 42 00 – References.
- D. Section 01 45 00 – Quality Control.
- E. Section 01 66 00 – Project Storage and Handling Requirements.
- F. Section 01 78 00 – Closeout Submittals.
- G. Section 07 52 00 – Modified Bituminous Membrane Roofing.
- H. Section 09 91 00 – Painting.
- I. Section 09 29 00 – Gypsum Board.

1.4 REFERENCES

- A. Comply with Section 01 42 00 – References for additional reference standards, definitions, abbreviations and acronyms.
- B. American Forest and Paper Association (AFPA):
 - 1. National Design Specification for Wood Construction NDS-05 Conventional Wood Frame Construction
- C. American National Standards Institute (ANSI)/American Society of Mechanical Engineers (ASME):
 - 1. B18.2.1-2012 – Square, Hex, Heavy Hex, and Askew Head Bolts and Hex, Heavy Hex, Hex Flange, Lobed Head and Lag Screws (Inch Series).
 - 2. B18.2.2-2010 – Nuts for General Applications: Machine Screw Nuts, Hex, Square, Hex Flange and Coupling Nuts
 - 3. B18.6.1-1981 (R2008) - Wood Screws, (Inch Series).
 - 4. B18.6.4-98(R2005) Thread Forming and Thread Cutting Tapping Screws and Metallic Drive Screws (Inch Series).
- D. American Plywood Association (APA):
 - 1. E30-07 Engineered Wood Construction Guide
- E. American Society for Testing and Materials (ASTM):

1. ASTM A47-99(2009): Standard Specification for Ferritic Malleable Iron Castings.
 2. ASTM A48-03(2012): Standard Specification for Gray Iron Castings.
 3. A653/A653M-13: Standard Specification for Steel Sheet Zinc-Coated (Galvanized) or Zinc-Iron Alloy Coated (Galvannealed) by the Hot Dip Process.
 4. ASTM C954-11: Standard Specification for Steel Drill Screws for the Application of Gypsum Board or Metal Plaster Bases to Steel Studs from 0.033” (2.24 mm) to 0.112” (2.84 mm) in thickness.
 5. ASTM C1002-07(2013): Standard Specification for Steel Self-Piercing Tapping Screws for the Application of Gypsum Panel Products or Metal Plaster Bases to Wood Studs or Metal Studs.
 6. ASTM D143-09: Standard Specification for Small Clear Specimens of Timber, Method of Testing.
 7. ASTM D2559-12a: Standard Specification for Adhesives for Structural Laminated Wood Products for Use Under Exterior (Wet Use) Exposure Conditions.
 8. ASTM D3498-03(2011): Standard Specification for Adhesives for Field-Gluing Plywood to Lumber Framing for Floor Systems.
 9. ASTM F844-0 7a (2013): Standard Specification for Washers, Steel, Plain (Flat) Unhardened for General Use.
 10. ASTM F1667-13: Standard Specification for Nails, Spikes, and Staples.
- F. American Wood Protection Association (AWPA):
1. AWPA Standard U1, Commodity Specification A, requirements of Use Category 2 (UC-2).
- G. Southern Pine Inspection Bureau (SPIB) – Standard Grading Rules for Southern Pine Lumber.
- H. U.S. Department of Commerce Product Standard (PS).
1. PS 1-95 - Construction and Industrial Plywood.
 2. PS 20 -10 - American Softwood Lumber Standard.

1.5 SUBMITTALS:

- A. Submit in accord with Section 01 33 00 – Submittal Procedures.
- B. Shop Drawings showing wood trusses, framing, connection details, fasteners, connections and dimensions.
- C. Product Data:
 1. Wood/Plywood.
 2. Fasteners and anchors.
 3. Wood preservative treatment materials and application instructions.
 4. MSDS of treatment materials.
- D. Samples:
 1. Fastener types: Two (2) of each type.
 2. Material samples, if requested by Architect.

1.6 PRODUCT DELIVERY, STORAGE AND HANDLING:

- A. Comply with Section 01 66 00 – Storage and Handling.
- B. Protect lumber and other products from dampness both during and after delivery at site.
- C. Stack lumber to provide air circulation around surfaces of each piece.
- D. Stack plywood and other board products to prevent warping.

- E Locate lumber and plywood in well drained areas, supported at least 6" (150 mm) above grade and cover with well ventilated sheds having firmly constructed over hanging roof with sufficient end wall to protect lumber from driving rain.

PART 2 PRODUCTS

2.1 LUMBER:

- A. Lumber shall be SPIB Stress Group D 1x and 2x No. 2 grade Southern Yellow Pine species, with specified preservative treatment.
 - 1. Identifying marks shall be in accord with rule or standard under which material is produced, including requirements for qualifications and authority of inspection organization, usage of authorized identification, and information included in identification.
- B. Lumber Other Than Structural:
 - 1. Unless otherwise specified, species graded under grading rules of inspection agency shall be approved by Board of Review, American Lumber Standards Committee.
 - 2. Framing lumber: Minimum extreme fiber stress in bending of 1100 psi.
 - 3. Furring, blocking, nailers and similar items 100 mm (4") and narrower Standard Grade; and, members 150 mm (6") and wider, Number 2 Grade.
- C. Sizes:
 - 1. Conform to Prod. Std. PS20.
 - 2. Size references are nominal sizes, unless otherwise specified, actual sizes within manufacturing tolerances allowed by standard under which produced.
- D. Moisture Content (At time of delivery and maintained on site):
 - 1. Boards and lumber 50 mm (2") and less in thickness: 19 percent or less.
 - 2. Lumber over 50 mm (2") thick: 25 percent or less.

2.2 PRESERVATIVE TREATMENT:

- A. Wood Preservative (Pressure Treatment) for wood (exterior, above ground): AWWA U1, Use Category 3 (UC3) using waterborne preservative with 4.0 kg/m³ (0.25 pcf) of wood product.
- B. Treat wood members and plywood exposed to weather or in contact with plaster, masonry or concrete, including framing of open roofed structures; sills, sole plates, furring, and sleepers that are less than 600 mm (24") from ground; nailers, edge strips, blocking, crickets, curbs, cant, vent strips and other members used in connection with roofing and flashing materials.
- C. Wood preservative shall be borate based product. Use of Chromated Copper Arsenate (CCA) for pressure treating wood is not permitted.
- D. Approved Wood Preservative Applicator:
 - 1. Robbins Lumber Co., 13001 N. Nebraska Ave., Tampa, FL 33612-4456; Tel: 813-971-3030; Website: www.robbinlumber.com.
 - 2. Other preservative treatment companies shall comply with Section 01 25 13 – Product Substitution Procedures.

2.3 PLYWOOD

- A. Comply with Prod. Std. PS 1.
- B. Bear mark of recognized association or independent inspection agency that maintains continuing control over quality of plywood which identifies compliance by veneer grade, group number, span rating where applicable, and glue type.

- C. Sheathing:
 - 1. APA rated Exposure 1 or Exterior; panel grade CD or better.
 - 2. Wall sheathing:
 - a. Minimum 12 mm (15/32") thick with vertical supports not more than 600 mm (24") on center unless specified otherwise.
 - b. Minimum 1200 mm (48") wide at corners without corner bracing of framing.
 - 3. Roof sheathing:
 - a. Minimum 15 mm (19/32") thick for supports not more than 600 mm (24") on center.
- D. Wall Mounted Plywood in Communications Rooms (MDF and IDF Rooms):
 - 1. 19.5 mm (3/4") AC Grade APA Exterior rated Exposure 1 Plywood, painted flat grey on both sides and panel edges per Section 09 91 00.
 - 2. Plywood shall have Class A fire rating per ASTM E84-01 – Standard Test Method for Surface Burning Characteristics of Building Materials.
 - 3. Fire Retardant Wood Treatment:
 - a. DRICON by Arch Wood Protection, Inc., 1955 Lake Park Dr., Suite 100, Smyrna, GA 30080; Tel: 770-801-6600; Fax: 770-801-1990); website: www.archchemicals.com
 - b. D-Blaze by Chemical Specialties, Inc., One Woodland Green, Suite 250, 200 East Woodlawn Rd., Charlotte, NC 28217. Tel: 800-421-8661; Fax: 704-527-8232; website: www.treatedwood.com.
 - c. FirePRO by Osmose, Inc., P.O. Drawer O, Griffin, GA 30224-0249; Tel: 800-241-0240; Fax: 770-229-5225; website: www.osmose.com.

2.4 ROUGH HARDWARE AND ADHESIVES:

- A. Anchor Bolts:
 - 1. ASME B18.2.1 and ANSI B18.2.2 galvanized, 13 mm (1/2") unless shown otherwise.
 - 2. Extend at least 200 mm (8") into masonry or concrete with ends bent 50 mm (2").
- B. Miscellaneous Bolts: Expansion Bolts: C1D, A-A-55615; lag bolt, long enough to extend at least 65 mm (2-1/2") into masonry or concrete. Use minimum 3/8" (9 mm) diameter bolts unless shown otherwise.
- C. Washers
 - 1. ASTM F844-07a (2013).
 - 2. Use zinc or cadmium coated steel for washers exposed to weather.
- D. Screws:
 - 1. Wood to Wood: ANSI B18.6.1 or ASTM C1002-07(2013), stainless steel.
 - 2. Wood to Steel: ASTM C954-11, or ASTM C1002-07(2013), stainless steel.
- E. Nails:
 - 1. Size and type best suited for purpose unless noted otherwise. Use aluminum-alloy nails, plated nails, or zinc-coated nails, for nailing wood work exposed to weather and on roof blocking.
 - 2. ASTM F1667-13:
 - a. Common: Type I, Style 10.
 - b. Concrete: Type I, Style 11.
 - c. Barbed: Type I, Style 26.
 - d. Underlayment: Type I, Style 25.
 - e. Masonry: Type I, Style 27.
 - f. Use special nails designed for use with ties, strap anchors, framing connectors, joists hangers, and similar items. Nails not less than 32 mm (1-1/4") long, 8d and deformed or annular ring shank.

PART 3 EXECUTION

3.1 INSTALLATION OF FRAMING AND MISCELLANEOUS WOOD MEMBERS:

- A. Conform to applicable requirements of the following:
 - 1. APA for installation of plywood or structural use panels.
 - 2. TPI for metal plate connected wood trusses.
- B. Fasteners:
 - 1. Nails.
 - a. Nail in accord with Recommended Nailing Schedule as specified in AFPA Manual for House Framing. Where detailed nailing requirements are not specified in nailing schedule, select nail size and nail spacing sufficient to develop adequate strength for connection without splitting members.
 - b. Use special nails with framing connectors.
 - c. For sheathing, select length of nails sufficient to extend 25 mm (1") into supports.
 - d. Use eight penny or larger nails for nailing through 25 mm (1") thick lumber and for toe nailing 50 mm (2") thick lumber.
 - e. Use 16d or larger nails for nailing through 50 mm (2") thick lumber.
 - f. Select the size and number of nails in accord with Nailing Schedule except for special nails with framing anchors.
 - g. Nailing Schedule; Using Common Nails:
 - 1) Sheathing:
 - a) 150 mm (6") wide or less to each joist face nail two-8d.
 - b) Plywood or structural use panel to each stud or joist face nail 8d, at supported edges 150 mm (6") on center and at intermediate supports 250 mm (10") on center. When gluing plywood to joint framing increase nail spacing to 300 mm (12") at supported edges and 500 mm (20") o.c. at intermediate supports.
- 2. Bolts:
 - a. Fit bolt heads and nuts bearing on wood with washers.
 - b. Countersink bolt heads flush with the surface of nailers.
 - c. Embed in concrete and solid masonry or use expansion bolts. Special bolts or screws designed for anchor to solid masonry or concrete in drilled holes may be used.
 - d. Use toggle bolts to hollow masonry or sheet metal.
 - e. Use bolts to steel over 2.84 mm (0.112", 11 gage) in thickness. Secure wood nailers to vertical structural steel members with bolts, placed one at ends of nailer and 600 mm (24 inch) intervals between end bolts. Use clips to beam flanges.
- 3. Drill Screws to steel less than 2.84 mm (0.112") thick.
 - a. ASTM C1002-07(2013) for steel less than 0.84 mm (0.033") thick.
 - b. ASTM C 954-11 for steel over 0.84 mm (0.033") thick.
- 4. Power actuated drive pins may be used where practical to anchor to solid masonry, concrete, or steel.
- 5. Do not anchor to wood plugs or nailing blocks in masonry or concrete. Use metal plugs, inserts or similar fastening.
- 6. Screws to Join Wood:
 - a. Where shown or option to nails.
 - b. ASTM C1002-07(2013), sized to provide not less than 25 mm (1") penetration into anchorage member.
 - c. Spaced same as nails.

- C. Cut notch or bore in accord with NFPA Manual for House-Framing for passage of ducts wires, bolts, pipes, conduits and to accommodate other work. Repair or replace miscut, misfit or damaged work.
- D. Blocking Nailers, and Furring:
 - 1. Install furring, blocking, nailers, and grounds where shown.
 - 2. Use longest lengths practicable.
 - 3. Use fire retardant treated wood blocking where shown at openings and where shown or specified.
 - 4. Layers of Blocking or Plates:
 - a. Stagger end joints between upper and lower pieces.
 - b. Nail at ends and not over 24" (600 mm) between ends.
 - c. Stagger nails from side to side of wood member over 5" (125 mm) in width.
 - 6. Unless otherwise shown, use wall furring 1" by 3" (25 mm by 75 mm) continuous wood strips installed plumb on walls, using wood shims where necessary so face of furring forms a true, even plane. Space furring not over 400 mm (16") on centers, butt joints over bearings and rigidly secure in place. Anchor furring on 16" (400 mm) centers.

END OF SECTION

SECTION 06 41 00
CUSTOM CASEWORK

PART 1 GENERAL

1.1 RELATED DOCUMENTS

- A. The provisions of the General Conditions, Supplementary Conditions, and the Sections included under Division 1, General Requirements, are included as a part of this Section as though bound herein.

1.2 SECTION INCLUDES

- A. Provide labor, materials, services, and equipment necessary to furnish and install work as indicated and as specified herein, which includes, but is not limited to:
 - 1. Millwork and custom casework including cabinetry, countertops, and shelving
 - 2. Millwork and casework hardware and accessories

1.3 REFERENCES

- A. ASTM E84 – Standard Test Method for Surface Burning Characteristics of Building Materials
- B. AWI – Quality Standards
- C. BHMA A156.9 – Cabinet Hardware
- D. FED MMM-A-130 – Adhesive, Contact
- E. NEMA (National Electric Manufacturer’s Association) LD3 – High Pressure Decorative Laminates
- F. PS 1 – Construction and Industrial Hardwood
- G. PS 20 – American Softwood Lumber Standard
- H. Voluntary Product Standards PS 20-70
- I. Grading rules of Southern Pine Inspection Bureau (SPIB)
- J. Forest Stewardship Council (FSC)
- K. Sustainable Forestry Initiative (SFI)
- L. Canadian Standards Association (CSA):
- M. FBC – Florida Building Code

1.4 SUBMITTALS

- A. Shop Drawings: Submit Shop Drawings in accordance with Specifications.
 - 1. Indicate quality grade, materials, species, construction, sizes, shapes, quantities, locations, and conditions of adjoining work.
 - 2. Indicate items in related or dimensional position with sections or details shown either full size or 3" = 1'-0" scale.
 - 3. Indicate required field measurements beyond control of mill.
 - 4. Indicate the allowable uniformly distributed loads for shelving.
- B. Samples: Submit manufacturer's full range of sample colors, textures, and patterns of plastic laminate for Architect's selection.
- C. Installation Instruction: Provide installation instructions and lists of replacement parts for all hardware and accessories.

- D. Product Data: Provide product data for all hardware and accessories. Product data. Unless otherwise indicated, submit the following for each type of product provided under work of this Section:
1. Recycled Content:
 - a. All interior wood lumber shall be formaldehyde free.
 - b. Salvaged Lumber: Provide documentation certifying products are from salvaged lumber sources.
 - c. Recovered Lumber: Provide documentation certifying products are from recovered lumber sources.
 2. Local/Regional Materials:
 - a. Sourcing Location(s): Indicate location of extraction, harvesting, and recovery; indicate distance between extraction, harvesting, and recovery and the project site.
 - b. Manufacturing Location(s): Indicate location of manufacturing facility; indicate distance between manufacturing facility and the project site.
 - c. Product Value: Indicate dollar value of product containing local/regional materials; include materials cost only.
 - d. Product Component(s) Value: Where product components are sourced or manufactured in separate locations, provide location information for each component. Indicate the percentage by weight of each component per unit of product.
 3. VOC Data:
 - a. Adhesives:
 - i) Submit manufacturer's product data for adhesives. Indicate VOC limits of the product. Submit MSDS highlighting VOC limits.
 - ii) Submit Green Seal Certification to GS-36 and description of the basis of certification.
 - iii) Submit manufacturer's certification that products comply with SCAQMD #1168.
 4. Submit environmental data in accordance with Table 1 of ASTM E2129 for products provided under work of this Section.
- E. Letter of Certification(s) for Sustainable Forestry:
1. Forest Stewardship Council (FSC): Provide letter of certification signed by lumber supplier. Indicate compliance with FSC "Principles for Natural Forest Management" and identify certifying organization.
 - a. Submit FSC certification numbers; identify each certified product on a line-item basis.
 - b. Submit copies of invoices bearing the FSC certification numbers.
 2. Sustainable Forestry Board: Provide letter of certification signed by lumber supplier. Indicate compliance with the Sustainable Forestry Board's "Sustainable Forestry Initiative" (SFI) and identify certifying organization.
 - a. Submit SFI certification numbers; identify each certified product on a line-item basis.
 - b. Submit copies of invoices bearing the SFI certification numbers.
 3. Canadian Standards Association (CSA): Provide letter of certification signed by lumber supplier. Indicate compliance with the CSA and identify certifying organization.
 - a. Submit CSA certification numbers; identify each certified product on a line-item basis.
 - b. Submit copies of invoices bearing the CSA certification numbers.
- F. Key Schedule:
1. Provide lock and key schedule for lockable cabinets.
 2. Coordinate key schedule with Specification Section - Door Hardware.
- G. Certification: Submit certifications by treating plant that pressure treatment materials comply with governing ordinances.

1.5 QUALITY ASSURANCE

- A. Millwork and casework fabricator shall have a minimum 5-years previous experience of successfully completed comparable work.
- B. Lumber Grading:
 - 1. Lumber Grading Rules and Wood Species in accordance with Voluntary Product Standards PS 20-70
 - 2. Grading rules of Southern Pine Inspection Bureau (SPIB) apply to materials furnished.
- C. Fire Hazard Classification: Comply with required NFPA, ANSI, and UL surface burning characteristics for plastic laminates, lumber, and plywood.
- D. Perform work in compliance with AWI standards.
- E. Sustainably Harvested Wood: Certification Organizations shall be accredited by the Forest Stewardship Council, Sustainable Forestry Board, or Canadian Standards Association.

1.6 MOCK-UP

- A. Prepare mock-up under provisions as specified.
- B. Provide full size base cabinet and upper cabinet of each type indicated, in specified finish with hardware installed. Contractor to coordinate with Architect for all required locations.
- C. Owner shall inspect units to ascertain quality and conformity to AWI Standards.
- D. Units will establish a minimum standard of quality for this work.
- E. Vendor may use undamaged approved units as part of the work.

1.7 FIELD MEASUREMENTS

- A. Design and fabricate units based upon field conditions and measurements.
- B. Verify field measurements are included in shop drawings.

1.8 PRE-INSTALLATION CONFERENCE

- A. Convene a pre-installation conference after site inspection and prior to commencement of work.
- B. Discuss any items that may alter fabrications or intended installation and determine acceptable conclusions.

1.9 COORDINATION

- A. Coordinate work with plumbing, mechanical, electrical, and other trades for rough-in work and installation of adjacent and associated components.

1.10 ENVIRONMENTAL REQUIREMENTS AND PROTECTION

- A. Specification Section - Material Equipment and Approved Equals: Environmental conditions affecting products on site.
- B. Immediately prior to, during and after installation of work of this section, maintain the same temperature and humidity conditions in building spaces as will occur after occupancy.
- C. Protect work from damage until final acceptance.

PART 2 PRODUCTS

2.1 QUALITY GRADE

- A. Materials and Fabrication: Provide premium grade construction and finishing in accordance with AWI "Quality Standards", conforming to Section 400B - Laminate Clad Cabinets.
- B. Design Type: Reveal overlay design in accordance with AWI Architectural Casework - General Details, except as otherwise specified and detailed.

2.2 CABINET MATERIALS

- A. Sub-base Material:
 - 1. Provide millwork or casework plywood cores of Hardwood Plywood "veneer core" with no-added-Urea Formaldehyde adhesives.
 - 2. Use ¾" thick, 9-ply closed-grain hardwood plywood typical unless noted otherwise.
 - 3. Use ¼" thick hardwood plywood at cabinet backs and drawer bottoms.
- B. Adhesive: Provide type II, CS 35 or as recommended by plastic laminate manufacturer.
 - 1. Adhesives shall be low VOC meeting USGB LEED for Schools requirements for low VOC.
- C. Plastic Laminate: High-pressure laminate, General Purpose Grade, NEMA LD3, GP-50 by Formica or Nevamar.
 - 1. Exposed horizontal surfaces: Use 0.050" thick, matte finish.
 - 2. Exposed vertical surfaces: Use 0.030" thick, matte finish.
 - 3. Provide GP 42 for post forming: Use 0.042" thick, matte finish.
 - 4. BK 20 for concealed backing: Use 0.020" thick, matte finish, vertical grade, white unless otherwise indicated.
 - 5. Architect and the District's Design Coordinator shall select the Color and pattern, which may determine the laminate manufacturer.
- D. Finish Hardware Items: Provide following items of finish hardware with millwork:
 - 1. Drawer Glides: No. 8400 Extension Slides by Knape & Vogt Mfg. Co.
 - a. Equal products to Knape & Vogt produced by Accuride and Blum are acceptable.
 - 2. Shelf Standards and Supports (recessed in cabinets): No. 255 Standard and No. 256 Supports by Knape & Vogt Mfg. Co., Natural aluminum finish.
 - a. Equal products to Knape & Vogt produced by Accuride and Blum are acceptable.
 - 3. Doors: 1 pair heavy-duty institutional hinges, Stanley HT1592, US28.
 - a. 1 catch, Stanley 41 Series.
 - b. 1 pull, Stanley 4483, US28.
 - c. Equal products to Stanley produced by Grant and Hettich America are acceptable.
 - 4. Drawer Pulls: Stanley 4483, US28. Equal products to Stanley produced by Grant and Hettich America are acceptable.
 - 5. Drawer Locks: Schlage CL 888R or Olympus 888IC cabinet drawer lock, US26D, complete with strike plate.
 - a. Provide locks with Interchangeable Core Schlage cylinders keyed to the existing Facility Master Key System as directed by Owner.
 - 6. Door Locks: Schlage CL 777R or Olympus 777IC cabinet door lock, US26D, complete with strike plate.
 - a. Provide locks with Interchangeable Core Schlage cylinders keyed to the existing Facility Master Key System as directed by Owner.
 - b. Provide one elbow catch per pair doors.

7. Cabinet locks keyed to the facility shall be coordinated with the Hardware Supplier of section 08 71 00 who shall provide the locks.
8. Master key:
 - a. Master key doors and drawers of cabinetry in each room with each other and the main entrance room door.
 - b. Use a Schlage Everest D245 or Schlage 1456 restricted keyway as directed by owner.
 - c. Equal products to Schlage produced by Olympus are acceptable.
9. Silencers: Use neoprene type with self-adhesive at all cabinet doors.
- E. Glazing: Provide clear, tempered glass for glazed doors and openings in cabinetwork, ¼" thick unless otherwise indicated, or approved.
 1. Alternate glazing: Varia – Organics Collection by 3Form to be provided as scheduled.
 - a. Provide gauge as recommended by manufacturer.
 - b. Finish and color to be selected by architect.
 - c. Provide all required hardware to secure panels per manufacturer's recommendations.
- F. Accessories: Provide adhesives, concealed fasteners, nuts, bolts, screws, pins, washers, and etc. of type and size to suit application and severity of use. Provide finish washers at all exposed screw locations.
 1. Provide finished grommets for holes and cut-outs and escutcheons at pipe penetration.
- G. Miscellaneous: Provide shims, blocking, etc. as required for complete installation.

2.3 FABRICATION

- A. General:
 1. All exposed cabinet edges shall be beveled or rounded to prevent sharp edges or corners.
 2. All counter tops exposed to room or student access have beveled or rounded edges, and exposed corners rounded with minimum ½" radius.
- B. Fabrication Workmanship:
 1. Construct millwork items in accordance with specified quality grade of reference standards, except as otherwise specified or detailed.
 2. Construct millwork items using materials specified for plastic laminate finish.
- C. Milling:
 1. Fabricate and assemble work at mill as complete as practicable.
 2. Deliver ready to assemble and set in place.
 3. Machine sand all work at mill and deliver free of machine or tool marks or defects that will show through finish.
- D. Plastic Laminate Tops, Panels, Cabinet Shelving, and All Exposed Surfaces:
 1. Use plywood substrate as specified.
 - a. Particleboard, hardboard, and flake-board are not acceptable.
 2. Glue tops and panels under pressure using Type II water-resistant adhesive.
 - a. Glue plastic, core, and backing sheet in one operation after applying edge bands.
 3. Plastic Laminate shall be applied to the top of all tall cabinets and scribed to wall.
- E. Fabricate finished tops and edges from one continuous sheet of plastic laminate.
 1. Make corners and joints hairline.
 2. Slightly bevel arises.
- F. Ease the edges of millwork as required to eliminate sharp edges.
- G. Backsplash and Aprons:
 1. Square edge, direct bond cover, and full returns.
 2. Make corners and joints hairline.
- H. Door and Drawer fronts shall be ¾" thick.

- I. Provide plastic laminate finish on all exposed surfaces of doors, drawers, countertops, splashes, etc. of cabinets.
 - 1. Shelves shall be finished on all sides and edges.
- J. Construction: Construct each unit or cabinet in one section where practical, or construct in largest practical sections to facilitate ease of handling and installation.
 - 1. Cabinet constructed in more than one section, ship trim and scribe strips loose at field joints.
 - 2. Locate counter butt joints minimum 2' from sink cutouts.
- K. Finish Hardware: Fit drawer guides and cabinet-mounted shelf standards at mill.
 - 1. Ship other finish hardware items loose for installation at job site.
- L. Glazing: Install glazing at mill to the greatest extent practical.
 - 1. Field glazing shall be with dry type glazing gaskets sized to eliminate gaps and prevent loose glazing installations.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Examine surfaces for conditions that would prevent quality installation of millwork.
- B. Verify that grounds and blocking are in place to support millwork.
- C. Do not install on defective conditions, doing so shall indicate acceptance of site conditions and require you to correct any defects.

3.2 INSTALLATION

- A. General:
 - 1. Install all millwork items, plumb, level and true (within 1/16" in 10'), in accordance with drawing details and shop drawings.
 - 2. Do not install trim until backs and unexposed edges have been back primed.
 - 3. Provide cutting, fitting, fabricating, erecting, wedging, bracing, blocking, nailing, and securing of items of rough woodwork throughout, including miscellaneous furring, grounds, blocking, and nailers.
 - a. Build-in items where indicated on Drawings or where required for attachment of finish and other work.
 - 4. Provide 4" high backsplash and end splashes at all locations where countertops abut walls.
 - 5. Fully bed backsplashes and end splashes to top and each other with Dow Corning #786 mildew resistant silicone sealant.
 - 6. Offsets: Offsets in plane on work surfaces and counters shall be negligible and no more than 1/32" at other abutting materials.
- B. Cabinets:
 - 1. Install cabinets plumb with countertops level to within 1/16" in 10'.
 - 2. Level the base cabinets to within allowable tolerances.
 - 3. Accurately scribe and fit scribe strips, trim strips, and filler panels to irregularities of adjacent surfaces, maximum gap opening 0.025". Plastic laminate overlay trim shall not be used to close caps.
 - 4. Secure cabinets permanently to floor using anchors spaced at maximum of 30" o.c., minimum of two for each unit while maintaining 3/4" clearance between the back of cabinet and the exterior wall.
 - 5. Bolt adjoining cases together, maximum width of joints 1/32".

6. Fasten tops to bases with screws driven through base cabinet top frame into bottom of countertop.
7. Scribe all backsplashes and aprons and caulk.
8. Blocking, Bucks, and Nailers: Install plumb, level and true with joints flush, fastened securely in place.
9. Furring and Stripping: Install plumb and level, shim to provide true finish surface.
10. Install color-matched sealant at unfinished joints with other materials.
11. Install wall-shelving standards on solid backing or with toggle bolts into steel studs or masonry or TEK screws into concrete.
 - a. Do not install wall-shelving standards into gypsum wallboard only.
 - b. Space standards as required to support indicated loading but not less than 5-plf based on shelf material provided.
12. Do not install cabinetry or millwork closer than 24" to ceilings in fully sprinklered buildings or such that installation obstructs any fire sprinkler head.

3.3 ADJUSTING AND CLEANING

- A. Adjust doors, drawers, hardware, fixtures, and other moving or operating parts to function smoothly and correctly.
- B. On completion of installation, touch up marred or abraded finished surfaces and wipe down surfaces to remove fingerprints and markings, and leave in clean condition.

3.4 WASTE MANAGEMENT

- A. Waste Management: Collect cutoffs and scrap and place in designated areas for recycling.

END OF SECTION

DIVISION

7

THERMAL AND MOISTURE PROTECTION

SECTION 07 62 00
FLASHING AND SHEET METAL

PART 1 GENERAL

1.1 SCOPE OF WORK

- A. Flashing, counter-flashing, roofing grounds and nailers, and fabricated sheet metal items for roofing intersections with vertical surfaces, copings, curbs, gutters, eaves, roof drains, scuppers, vents and other roof penetrations.

1.2 RELATED SECTIONS

- A. Section 01 25 13 – Product Substitution Procedures.
- B. Section 01 31 00 – Project Management and Coordination.
- C. Section 01 33 00 – Submittal Procedures.
- D. Section 01 42 00 – References.
- E. Section 01 45 00 – Quality Control.
- F. Section 01 66 00 – Product Storage and Handling.
- G. Section 01 78 00 – Closeout Submittals.
- H. Section 06 10 00 – Rough Carpentry.
- I. Section 07 92 13 – Elastomeric Joint Sealants.

1.3 REFERENCES

- A. See Section 01 42 00 – References for additional reference standards, abbreviations, definitions, and acronyms.
- B. ANSI-SPRI/ES-1.
- C. American Society for Testing and Materials (ASTM):
 - 1. ASTM A240/A240M-15a: Standard Specification for Heat-resisting Chromium and Chromium-nickel Stainless Steel Plate, Sheet, and Strip for Pressure Vessels
 - 2. ASTM A653/A653M-13: Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot Dip Process
 - 3. ASTM A755/A755M-15: Standard Specification for Steel Sheet, Metallic-Coated by the Hot Dipped Process (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot Dip Process.
 - 4. ASTM D4586/D4586M-07(2012)e1: Standard Specification for Asphalt Roof Cement, Asbestos Free.
 - 5. ASTM B32-08(2014): Standard Specification for Solder Metal (Lead Free).
- D. Florida Building Code (FBC), 6th Edition.
- E. National Roofing Contractors Association (NRCA) “Roofing and Waterproofing Manual” Detail for installation of units.
- F. Sheet Metal and Air-Conditioning Contractor’s National Association, Inc. (SMACNA): Architectural Sheet Metal Manual”, latest Edition. Details for fabrication of units, including flanges and installation to coordinate with type of roofing indicated.

1.4 SUBMITTALS

- A. Comply with Section 01 33 00 – Submittal Procedures.

- B. Submit Shop Drawings on flashing and sheet metal work.
- C. Samples:
 - 1. Submit 8" (203 mm) x 8" (203 mm) square samples of each specified sheet materials to be exposed as finished surfaces.
 - 2. Submit each samples of factory fabricated products exposed as finished work, complete with specified factory finish.

1.5 QUALITY ASSURANCE

- A. Comply with Section 01 45 00 – Quality Control.
- B. Regulatory Requirements: Ensure flashing and sheet metal complies with requirements of Florida Building Code, NRCA, SMACNA, and ANSI-SPRI/ES-1.
- C. Coordinate application of flashings with application of roofing, protruding material, and roof accessories to provide a complete weather tight installation under provisions of the specified warranty requirements.
- D. Perform work in accord with referenced standards and manufacturer's printed installation instructions.

1.6 PRE-INSTALLATION MEETING

- A. Comply with Section 01 31 00 – Project Coordination.
- B. Meeting Format:
 - 1. Pre-installation meeting shall occur after approval of Shop Drawings by Contractor/CM and accepted by AE.
 - 2. Meeting shall convene minimum of one week before starting work.
 - 3. Required Attendees:
 - a. Contractor/CM.
 - b. Roof flashings installer.
 - c. Roofing and roofing equipment manufacturers.
 - d. Installers of deck or substrate construction to receive roofing work.
 - e. Installers of roof-top mechanical, plumbing or electrical items or other work in and around roofing that must precede or follow roofing work
 - f. Other subcontractors associated with work.
 - g. Architect.
 - h. Owner's Project Manager.
 - 4. Contractor/CM shall make arrangements for meeting and notify parties required to attend.
 - 5. Agenda shall include:
 - a. Review preparation and installation procedures and coordinating and scheduling required with related work.
 - b. Review roof, roof equipment, doors, and window system requirements (drawings, specifications, and other contract documents).
 - c. Review Shop Drawings and associated submittals.
 - d. Review manufacturer's technical materials.
 - e. Review and finalize construction schedule related to work and verify availability of materials, personnel, equipment and facilities needed to make progress and avoid delays
 - f. Review required inspection, testing, certifying and material usage accounting procedures.

- g. Review weather and forecasted weather conditions, and procedures for coping with unfavorable conditions, including temporary roofing.
- h. Meeting may be combined with roofing pre-installation meeting.

1.7 WARRANTIES

- A. Comply with Section 01 78 00 – Closeout Submittals.
- B. Provide installer’s five (5) year written warranty for flashings indicated.
 - 1. Flashings shall resist design wind speeds required by Florida Building Code, Chapter 16, in which installer agrees to repair or replace flashing components of roofing system that fail in materials or workmanship within specified warranty period.
 - 2. Flashing failures shall include water leaks, fasteners, accessories, flashing and sheet metal, grounds/nailers, gutters and downspouts, scuttles and vents, curbs, and other flashing components of roofing system.
- C. See Roofing Specifications for additional warranties that shall also apply.
- D. Warranty shall be a term type, with no conditions, exclusions, including exclusions of remedies by Owner, deductibles or limitations on coverage amount. Conditions, exclusions, or dollar limits.

PART 2 PRODUCTS

2.1 MATERIALS

- A. Manufactured flashing and sheet metal products are to contain recycled content.
- B. Sheet Material:
 - 1. Type 302 or 304 stainless steel, 22 gage, complying with ASTM A167.
 - 2. Flashing for Pipes, Conduits, and Round Equipment Supports: Type 304 stainless steel, 26 gage, 2B, complying with ASTM A240.
 - 3. Solder: Per ASTM B32.
- C. Fastening Devices:
 - 1. Stainless steel fasteners compatible with metal and roofing system. Use of powder-activated fasteners is prohibited.
 - 2. Attach sheet metal to wood with exposed fastenings: No. 10 x 1-1/4” (31.8mm) pan head stainless steel sheet metal screws. Provide neoprene sealant washers and stainless steel washers under screw heads.
 - 3. Attachment of sheet metal to masonry or concrete: No. 10 x 1-1/4” (31.8mm) pan head stainless steel masonry screws. Provide neoprene sealant washers and stainless steel washers under screw heads.
 - 4. Roofing Cement: Plastic roofing cement complying with requirements of ASTM D2822 or as appropriate and as recommended by roofing manufacturer.

2.2 ACCESSORIES

- A. Roof Drain Flashing: Minimum 4 lb (1.82 Kg) per ft² lead sheet flashing, 36” (91.44 cm) x 36” (91.44 cm) installed in accord with NRCA specifications.
- B. Cants:
 - 1. Pre-fabricated 16-gage, galvanized, minimum 4” (101 mm) vertical height, formed at 45° angle to walls and parapets.
 - 2. Manufacturer: Concrecel USA; Product: ARBS (Alternative Roof Blocking System).
 - 3. Substitutions: Comply with Section 01 25 13 - Product Substitution Procedures.

- C. Copings:
 - 1. Fabricate in approximately 10' (3 m) sections using sheet 22-gage stainless steel to detail as indicated.
 - 2. Provide continuous 16-gage stainless steel outer hold-down cleat with punched holes at 6" (152 mm) on center and face fasten at inward facing parapet components with removable fasteners as required for sheet metal.
 - 3. Provide 8" (203 mm) wide joint covers.
 - 4. Manufacturer: SBC Industries, North Miami, Florida.
 - 5. Substitutions: Comply with Section 01 25 13 - Product Substitution Procedures.
- D. Curb to Duct Flashing and Counter Flashing:
 - 1. Fabricate from stainless steel to fit duct curbs and ducts projecting from curbs.
 - 2. Provide 4" (101 mm) vertical flange to cover top edge of bituminous base flashings. Form flange bottom towards curb, with ¼" (6.3 mm) bottom edge bent ¼" (6.3 mm) out and hemmed.
 - 3. At top of curbs bend metal 90° and extend horizontally over to duct, then bend upward and extend vertically not less than 3" (71.2 mm) from top edge of flashing out 3/8" (9.5 mm) to receive sealant.
 - 4. Provide for field soldered lap joints at corners and 1" (25.4 mm) lap joints at horizontal miter splices.
- E. Edge Drips:
 - 1. Fabricate using sheet 22-gage stainless steel drip edge to detail indicated, in not over 10' (3 m) sections.
 - 2. Provide continuous 16-gage stainless steel continuous cleat with punched holes spaced as necessary. If cleat extends 6" (152 mm) or more below top fastener, provide second row of punched holes spaced as necessary.
 - 3. Provide 4" (101 mm) roof flange, and extend bottom drip not less than 1" (25.4 mm) below bottom of roof sheathing, with bottom ¾" (19 mm) kick-out to drip water away from finish wall.
 - 4. Manufacturer: Concrecel USA; Product: ARBS (Alternative Roof Blocking System).
 - 5. Substitutions: Request for substitutions shall be in accord with Section 01 25 13 - Product Substitution Procedures.
- F. Pipes, Conduits, Wires, and Round Equipment Supports Penetrating Roofing or Resting on Roofing:
 - 1. Type 304 stainless steel, 26-gage, complying with ASTM A240.
 - 2. Form tubular stainless steel sleeves sized to shape of penetration, not less than 8" (202 mm) above finished roofing with 4" (101 mm) wide base flange welded to water-tight to sleeve.
 - 3. Shop punch flanges.
 - 4. Seal flashing and cover with protective umbrella.
 - 5. Pre-manufactured roof penetration seals.
 - a. Manufacturer: SBC Industries, North Miami, Florida.
 - 6. Substitutions: Request for substitutions shall be in accord with Section 01 25 13 - Product Substitution Procedures.
- G. Sanitary Vent Stack Flashings:
 - 1. 4 lb (1.82 Kg) per ft² lead flashing.
 - 2. Form tubular lead flashing sleeve not less than 8" (202 mm) high with diameter ½" (12.7mm) larger than vent stack.
 - 3. Provide 4" (101 mm) wide flange soldered water-tight.
 - 4. Provide vandal-proof vent covers.
- H. Scuppers:

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1. Fabricate using stainless steel to profiles and details shown.
 2. Lock seam corners, solder water-tight and hem outer exposed edges.
 3. Provide 4" (101 mm) wide minimum flanges formed to fit cants, decks and vertical wall surface.
 4. Shop punch flanges for fastenings at 6" (152 mm) on center.
- I. Gutters:
1. Gutters shall be minimum 6" (152 mm) wide x 6" (152 mm) deep, 24-gage stainless steel with mill finish.
 2. Gutter straps shall be 1" (25.4 mm) wide rolled stainless steel located at 24" o.c. (61 cm) and pop riveted to gutter.
 3. Gutter brackets shall be 1.25" wide by 0.125" thick stainless steel with mill finish located at 2'-6" o.c.
 4. Gutters shall be in minimum 10'-0" long sections formed to provide flush exterior seams between gutter sections. Joints between gutter sections shall be 1/2" wide with 6" wide cover plates and support brackets to allow for expansion and contraction. Joints shall be fully bedded in sealant on inside joints.
- J. Downspouts:
1. Downspouts:
 - a. Downspouts shall be 5" by 5" square 0.125" thick stainless steel with mill finish fabricated in one continuous piece down to kick-out diverter section at bottom of downspout.
 - b. Sections shall be welded and ground smooth.
 2. Downspout bracket/straps:
 - a. Straps shall be 1" wide by 0.125" thick located not more than 4'-0" apart with top and bottom brackets located not more than 12" from ends of downspouts.
 - b. Brackets shall be attached to structure with two .025" diameter Zamac drive pins per bracket.
 - c. Bracket shall be attached to gutter with two #10 sheet metal screws each side of bracket and calked with sealant.
- K. Stucco Stop with Counter-flashing (2-piece):
1. Fabricate in approximately 10 ft sections using sheet stainless steel to details indicated.
 2. Provide receiver with 1.5" wall flange, 0.75" sloping stucco stop, and 0.75" flange bend downward with 0.50" hem.
 3. Shop punch wall flange for fastening.
 4. Provide shop fabricated soldered corner splices extending 4" each way.
 5. Provide counterflashing with 1.5" 45° top flange with 0.35" kick back at top and 4" bottom flange formed inward 3/4" towards wall with hemmed 0.25" kick at bottom.
 6. Provide 1.5" x 4" storm cleats.
 7. Manufacturer: Subject to compliance with requirements, provide products by following manufacturer:
 - a. SBC Industries, North Miami, Florida.
 8. Substitutions: Request for substitutions shall be in accord with Section 01 25 13 - Product Substitution Procedures
- L. Stucco Top with Counter-flashing (1-piece for re-roofing):
1. Fabricate in approximately 10 ft. sections using sheet stainless steel to details as indicated.
 2. Provide counterflashing with 0.50" 45° leg for sealant with 1.5" wall flange with a 4" bottom flange formed inward 0.75" towards wall with hemmed 0.50" kick at bottom.
 3. Shop punch wall flange for fastening.
 4. Provide shop fabricated soldered corner splices extending 4 inches each way.

5. Manufacturer: Subject to compliance with the specified requirements, provide products by the following manufacturer:
 - a. SBC Industries, North Miami, Florida.
 6. Substitutions: Substitutions: Request for substitutions shall be in accord with Section 01 25 13 - Product Substitution Procedures
- M. Surface Mounted Flashing (1-piece):
1. Fabricate in approximately 10 ft. sections using sheet stainless steel to detail as indicated.
 2. Provide flashing with 1.50" wall flange with 0.25" kick at top to receive sealant, 0.50" 135° sloping top flange and 4" bottom flange formed inward 0.75" towards wall with hemmed 0.50" kick at bottom.
 3. Shop punch wall flange for fastening to meet wind loads per FBC
 4. Provide shop fabricated corner splices extending 4".
 5. Manufacturer: Subject to compliance with the specified requirements, provide products by following manufacturers:
 - a. SBC Industries, North Miami, Florida.
 6. Substitutions: Request for substitutions shall be in accord with Section 01 25 13 - Product Substitution Procedures

PART 3 EXECUTION

3.1 EXAMINATION

- A. Do not proceed with work until conditions detrimental to proper and timely completion of work have been corrected in acceptable manner.

3.2 INSTALLATION

- A. Lap, rivet, lock, or seal joints, as field conditions require.
- B. Provide necessary reinforcement, miscellaneous fittings, and accessories.
- C. Apply flashing and sheet metal work including miscellaneous fittings and accessories to even, smooth, sound, thoroughly clean and dry surfaces that are free from defects that might affect application. Prime metal flanges that receive bitumen under provisions of FBC and manufacturer's requirements.
- D. Perform soldering work slowly, with properly heated coppers to thoroughly heat seam material and sweat solder through full width of seam that shows no less than 1" of evenly flowed solder. Solder under provisions of ASTM B 32.
 1. Start soldering immediately after application of flux.
 2. Solder flat locked seam.
- E. Isolate dissimilar metals with accepted isolation paint or other accepted materials.
- F. Make flashing and sheet metal work water and weather tight, with lines, arises and angles sharp and true and plane surfaces free from waves and buckles.
- G. Provide sufficient fasteners and related hardware to ensure a complete and weather tight system.
- H. Base Flashings at Aluminum Walkway Covers Abutting Concrete and Masonry:
 1. Set flashing tight against wall and with roof flange set on aluminum deck in bed of sealant.
 2. Secure roof flanges to metal deck with No. 10 x 0.50" stainless steel sheet metal screws at 6" on center maximum. Provide sealant washers and stainless steel washers under screw heads.

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- I. Cants Strips: Install at transitions of roof membrane with flat vertical surfaces.
- J. Copings:
 - 1. Secure outer hold-down cleat to woodblock at 6 inches on center with ring shank roofing nails.
 - 2. Install coping over cleat. Allow 0.125" space between each coping section.
 - 3. Secure inside face of coping with removable grommet type fasteners.
 - 4. Provide 1" to 12" slope at coping to inner parapet wall.
 - 5. Install joint covers in full bed of sealant.
- K. Curb to Duct Flashing and Counterflashing:
 - 1. Install flashings after ducts through curbs are in place and after bituminous base flashings are completed.
 - 2. Place flashings in place on curbs and solder corners and corner miter laps water-tight.
 - 3. Secure counterflashings to vertical edge of curb nailers with No. 10 stainless steel sheet metal screws through sealant washers at not over 12" on center.
 - 4. Secure vertical upturned duct flashing to duct with No. 10 stainless steel sheet metal screws through sealants washers at not over 6" on center.
 - 5. Seal joint between flashings and ducts with sealant per Section 07 92 13 – Elastomeric Joint Sealants.
- L. Edge Drips:
 - 1. Install continuous 20 gage stainless steel cleat.
 - 2. Set 22 gage stainless steel edge drip roof flanges in full bed of roofing cement over completed roofing.
 - 3. Lap splices 4" minimum and seal top horizontal surface laps with cold bitumen.
 - 4. Stagger nails at flange to roof deck at 4" on center.
 - 5. Cover roof flanges with 2-ply felt stripping set in full bed of roofing cement.
 - 6. Locate drip bottom not less than 0.75" away from finished vertical surfaces.
- M. Roof Drains:
 - 1. Prime roof drain flanges before applying roof felts.
 - 2. Set lead in full bed of cold bitumen over intermediate plies or cap sheet.
 - 3. Strip lead cover with 2 layers of roofing felts in solid coats of hot bitumen.
- N. Roof penetration materials at pipes, conduits and round equipment supports.
 - 1. After preliminary examination install conical sealant cover with sealant.
- O. Sanitary Vent Stack Flashings:
 - 1. Install in accord with NRCA specifications.
- P. Scuppers:
 - 1. Set scuppers in full bed of roofing cement over completed base flashing and roof membrane.
 - 2. Secure to masonry walls and concrete decks with stainless sheet metal screws in lead shields at 6" on center.
 - 3. Secure to wood nailers with stainless steel sheet metal screws at 6" on center.
- Q. Stucco Stop with Counterflashing (2-piece):
 - 1. Set receiver on masonry and concrete walls where indicated.
 - 2. Lap splices 4 inches minimum and seal laps with sealant.
 - 3. Secure to wall with No. 10 x 1.25" minimum Tap-Con screws 12" on center maximum.
 - 4. Check for membrane/bitumen seal on top of felt flashing before counterflashing installation.
 - 5. Attach storm cleats at 30" on center and with 1 cleat at each joint.
 - 6. Insert counterflashing into receiver, and secure tightly with storm cleats.
- R. Surface Mounted Flashing (1-piece):
 - 1. Set on masonry and concrete walls over base flashing where indicated.

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2. Lap splices 4" minimum and seal laps with sealant.
3. Secure to wall with No. 10 x 1-1/4 inch Tap-Con pan head screws at 12 inches on center maximum. Provide neoprene sealant washers and stainless steel washers.
4. Where corrugated metal wall occurs, place premolded neoprene filler strip on wall immediately above top of metal base flashing.
 - a. Set filler strip in sealant and seal abutting edges of filler strip with sealant.
 - b. Place counterflashing over filler strip set in sealant and secure flashing to metal wall through filler strip with No. 10 x appropriate length stainless steel sheet metal screws at 6 inches on center maximum and centered on wall flutes.
 - c. Provide sealant washers and stainless steel washers under screw heads.
5. Check for membrane/bitumen seal on top of felt flashing before flashing installation.

END OF SECTION

SECTION 07 84 00
FIRESTOPPING

PART 1 GENERAL

1.1 RELATED DOCUMENTS

- A. The provisions of the General Conditions, Supplementary Conditions, Drawings, Specifications and the Sections included under Division 1, General Requirements and References are included as a part of this Section as though bound herein.

1.2 SECTION INCLUDES

- A. Provide labor, material, services and equipment necessary to furnish and install work as indicated and as specified herein, which includes, but is not limited to:
 - 1. Firestopping at penetrations in fire rated assemblies, fire-resistive joints and intersections with fire rated walls, floors and roofs, perimeter fire containment systems in fire rated spaces, fire and smoke seals for doors and corridors.

1.3 RELATED SECTIONS

- A. Section 01 25 13 – Product Substitution Procedures.
- B. Section 01 31 13 – Project Coordination.
- C. Section 01 33 00 – Submittal Procedures.
- D. Section 01 42 00 – References.
- E. Section 01 45 00 – Quality Control.
- F. Section 01 66 00 – Project Storage and Handling Requirements.
- G. Section 01 78 00 – Closeout Submittals.
- H. Section 03 30 00 – Cast-In-Place Concrete.
- I. Section 04 22 00 – Concrete Unit Masonry.
- J. Section 07 92 00 – Joint Sealants.
- K. Section 09 29 00 – Gypsum Board.
- L. Division 23 – Heating, Ventilating and Air Conditioning (work requiring firestopping).
- M. Division 26 – Electrical (work requiring firestopping).
- N. Division 27 – Communications (work requiring firestopping).

1.4 REFERENCES

- A. See Section 01 42 00 – References for additional reference standards, definitions, abbreviations, and acronyms.
- B. American Society of Testing Materials (ASTM):
 - 1. ASTM C920-11: Standard Specification for Elastomeric Joint Sealants.
 - 2. ASTM E1399-13e1: Standard Test Method for Cyclic Movement and Measuring the Minimum and Maximum Widths of Architectural Joint Systems.
 - 3. ASTM E 1996-00: Standard Test Method for Fire Resistive Joint Systems.
- C. American National Standards Institute/Underwriter’s Laboratory (ANSI/UL):
 - 1. ANSI/UL 1479: Fire Test of Through Penetration Firestops.
 - 2. ANSI/UL 2079: Test for Fire Resistance of Building Joint Systems.
- D. Florida Building Code, 6th Edition.
- E. Florida Fire Prevention Code, 6th Edition.

1.5 PERFORMANCE REQUIREMENTS

- A. Provide products that upon curing, do not re-emulsify, dissolve, leach, breakdown, or otherwise deteriorate over time from exposure to atmospheric moisture, sweating pipes, ponding water or other forms of moisture characteristic during and after construction.
- B. Provide firestop sealants sufficiently flexible to accommodate motion such as pipe vibration, water hammer, thermal expansion and other normal building movement without damage to seal.
- C. Pipe insulation shall not be removed, cut away or otherwise interrupted through wall or floor openings. Provide products appropriately tested for thickness and type of insulation utilized.
- D. Openings within walls and floors designed to accommodate voice, data and video cabling shall be provided with re-enterable products specifically designed for retrofit.
- E. Penetrants passing through fire-resistance rated floor-ceiling assemblies contained within chase wall assemblies shall be protected with products tested by being fully exposed to fire outside of chase wall. Systems within UL Fire Resistance Directory that meet criterion are identified with words "Chase Wall Optional".
- F. Provide fire-resistive joint sealants sufficiently flexible to accommodate movement such as thermal expansion and other normal building movement without damage to seal.
- G. Provide fire-resistive joint sealants designed to accommodate specific range of movement and tested for purpose in accord with cyclic movement test criteria as outlined in Standards, ASTM E-1399, ASTM E-1966 or ANSI/ UL 2079.
- H. Provide through penetration firestop systems and fire-resistive joint systems and conduct air leakage test in accord with Standards, ANSI/UL1479 and ANSI/UL2079, respectively, with published L-Ratings for ambient and elevated temperatures as evidence of ability of through penetration firestop system or fire-resistive joint system to restrict movement of smoke.

1.6 SUBMITTALS

- A. Submit in accord with Section 01 33 00 – Submittal Procedures.
- B. Product Data: Provide manufacturer's standard catalog data for specified products demonstrating compliance with referenced standards and listing numbers of systems in which each product is to be used.
- C. Shop Drawings: Submit schedule of opening locations and sizes, penetrating items, and required listed design numbers to seal openings to maintain fire resistance rating of adjacent assembly.
- D. Certificates:
 - 2. Product certificates signed by firestop system manufacturer certifying material compliance with applicable code and specified performance characteristics.
 - 3. Certification of Installer's Qualifications.
- E. Installation Instructions: Submit manufacturer's printed installation instructions.

1.7 QUALITY ASSURANCE

- A. Comply with Section 01 45 00 – Quality Control.
- B. Products/Systems: Provide firestopping systems that comply with following requirements and as specified in Paragraph 1.04 - Performance Criteria.
 - 1. Firestopping tests shall be performed by qualified, testing and inspection agency, UL approved, or another agency performing testing and follow-up inspection services for firestop systems acceptable to authorities having jurisdiction.

2. Firestopping products bear classification marking of qualified testing and inspection agency.
- B. Installer Qualifications: Installer shall have five continuous previous years of experience in performing work specified, and is certified or approved by firestopping manufacturer as having required training to install firestop products specified.
- C. Mock-Ups:
 1. Comply with Section 01 43 39 – Mockups.
 2. Install mockup using acceptable products and manufacturer approved installation methods.
 3. Apply one of each unit type of firestopping material, such as penetrations through fire rated partition, to representative application.
 4. Locate where directed.
 5. Maintain mockup during construction for workmanship comparison.
 6. Remove and legally dispose of mockup when no longer required.
- D. Preinstallation Meeting:
 1. Comply with Section 01 31 13 – Project Coordination.
 2. Contractor/CM shall coordinate and conduct meeting with applicable installers to verify project requirements, review substrate conditions, plan and schedule work progress, determine phasing and layout of work with other trades to minimize conflicts.
 3. Review manufacturer's printed installation instructions, and warranty requirements.

1.8 DELIVERY, STORAGE, AND HANDLING

- A. Comply with Section 01 66 00 – Product Storage and Handling Requirements.
- B. Deliver products in manufacturer's original, unopened, undamaged containers, identification labels intact identifying product and manufacturer, date of manufacture; lot number; shelf life, if applicable; qualified testing and inspection agency's classification marking; and mixing instructions for multicomponent materials.
- B. Handle and store products in accord with manufacturer's written recommendations published in technical materials. Leave products wrapped or otherwise protected and under clean and dry storage conditions until required for installation.
- C. Store materials protected from exposure to harmful weather conditions and at temperature and humidity conditions recommended by manufacturer.

1.9 PROJECT CONDITIONS

- A. Do not install firestopping products when ambient or substrate temperatures are outside limitations recommended by manufacturer.
- B. Do not install firestopping products when substrates are wet due to rain, frost, condensation, or other causes.
- C. Maintain minimum temperature before, during, and for minimum 3 days after installation of materials
- D. Do not use materials containing flammable solvents.
- E. Coordinate construction of openings and penetrating items to ensure that through-penetration firestop systems are installed according to specified requirements.
- F. Coordinate sizing of sleeves, openings, core-drilled holes or cut openings to accommodate through-penetration firestop systems.
- G. Schedule installation of firestopping after completion of penetrating item installation but prior to covering or concealing of openings.

- H. Schedule installation of safing materials in linear opening at curtain wall prior to construction that limits access to safing slot.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Approved Manufacturer: Specified Technologies Inc., 200 Evans Way; Somerville, NJ 08876; Tel: 800-992-1180; Tel: 908-526-8000; Fax: 908-526-9623; Website: www.stifirestop.com.
- B. Other manufacturers shall make requests for product substitutions in accord Section 01 25 13 – Product Substitution Procedures.
- C. Single Source: Obtain firestop systems for each type of penetration or joint opening and construction condition indicated from single manufacturer.

2.2 MATERIALS

- A. Use firestopping products that have been tested for specific fire-resistance-rated construction conditions conforming to construction assembly type, penetrating item type or joint opening width and movement capabilities, annular space requirements, and fire-rating involved for each separate instance.
- B. Latex Sealants: STI SpecSeal Series single component latex formulations that upon cure do not re-emulsify during exposure to moisture. Following products are acceptable:
 - 1. Specified Technologies, Inc. (STI) SpecSeal Series SSS Intumescent Sealant.
 - 2. Specified Technologies, Inc. (STI) SpecSeal Series LCI Intumescent Sealant.
 - 3. Specified Technologies, Inc. (STI) SpecSeal Series LC Endothermic Sealant.
 - 4. Specified Technologies, Inc. (STI) SpecSeal Series AS Elastomeric Spray.
 - 5. Specified Technologies, Inc. (STI) SpecSeal Series ES Elastomeric Sealant.
- C. Firestop Devices: STI SpecSeal Series factory-assembled steel collars lined with intumescent material sized to fit specific outside diameter of penetrating item. Following products are acceptable:
 - 1. Specified Technologies, Inc. (STI) SpecSeal Series SSC Firestop Collars.
 - 2. Specified Technologies, Inc. (STI) SpecSeal Series LCC Firestop Collars.
- D. Wall Opening Protective Materials: STI SpecSeal Series intumescent, non-curing pads or inserts for protection of electrical switch and receptacle boxes to reduce horizontal separation to less than 24 inches (610mm). Following products are acceptable:
 - 1. Specified Technologies, Inc. (STI) SpecSeal Series SSP Firestop Putty Pads.
 - 2. Specified Technologies, Inc. (STI) SpecSeal Series EP PowerShield Insert Pads.
- E. Firestop Putty: STI SpecSeal Series intumescent, non-hardening, water resistant putties containing no solvents, inorganic fibers or silicone compounds. Following products are acceptable:
 - 1. Specified Technologies, Inc. (STI) SpecSeal Series SSP Firestop Putty.
- F. Fire Rated Cable Pathways: STI EZ-PATH device modules comprised of steel raceway with intumescent foam pads allowing 0 to 100 percent cable fill. Following products are acceptable:
 - 1. Specified Technologies Inc. (STI) EZ-PATH Fire Rated Pathway.
- G. Wrap Strips: STI SpecSeal Series single component intumescent elastomeric strips faced on both sides with plastic film. Following products are acceptable:
 - 1. Specified Technologies, Inc. (STI) SpecSeal Series RED Wrap Strip.
 - 2. Specified Technologies, Inc. (STI) SpecSeal Series BLU Wrap Strip.

3. Specified Technologies, Inc. (STI) SpecSeal Series BLU2 Wrap Strip.
- H. Firestop Pillows: STI SpecSeal Series re-enterable, non-curing, mineral fiber core encapsulated with an intumescent coating contained in flame retardant poly bag. Following products are acceptable:
 1. Specified Technologies, Inc. (STI) SpecSeal Series SSB Firestop Pillows.
- I. Mortar: STI SpecSeal Series Portland cement based dry-mix product formulated for mixing with water at Project site to form a non-shrinking, water-resistant, homogenous mortar. Following products are acceptable:
 1. Specified Technologies, Inc. (STI) SpecSeal Series SSM Firestop Mortar.
- J. Silicone Sealants: STI SpecSeal Series moisture curing, single component, silicone elastomeric sealant for horizontal surfaces (pourable or nonsag) or vertical surface (nonsag). Following products are acceptable:
 1. Specified Technologies, Inc. (STI) Pensil 300 Silicone Sealant.
 2. Specified Technologies, Inc. (STI) Pensil 300 SL Self-Leveling Silicone Sealant.
- K. Silicone Foam: STI SpecSeal Series multicomponent, silicone-based liquid elastomers, that when mixed, expand and cure in place to produce a flexible, non-shrinking foam. Following products are acceptable:
 1. Specified Technologies, Inc. (STI) Pensil 200 Silicone Foam.
- L. Silicone/Urethane Sealants: STI SpecSeal Series moisture curing, single component, silicone/urethane hybrid elastomeric sealant for horizontal surfaces. Following products are acceptable:
 1. Specified Technologies, Inc. (STI) SpecSeal Fast Tack Firestop Spray.
- M. Installation Accessories: Provide clips, collars, fasteners, temporary stops or dams, and other devices required to position and retain materials in place.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Before beginning installation, verify that substrate conditions previously installed under other sections are acceptable for installation of firestopping in accord with manufacturer's printed installation instructions and technical bulletins.
- B. Surfaces shall be free of dirt, grease, oil, scale, laitance, rust, release agents, water repellents, and any other substances that may inhibit optimum adhesion.
- C. Provide masking and temporary covering to protect adjacent surfaces.
- D. Do not proceed until unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. General: Install through-penetration firestop systems and fire-resistive joint systems in accord with Performance Criteria and in accord with conditions of testing and classification as specified in published design.
- B. Manufacturer's Instructions:
 1. Comply with manufacturer's printed instructions for installation of firestopping products and following.
 2. Seal openings or voids made by penetrations to ensure air and water resistant seal.
 3. Consult with mechanical engineer, project manager, and damper manufacturer prior to installation of through-penetration firestop systems that might hamper the performance of fire dampers as it pertains to duct work.
 4. Protect materials from damage on surfaces subjected to traffic.

5. Apply suitable bond-breaker to prevent three-sided adhesion in applications where conditions might occur such as intersection of gypsum wallboard/steel stud wall to floor or roof assembly where joint is backed by steel ceiling runner or track.
6. Where joint application is exposed to elements, fire-resistive joint sealant shall be approved by manufacturer for use in exterior applications and shall comply with ASTM C-920-11: Standard Specification for Elastomeric Joint Sealants.
7. Select materials pertinent to conditions from the list above within the Specification and the UL, FM, or other approved assembly information.

3.3 FIELD QUALITY CONTROL

- A. Keep areas of work accessible until inspection by authorities having jurisdiction.
- B. Where deficiencies are found, repair or replace firestopping products to comply with requirements.

3.4 ADJUSTING AND CLEANING

- A. Remove equipment, materials and debris, leaving area in undamaged, clean condition.
- B. Clean surfaces adjacent to sealed openings to be free of excess firestopping materials and soiling as work progresses.

END OF SECTION

SECTION 07 91 23
BACKER RODS

PART 1 GENERAL

1.1 RELATED DOCUMENTS

- A. The provisions of the General Conditions, Supplementary Conditions, Drawings, Specifications, and the Sections included under Division 1, General Requirements and References are included as a part of this Section as though bound herein.

1.2 SECTION INCLUDES

- A. Provide labor, material, services, and equipment necessary to furnish and install work as indicated and as specified herein, which includes, but is not limited to:
 - 1. Application of closed-cell polyethylene foam backer rod in expansion joints where indicated.

1.3 RELATED SECTIONS

- A. Section 01 25 13 – Product Substitution Procedures
- B. Section 01 31 00 – Project Coordination
- C. Section 01 33 00 – Submittal Procedures
- D. Section 01 42 00 – References
- E. Section 01 45 00 – Quality Control
- F. Section 01 66 00 – Product Storage and Handling Requirements
- G. Section 01 78 00 – Closeout Submittals
- H. Section 07 62 00 – Sheet Metal Flashing and Trim

1.4 REFERENCES

- A. Comply with Section 01 42 00 – References for additional reference standards, definitions, abbreviations and acronyms.
- B. American Society of Testing Materials:
 - 1. ASTM C1016-14: Standard Test Method for Determination of Water Absorption of Sealant Backing (Joint Filler) Material
 - 2. ASTM C1330-02(2013): Standard Specification for Cylindrical Sealant Backing for Use with Cold Liquid Applied Sealants.
 - 3. ASTM D1623-09: Standard Test Method for Tensile and Tensile Adhesion Properties of Rigid Cellular Plastics
 - 4. ASTM D1662-08(2014): Standard Test Method for Acid Sulfur in Cutting Oils
 - 5. ASTM D5249-14: Standard Test Method for Isolation and Enumeration of Enterococci from Water by the Membrane Filter Procedure

1.5 SUBMITTALS

- A. Comply with Section 01 33 00 - Submittal Procedures.
- B. Submit manufacturer's product data and printed application instructions.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Comply with Section 01 66 00 – Product Storage and Handling Requirements.
- B. Deliver materials to site in manufacturer's original, unopened containers and packaging, with labels clearly identifying product name and manufacturer.
- C. Store materials in a clean, dry area in accord with manufacturer's instructions.
- D. Protect materials during handling and application to prevent damage.

PART 2 PRODUCTS

2.1 APPROVED MANUFACTURER

- A. W. R. Meadows, Inc., PO Box 338, Hampshire, Illinois 60140-0338; Tel: 800-342-5976, 847-214-2100; Fax: 847-683-4544. Website: www.wrmeadows.com.
 - 1. Product: KOOL-ROD closed cell, backer rod joint filler.
 - 2. Color: Gray.
- B. Sonneborn, Division of BASF Construction Chemicals, LLC-Building Systems, 889 Valley Park Dr., Shakopee, MN 55379; Tel: 800-433-9517; Website: www.buildingsystems.BASF.com.
 - 1. Product: Sonalastic Closed-Cell Backer-Rod, closed-cell polyethylene foam joint-filler and backing for sealants in sizes to fit openings indicated.
 - 2. Color: Gray.
- C. Other manufacturers shall comply with Section 01 25 13 – Product Substitution Procedures.

2.2 MATERIALS

- A. Closed Cell Backer Rod Test Data:
 - 1. Water Absorption, oz/in³ (g/cc³): <0.017 (<0.03), per ASTM C1016-14.
 - 2. Density, lbs/ft³ (kg/m³): 1.50-3.0 (24-48), per ASTM D1662-08(2014).
 - 3. Compression Recovery, %: >90, per ASTM D5249-14.
 - 4. Compression Deflection, psi (KPa): >2.97 (>20.5), per ASTM D5249-14.
 - 5. Tensile Strength, psi (KPa): 29.0 (>200), per ASTM D1623-09.
 - 6. Service Temperature, °F (°C): -45 to 160 (-43 to 71).
- B. Size of Backer Rods:
 - 1. For joint widths up to 0.75” (19mm) wide, backer rods shall be sized 0.125” (3mm) larger than width of joint.
 - 2. For 0.75” (19mm) joint widths, backer rods shall be 1” (25mm).

PART 3 EXECUTION

3.1 EXAMINATION

- A. Examine areas to receive backer rod. Notify Contractor/CM if areas are not acceptable.
- B. Do not begin application until unacceptable conditions have been corrected. Commencement of installation shall be deemed acceptance of substrate conditions.
- C. Expansion joints shall be clean, dry and free of obstructions.

3.2 APPLICATION

- A. Install backer rod in accord with manufacturer's printed instructions.

- B. Select proper backer rod diameter and cut to length or use directly from spool. Do not stretch backer rod.
- C. Uniformly install backer rod with blunt instrument or roller at depth or level recommended by sealant manufacturer.
- D. Use template or roller gage to control depth of backer rods in joints to allow correct installation of joint sealant.

3.3 PROTECTION

- A. Protect expansion joints, backer rods and joint sealant from damage until project's Substantial Completion.

END OF SECTION

SECTION 07 92 00
JOINT SEALANTS

PART 1 GENERAL

1.1 RELATED DOCUMENTS

- A. The provisions of the General Conditions, Supplementary Conditions, Drawings, Specifications, and the Sections included under Division 1, General Requirements, and References are included as a part of this Section as though bound herein.

1.2 SECTION INCLUDES

- A. Provide labor, materials, services, and equipment necessary to furnish and install work as indicated and as specified herein, which includes, but is not limited to:
 - 1. Joint sealers

1.3 JOB CONDITIONS

- A. This Contractor shall inspect the job conditions as he finds them, and his starting of the work constitutes approval of all conditions.

1.4 QUALITY ASSURANCE

- A. All manufacturer items must be factory labeled, on the material or its container.
- B. Manufacturer shall have a minimum of 10-years experience specializing in specified item.
- C. Applicator shall be Sealant Manufacturer approved with 5-years successful experience.
 - 1. Applicator shall also agree to employ only skilled tradesmen for the Work.
- D. Obtain elastomeric materials only from manufacturers that if requested, will send a qualified technical representative to the project site for advising the Installer of proper procedures and precautions for the use of the materials.
- E. Contractor shall hold a pre-caulking meeting at the project site with the Architect and all involved parties to review conditions, materials, colors, and other requirements.

1.5 REFERENCES

- A. ACI 504 R – Guide to Joint Sealants for Concrete Structures
- B. ASTM C834 – Standard Specification for Latex Sealants
- C. ASTM C919 – Standard Practice for Use of Sealants in Acoustical Applications
- D. ASTM C920 – Standard Specification for Elastomeric Joint Sealants
- E. ASTM C 1193 – Standard Guide for Use of Joint Sealants
- F. ASTM D1056 – Standard Specification for Flexible Cellular Materials - Sponge or Expanded Rubber
- G. SWRI (Sealant, Waterproofing and Restoration Institute) - Sealant and Caulking Guide Specification.
- H. California South Coast Air Quality Management District (SCAQMD) #1168

1.6 SUBMITTALS

- A. Submit manufacturer's detailed technical data for materials, fabrication, and installation, including catalog cuts of bond breakers, backer rods, and accessories.
 - 1. Submit full color samples for Architect selection.
- B. Certificates from the manufacturers of joint sealants attesting that their products comply with the specification and are suitable for the use indicated.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials to the project site in original unopened containers or bundles with labels indicating manufacturer, product name and designation, color, expiration period for use, pot life, curing time, and mixing instructions for multi-component materials.
- B. Store and handle materials in compliance with manufacturer's requirements to prevent their deterioration or damage due to moisture, temperature, contaminants, or other causes.

1.8 WARRANTY

- A. The Contractor shall furnish written guarantee that work executed under this section is free from defects of material and workmanship for a period of 5-years from date of substantial completion of the entire project.
 - 1. Include coverage that he will immediately and at his own expense, repair and replace all such defects as may develop during the term of this guarantee.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturer shall be one of the following however products of other manufacturers will be considered for acceptance provided they equal or exceed the material requirements and functional qualities of the specified product.
 - 1. DAP, Inc., Dayton, Ohio
 - 2. Dow Corning Corp., Midland, Michigan
 - 3. General Electric Co., GE Silicones, Waterford, New York
 - 4. Pecora Corp., Harleysville, Pennsylvania
 - 5. Sonneborn Building Products Div., Minneapolis, Minnesota
 - 6. Tremco, Inc., Beachwood, Ohio
 - 7. Hilti Construction Chemicals, Tulsa, Oklahoma
- B. Contractor may request other products or manufacturers for acceptance provided they equal or exceed the material requirements and functional qualities of the specified product.
 - 1. The "Substitution Request Form" and complete technical data for evaluation must accompany requests for Architect's approval.
 - 2. All materials for evaluation must be received at least 10-days prior to bid due date.
- C. Toxicity/IEQ:
 - 1. Comply with applicable regulations regarding toxic and hazardous materials, and as specified. Sealants must meet or exceed requirements of Bay Area Resources Board, reg. 8, rule 51.
 - 2. Sealants containing aromatic solvents, fibrous talc, formaldehyde, halogenated solvents, mercury, lead, cadmium, chromium and their compounds, are not permitted.
- D. Backer Rods: Provide composite backer rods.

2.2 MATERIALS

A. General

1. The term “Acceptable Standard” when used within this Section, refers to the manufacturer and product listed, specified as to type and quality required for this project.
2. Contractor shall supply a single resource responsibility for joint sealer materials.
 - a. Obtain joint sealer materials from a single manufacturer for each different product required.
3. Compatibility: Provide joint sealers, joint fillers, and other related materials that are compatible with one another and with joint substrates under conditions of service and application, as demonstrated by sealant manufacturer based on testing and final experience.

B. Caulking Compounds (Acrylic Latex Sealant)

1. Latex rubber modified, acrylic emulsion polymer sealant compound; manufacturer’s standard, one part, non-sag, mildew resistant, acrylic emulsion sealant complying with ASTM C 834, formulated for accepting paint. (Product recommended for exposed interior locations involving joint movement of less than 5%).
2. Acceptable Standard
 - a. “Sonolac”; Sonneborn Building Products, Inc
 - b. “Acrylic Latex Caulk 832”; Tremco, Inc
 - c. “Acrylic Latex Caulk with Silicone”; DAP

C. One-Part Elastomeric Sealant (Silicone)

1. One component elastomeric sealant complying with ASTM C 920, Class 25, Type NS (non-sag), unless manufacturer recommends Type S (self-leveling) for the application shown (general caulking , glazing applications).
 - a. Acceptable Standard
 - i) “Dow Corning 791; Dow Corning Corp.
 - ii) “Omniseal”; Sonneborn Building Products, Inc.
 - iii) “Spectrem 2; Tremco, Inc.
2. One component mildew resistant silicone sealant used around countertops, backsplashes, and other wet interior locations.
 - a. Acceptable Standard
 - i) “Dow Corning 786”, Dow Corning Corp.
 - ii) “Sanitary 1700”; General Electric
3. One-component high movement joints (+100/-50) use sealants in locations indicating high movement.
 - a. “Dow Corning 790”; Dow Corning Corp.
 - b. “Spectrem 1”; Tremco, Inc.

D. One-part self-leveling polyurethane sealant (for traffic areas)

1. One component polyurethane self-leveling sealant, complying with ASTM C 920, Type S, Grade P, Class 25.
 - a. Acceptable Standard
 - i) “Sonolastic SL 1”; Sonneborn Building Products, Inc.
 - ii) “NR-201 Urexpant”; Pecora Corp.
2. Two component polyurethane self-leveling sealant, complying with ASTM C920, Type M, Grade P, Class 25.
 - a. Acceptable Standard
 - i) “Sonolaastic SL 2”; Sonneborn Building Products, Inc.
 - ii) “NR-200 Urexpant”: Pecora Corp.
 - iii) “THC900/THC901”: Tremco, Inc.

- E. Flexible Polyurethane Security Sealant (for use on interior joints, perimeter of fixtures, penetrations, vents, doors, windows and similar openings)
 - 1. Two component polyurethane sealant, complying with ASTM C 920, Grade NS, Class 12.5, with a Shore A Hardness of 55, Type M.
 - a. Acceptable Standard
 - i) “Dynaflex”, Pecora Corp.
 - ii) “Ultra”, Sonneborn Building Products, Inc.
- F. Miscellaneous Materials
 - 1. Provide joint cleaner and joint primer sealer as recommended by the sealant or caulking compound manufacturer.
 - 2. Sealant backer rod shall be compressible rod stock, polyethylene foam; polyethylene jacketed polyurethane foam, butyl rubber foam, neoprene foam, or other materials as recommended by sealant manufacturer.
 - a. Where plans indicate a 2" building expansion joint, provide an expanding foam secondary sealant, “BackerSeal” as manufactured by Emseal Joint Systems, Ltd., or Apolytite Standard as manufactured by Polytite Manufacturing Corporation, behind sealant in lieu of standard backer rod.
 - 3. Primer: Provide type recommended by joint sealer manufacturer where required for adhesion of sealant to joint substrates indicated, as determined from preconstruction joint sealer substrate tests and field tests.
 - 4. Cleaners for Nonporous Surfaces: Provide non-staining, chemical cleaners of type acceptable to manufacturer of sealant and sealant backing materials, which are not harmful to substrates and adjacent nonporous materials, and which do not leave oily residues or otherwise have a detrimental effect on sealant adhesion or in service performance.
 - 5. Masking Tape: Provide non-staining, non-absorbent type compatible with joint sealants and to surfaces adjacent to joints.

PART 3 EXECUTIONS

3.1 INSPECTION

- A. This Contractor shall notify the General Contractor, when he has completed his work and is ready for A/E inspection.
- B. Verify that substrate surfaces and joint openings are ready to receive work.
- C. Verify that joint backing and release tapes are compatible with sealant.
- D. Clean and prime all joints in accordance with manufacturer’s instructions.
- E. Remove loose materials and foreign matter that might impair adhesion of sealant.

3.2 INSTALLATION

- A. Install all products in strict accordance to all manufacturers' recommendations.
- B. Measure joint dimensions and size materials to achieve required width/depth ratios.
- C. Install joint backing to achieve a neck dimension no greater than 1/3 the joint width.
- D. Install bond breaker where joint backing is not used.
- E. Install sealant free of air pockets, foreign embedded matter, ridges, and sags.
- F. Apply sealant within recommended application temperature ranges.
 - 1. Consult manufacturer when sealant cannot be applied within ranges.
- G. Tool joints concave.
- H. Tilt-up concrete wall panel joints; clean joints free of moisture, dust, sealers and form release agents using a wire brush and rag without solvents to clean concrete.

1. Exterior wall joints
 - a. Seal both sides (outside and inside) with an exterior joint system consisting of a foam-backer rod (set into the joint for the entire length of the joint cavity) and cover with a urethane or other acceptable joint sealant material (sealant depth should be one-half the joint width, max. ½” depth) tool joint material in place.
 - b. Protect sealant material during painting of walls.
2. Interior wall joints
 - a. In fire resistance rated walls
 - i) Seal both sides of joint with a fire-stopping sealant, encapsulating the ceramic blanket protection material, finish joint similar to that of the exterior wall joint described above.
 - b. In non-fire resistance rated walls
 - i) Seal exposed concrete panel joints
 - ii) Concealed (furred) concrete panel joints need not be sealed

3.3 ADJUSTMENT AND CLEANING

- A. After installation, thoroughly clean all exposed surfaces and restore all damaged material to its original condition, or replaced with new material.

3.4 SITE ENVIRONMENTAL PROCEDURES

- A. Indoor Air Quality:
 1. Temporary ventilation: Provide temporary ventilation during work of this Section.
 - a. Coordinate interior application of joint sealants with interior finishes schedules.

END OF SECTION

DIVISION

8

OPENINGS

SECTION 08 06 00
DOOR AND FRAME SCHEDULE NOTES AND LEGEND

1.1 General Notes and Legend

A. Legend

- | | | | |
|----|-----|---|----------------------|
| 1. | AL | - | Aluminum |
| 2. | GL | - | Glass |
| 3. | HM | - | Hollow Metal - Steel |
| 4. | SS | - | Stainless Steel |
| 5. | STL | - | Steel |
| 6. | WD | - | Wood |

B. Fire Rating in Minutes

- | | | | |
|----|-----|---|--|
| 1. | 20 | - | 20 Minute |
| 2. | 45 | - | C Label 3/4 Hour (interior); E label 3/4 hour (exterior) |
| 3. | 60 | - | B Label 1 Hour |
| 4. | 90 | - | B Label 1-1/2 Hour (interior); D label 1-1/2 hour (exterior) |
| 5. | 180 | - | A Label 3 Hour |

C. Door sizes are indicated thus: 21070 (2'-10"W. x 7'-0"H.) Door sizes as shown on Door and Frame Schedule are nominal. Approved shop drawings must be distributed between trades to coordinate and verify actual door and frame sizes.

D. Door thickness shall be 1-3/4 inch, unless noted otherwise.

E. (HM) hollow metal doors and frames shall be as specified in Section – Steel Doors and Frames.

F. Hardware sets indicated on schedule are specified under Section – Door Hardware.

G. Type and thickness of glazing for doors and frames shall be as specified in Section – Glazing.

H. UL frame anchors required for labeled openings.

I. For door and frame elevations see Drawing sheet A-104.

J. Closers shall be the last hardware item installed. Installing Contractor shall verify maximum degree of door swing that field conditions will allow and install closers accordingly regardless of swing shown on Drawings.

K. Except when restricted by individual published listings, it is permissible for a fire door assembly to consist of the labeled, listed, or classified components of different organizations that are acceptable to the authority having jurisdiction.

L. Steel astragals and wood door metal vision light frame shall be painted. Color to be as selected by the Architect.

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- M. Provide knurled levers on all doors to hazardous areas. Tactile material is not acceptable.
- N. Contractor shall provide shims for wall mounted wall stop/holders where the trim (pull, lever, or knobs) extend beyond the engaged depth of wall holder.
- O. Door specified with kickplates and vertical rod exit devices – cut kickplate short of vertical rod bottom latch case.
- P. Door under cut ½ maximum inches from finished floor.

The following information has been noted on the Door and Frame Schedule under the remarks column:

- A. Refer to the notes under the Remarks Column on the Door Schedule.

END OF SECTION

SECTION 08 11 13
METAL DOORS AND FRAMES

PART 1 GENERAL

1.1 RELATED DOCUMENTS

- A. The provisions of the General Conditions, Supplementary Conditions, Drawings, Specifications, and the Sections included under Division 1, General Requirements and References are included as a part of this Section as though bound herein.

1.2 SECTION INCLUDES

- A. Provide labor, material, services, and equipment necessary to furnish and install work as indicated and as specified herein, which includes, but is not limited to:
 - 1. Hollow steel doors and steel frames, frame components including sidelites, transom frames, borrowed lites, and louvers as indicated.
 - 2. Attachments including screws, bolts, expansion shields and related prep work.
 - 3. Door Hardware.

1.3 RELATED WORK

- A. Section 01 25 13 – Product Substitution Procedures
- B. Section 01 31 00 – Project Management and Coordination
- C. Section 01 33 00 – Submittal Procedures
- D. Section 01 42 00 – References
- E. Section 01 45 00 – Quality Control
- F. Section 01 66 00 – Product Storage and Handling
- G. Section 01 74 00 – Cleaning and Waste Management
- H. Section 01 78 00 – Closeout Submittals
- I. Section 08 14 29 – Prefinished Wood Doors
- J. Section 08 71 00 – Door Hardware
- K. Section 08 81 00 – Glazing
- L. Section 09 29 00 – Gypsum Board
- M. Section 09 91 00 – Painting

1.4 REFERENCES

- A. See Section 01 42 00 – References for additional reference standards, abbreviations, definitions and acronyms.
- B. ASCE 7-10 – Minimum Design Loads for Buildings and other Structures.
- C. American Society of Testing Materials (ASTM):
 - 1. ASTM A568A/568M-14: Standard Specification for Steel Sheet, Carbon, Structural, and High Strength, Low-Alloy, Hot-Rolled and Cold Rolled, General Requirements for
 - 2. ASTM A653/A653M-13: Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
 - 3. ASTM A1008/A1008M-15: Standard Specification for Steel, Sheet, Cold Rolled Carbon Structural High Strength Low-Alloy and High-Strength Low-Alloy with Improved Formability, Solution Hardened, and Bake Hardenable

4. ASTM E-90-09 – Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements.
- D. DHI (Door Hardware Institute) – The Installation of Commercial Steel Doors and Steel Frames, Insulated Steel Doors in Wood Frames and Builder's Hardware.
- E. National Fire Protection Association (NFPA):
 1. NFPA 80 – Fire Doors and Windows.
 2. NFPA 252 – Fire Tests for Door Assemblies.
- F. Florida Building Code, 6th Edition.
- G. Florida Fire Prevention Code, 6th Edition.
- H. American National Standards Institute (ANSI):
 1. ANSI A250.3 – Test Procedure and Acceptance Criteria for Factory Applied Finish Painted Steel Surfaces for Steel Doors and Frames.
 2. ANSI A250.8 – SDI-100 – Recommended Specifications for Standard Steel Doors and Frames.
 3. ANSI A250.10 – Test Procedure and Acceptance Criteria for Prime Painted Steel Surfaces for Steel Doors and Frames.
 4. ANSI A115.IG – Installation Guide for Doors and Hardware.
 5. ANSI A250.11 – Recommended Erection Instructions for Steel Frames.
- I. Underwriter's Laboratory (UL):
 1. UL 10B – Fire Tests for Door Assemblies.
 2. UL 10C – Positive Pressure Fire Test of Door Assemblies.

1.5 QUALITY ASSURANCE

- A. Comply with Section 01 45 00 – Quality Control.
- B. Conform to requirements of ANSI A250.8 SDI-100 – Recommended Specifications for Standard Steel Doors and Frames, or as amended herein if more restrictive.
- C. Manufacturer: Company specializing in manufacturing the products specified with minimum of three years continuous documented experience manufacturing products indicated.
- D. Product Approval: Door / Frame Assemblies shall meet current Florida Building Code Product Approval System or Miami-Dade Code Compliance Office requirements for High Velocity Hurricane Zone (HVHZ) or Notice of Approval (NOA) product approval.

1.6 SUBMITTALS

- A. Comply with Section 01 33 00 – Submittal Procedures.
- B. Submit Product Approvals for Door / Frame Assemblies certifying compliance with current Florida Building Code Product Approval System or Miami-Dade Code Compliance Office requirements for High Velocity Hurricane Zone (HVHZ) or Notice of Approval (NOA) product approval.
- C. Submit shop drawings, product data, manufacturer's literature and installation instructions. Include details of each frame type, elevations of door design types, conditions at openings details of construction, location and installation requirements of finish hardware and reinforcements and details of joints and connections.
- D. Indicate door and frame configuration, anchor spacing, anchor types, location of cutouts for hardware and glazing, and internal reinforcement.
- E. Performance Requirements: Provide hollow metal doors and frame assemblies that comply with performance requirements as demonstrated by testing manufacturer's assemblies in accordance with ASCE 7-10.
- F. Submit manufacturer's written installation instructions.

- G. Manufacturer shall certify and submit documentation that product complies with large and small missile impact criteria and have been tested and approved in compliance with Florida Product Approval or Miami Dade NOA and applicable requirements and submit documentation

1.7 DELIVERY, STORAGE, AND PROTECTION:

- A. Comply with Section 01 66 00 – Product Storage and Handling Requirements.
- B. Deliver doors and frames marked to identify each door, frame and opening in which they are located per numbers indicated.
- C. Store doors and frame in dry area on end with minimum ¼” spacers between units to allow ventilation.
- D. Frames shall be shipped and stored with temporary stiffeners and spacers in place to prevent distortion.
- E. Doors and frames shall be kept covered with water resistant, breathable fabric to prevent moisture intrusion on surfaces and allow ventilation.
- H. Replace doors and frames damaged during delivery, storage or construction.

1.8 WARRANTY:

- A. Comply with Section 01 33 00 – Submittal Procedures.
- B. Provide manufacturer's five-year warranty in which manufacturer agrees to repair or replace metal doors and frames that become corroded or rust within warranty period.
- C. Warranty shall include installation and finishing that is required due to repair or replacement of doors and frames.

PART 2 PRODUCTS

2.1 APPROVED MANUFACTURERS

- A. CECO DOOR, Division of Assa Abloy, 9159 Telecom Dr., Milan, TN 38353; Tel: 731-686-8345; Fax: 731-686-4211; Website: www.cecodoor.com.
- B. STEELCRAFT, 9017 Blue Ash Rd., Cincinnati, OH 45242; Tel: 800-243-9780; Fax: 513-745-6657; Website: www.steelcraft.com.
- C. Curries Manufacturing, Inc., 1502 12th St. NW, Mason City, IA 50401; Tel: 641-423-1334; Fax: 641-424-8305; Website: www.curries.com.
- D. Windsor Republic Doors, 155 Republic Dr., McKenzie, TN 38201; Tel: 800-733-3667; Website: www.republicdoor.com.
- E. Other manufacturers shall comply with Section 01 25 13 – Product Substitution Procedures.

2.2 DOORS AND FRAMES

- A. Material: Electro-Zinc coat bonderized conforming to ASTM A653/A653M-13.
 - 1. Exterior doors and frames: Factory applied G-90 (275 g/m²) electro plated zinc finish.
 - 2. Interior doors and frames: Factory applied G-60 (182 g/m²) electro plated zinc finish.
- B. Core: 20-gage cold rolled sheet steel vertical stiffeners in a "Z" configuration, spaced not more than 6" o.c. (16mm) and spot welded to face sheet. Vertical stiffeners extend full length of door cavity, except in areas of reinforcement. Fill core between stiffeners with rigid polyurethane chemically bonded to interior surfaces with minimum value of R10.
- C. Door Face: 16-gage.

D. Door Reinforcement:

1. Hinge reinforcement shall be minimum 10 ga. plate, 1.5" (318 mm) by full height of door.
2. Tops and bottom reinforcement shall be minimum 16 ga. full width of door welded to both face sheets.

E. Frame Gage: 16-gage for interior frames, 14-gage for exterior frames.

F. Fire Rated: Provide fire rated assembly where scheduled or required by Code. Installations shall be in accord with NFPA 80.

G. Insulated Doors: "U" value of 0.10 for polyurethane core for exterior metal doors.

H. Fire Rated Doors:

1. Test Doors in accord with UL 10B, UL 10C and NFPA 252.
2. Doors shall have UL labels, applied by authorized agent, in accord with independent testing agency.
3. Stairwell doors shall have 250°F (121°C) temperature rise rating with fire rating label on doors.

2.3 VISION LITES

A. Provide manufacturer's standard vision lites of minimum 16 gauge cold-rolled steel, factory primed of shapes and sizes where shown on drawings. Corners shall be mitered

B. Vision lites for fire rated applications shall be fire rated to comply with door rating.

1. At light opening cut outs, provide 18 gage bonderized zinc coated steel channel type stops tightly fitted to opening, with square and true butt joints.
 - a. Drill and dimple countersink stops for fastenings. Provide zinc plated No. 6 oval head screws into opening frames at not over 12 inches o.c.
 - b. Exterior stops shall be integral with opening frame, integral with door welded in place.
2. At exterior doors caulk perimeter seam between closure channel and door face sheet with grade exterior sealant prior to finish painting.
3. All light openings shall be cut, reinforced and stops applied in the shop. No field cutting of the doors.

C. Finish shall be zinc coat with baked enamel color selected by architect from manufacturer's standard colors.

D. Exterior frames shall be A60 galvanized or hot dipped galvanized.

2.5 ACCESSORIES

A. Door Silencers: Except on weather-stripped frames, drill stops to receive three silencers on strike jambs of single frames and two silencers on heads of double frames.

B. Jamb Anchors: Provide minimum four anchors on both hinge and latch jambs. Provide 14-gage galvanized sheet steel, angle anchors welded for each jamb which extend to floor, punched for minimum of two 0.25" (6.4 mm) diameter bolts.

C. Spreader: Provide frames with temporary steel spreader bars tack welded to jamb bottoms to maintain full rigidity and proper alignment during installation.

D. Astragals: Provide steel astragals (removable) as scheduled or indicated.

2.6 PROTECTIVE COATINGS

A. Frames: Provide with full immersion dip coat of rust-inhibitive metal primer for complete coverage including hidden surfaces.

- B. Doors: Provide full coverage electrostatic spray coat of rust-inhibitive metal primer.
- C. Dry frames and doors in baking oven process.
- D. AwlGrip Max Cor CF Primer manufactured by AkzoNobel Corp., 2270 Morris Ave., Union, NJ 07083; Tel: 908-686-1300; Fax: 908-964-2219; Website: www.akzonobel.com/us

2.7 GROUTING OF EXTERIOR FRAMES

- A. Paint inside (concealed) faces of door frames in exterior masonry or concrete walls, using fibered asphalt emulsion coating. Apply over shop primer approximately 1/8" thick and allow to dry before handling.
- B. Fill jambs and heads of hollow metal door and window frames solid with grout.

2.8 FABRICATION:

- A. Door Fabrication: Fully welded seamless construction. No metal tabs will be accepted.
- B. Frame Fabrication: Fully welded mitered corners ground smooth. Interior intersection of jambs shall be fully welded. Integral stops minimum 0.675" (16 mm) depth and minimum 2.5" (63.5 mm) width. Punch frames to receive silencers three on strike jamb of single leaf jambs. Provide 26-gage sheet metal grout guards at hinges, lock, bolts, door closer, foot, and silencer locations.
- D. Frame Reinforcement: Hinge reinforcing steel plate 0.1875" (4.8 mm) thick x 1.5"(43 mm) wide x 10" (254 mm) long and secured by a minimum of six spot-welds. Door closer foot shall be 10-gage steel reinforcing plate, 14" (356 mm) long x stop width anchored by minimum of 8 spot welds in hinge corner of head section of jamb.
- E. Hardware Location: Locate door hardware in accord with "Recommended Locations for Builder's Hardware" published by National Builder's Hardware Association.

PART 3 EXECUTION

3.1 INSTALLATION:

- A. Examine new and existing adjacent framing and rough opening preparation for conditions, which would prevent quality installation of doors and frames.
- B. Immediately notify Contractor/CM of conditions precluding successful installation. Proceeding with installation indicates installer's acceptance of conditions.
- C. Install frames in accord with NAAMM CHM-1-74 and ASCE 7-10.
- D. Install doors in accord with SDI-100, DHI and ASCE 7-10.
- E. Coordinate with masonry wall construction for anchor placement.
- F. Install roll-formed-steel reinforcement channels between two abutting frames. Anchor to structure and floor.
- G. Fully grout interior and exterior hollow metal frames with non-shrink grout.

3.2 PAINTING

- A. Comply with Section 09 91 00 – Painting for door and frame finishes.
- B. Exterior Door Frames: Air spray Max Cor DF AwlGrip, two component, anti-corrosive, chromate free epoxy primer on inside of door frame profiles of exterior doors prior to installation in accord with manufacturer's printed installation instructions.

3.3 TOLERANCES:

- A. Maximum Diagonal Distortion: 0.06375" (7.8 mm) measured with straight edge, corner to corner.
- B. Clearance between door and frame head and jambs shall be uniform 0.125" (15.6 mm).
- C. Clearance between meeting edges of pairs of doors shall be 0.1875" (23.4 mm) +/- 0.06375" (7.8 mm). For fire rated applications, clearance between meeting stiles shall be 0.125" (15.6 mm) +/- 0.06375" (7.8 mm).
- D. Bottom of door clearance shall be 0.50" (12.7 mm) minimum and 0.75" (19 mm) maximum floor clearance.
- E. Clearance between face of door and door stop shall be minimum 0.0625" (7.8 mm) to maximum 0.125" (15.6 mm).

3.4 ADJUSTING AND CLEANING:

- A. Adjust for smooth and balanced door movement.
- B. Check and readjust operating finish hardware items, leaving steel doors and frames undamaged and in complete and proper operating condition.

END OF SECTION

SECTION 08 14 16
FLUSH WOOD DOORS

PART 1 GENERAL

1.1 RELATED DOCUMENTS

- A. The provisions of the General Conditions, Supplementary Conditions, Drawings, Specifications, and the Sections included under Division 1, General Requirements and References are included as a part of this Section as though bound herein.

1.2 SECTION INCLUDES

- A. Provide labor, material, services, and equipment necessary to furnish and install work as indicated and as specified herein, which includes, but is not limited to:
 - 1. Flush wood doors with stain grade wood veneer, fire-rated and non-rated, solid core with and without glazing as indicated.

1.3 RELATED SECTIONS

- A. Section 01 25 13 – Product Substitution Procedures.
- B. Section 01 31 00 – Project Management and Coordination.
- C. Section 01 33 00 – Submittal Procedures
- D. Section 01 42 00 – References.
- E. Section 01 45 00 – Quality Control.
- F. Section 01 66 00 – Product Storage and Handling.
- G. Section 01 74 00 – Cleaning and Waste Management.
- H. Section 01 78 00 – Closeout Submittals.
- I. Section 08 11 00 – Metal Doors and Frames
- J. Section 08 70 00 – Finish Hardware
- K. Section 08 80 00 – Glazing

1.4 REFERENCES AND REGULATORY REQUIREMENTS

- A. See Section 01 42 00 – References for additional reference standards, abbreviations, acronyms and definitions.
- B. American Society of Testing Materials (ASTM):
 - 1. ASTM E90-09: Standard Test Method for Laboratory Measurement of Airborne Transmission Loss of Building Partitions
 - 2. ASTM E413-10: Classification for Rating Sound Insulation
- C. National Fire Protection Association (NFPA):
 - 1. NFPA 252 – Standard Methods for Fire Assemblies.
 - 2. NFPA 80 – Fire Doors and Windows.
- D. Florida Building Code, 6th Edition.
- E. Underwriters Laboratories, Inc.
 - 1. UL 10B – Fire Tests for Door Assemblies – Neutral Pressure.
 - 2. UL 10C – Fire Tests for Door Assemblies – Positive Pressure.
- F. American Woodwork Institute (AWI):
 - 1. Architectural Woodwork Standards, Section 9-Doors, 2nd Edition.

- G. Wood Door Manufacturers Association (WDMA):
 - 1. WDMA I.S.1-13:
 - 2. WDMA I.S.6-A.13: Interior Architectural Stiles and Rails Doors.

1.5 QUALITY ASSURANCE

- A. Comply with Section 01 45 00 – Quality Control.
- B. Door Standards:
 - 1. AWS Quality Standards 2nd Edition for Custom Grade.
 - 2. ANSI/WDMA I.S.6-A.13
- C. Labeling Agencies:
 - 1. Underwriters Laboratories, Inc. UL10B for neutral pressure and UL10C for positive pressure for rated doors.
 - 2. Intertek Testing Services-Warnock Hersey (ITS-WH) (Ratings for both Neutral pressure and Positive pressure rated doors).
- D. Sound Transmission Coefficient (STC) Minimum Performance Criteria:
 - 1. Classroom, Labs, Resource Room Doors and other spaces not noted: 31.
 - 2. Music (Band Choral and Orchestra Spaces): 50.
 - 3. Offices, Conference and Mechanical Room Doors: 45.

1.6 SUBMITTALS

- A. Submit in accord with Section 01 33 00 – Submittal Procedures.
- B. Shop drawings shall include:
 - 1. Door type.
 - 2. Door size.
 - 3. Fire rating.
 - a. Neutral pressure.
 - b. Positive pressure.
 - 4. Hardware types and locations.
 - 5. Lite opening size and location.
 - 6. Prefinished system type and approved color(s).
- C. Product Data: Indicate door core materials, thickness, construction, veneer may be ash, birch or maple species. See WDMA “A Specifier’s Guide to Door Face Veneers” for cut and matching requirements, factory machining and factory finishing criteria.
- D. Construction samples: Submit two or more manufacturer’s standard samples demonstrating door construction.
- E. Finish of submitted samples shall illustrate total range of color and grain of door face materials.
 - 1. Door color and grain finish failing to meet samples shall be rejected. Architect shall be sole judge of approved and rejected doors.
 - 2. Rejected doors shall be replaced at no additional cost to Owner.
- F. Provide manufacturer’s full lifetime door warranty.

1.7 DELIVERY STORAGE, HANDLING AND SITE CONDITIONS

- A. Comply with Section 01 66 00 – Product Delivery and Handling.
- B. Comply with WDMA’s Appendix Section “Care and Installation at Job Site”.
 - 1. Store doors flat and off floor on level surface in dry, well ventilated building.

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2. Protect doors from exposure to light, dirt, water and abuse.

3. Storage area in building shall have operational HVAC system maintaining temperature between 50° F (10°C) and 80° F (26.7°C) and 25%-55% relative humidity.
4. When handling doors, lift and carry. Do not drag across other doors or surfaces. Handle with clean hands or gloves.
5. Mark each door on top rail with opening number.
6. Accept doors on site in manufacturer's standard packaging. Inspect for damage.

1.8 COORDINATION

- A. Coordinate work in accord with Section 01 31 00 – Project Coordination.
- B. Coordinate work with door opening construction, door frame and door hardware installation with in pre-installation conference.

1.9 WARRANTY

- A. Provide manufacturer's warranty to include:
 1. Interior Solid Core Doors: "Full Life of Original Installation" including rehang and refinishing if door(s) do not comply with warranty tolerance standards.
 2. Include coverage for delamination, warping, bow, cup and telegraphing of core construction beyond warranty tolerances.

PART 2 PRODUCTS

2.1 APPROVED MANUFACTURERS

- A. Eggers Industries, Inc., 164 North Lake St., Neenah, WI 54956; Tel: 920-722-6444; Fax: 920-722-0357; website: www.eggersindustries.com.
- B. Algoma Hardwoods, Inc., 1001 perry St., Algoma, WI 54201; Tel: 920-487-5221; Fax: 920-487-3636; website: www.algomahardwoods.com.
- C. Marshfield Door Systems, Inc., 1401 East Fourth St., Marshfield, WI 54449-3667; Tel: 800-869-3667; website: www.marshfielddoors.com.
- D. Graham Wood Doors, Div. of Assa Abloy; 525 9th St. SE, Mason City, IA; Tel: 641-423-2444; Website: www.grahamdoors.com.
- E. Other manufacturers shall make requests for substitutions in accord with Section 01 25 13 – Product Substitution Procedures.

2.2 DOOR CONSTRUCTION

- A. Stiles and Rails: Comply with WDMA I.S. 6A-13 – Interior Architectural Stiles and Rails Doors.
- B. Flush Doors: Comply with WDMA I.S. 1-13 - 6A-13 – Interior Architectural Wood Flush Doors.
- C. Fabricate doors to “Custom Grade” per AWI Quality Standards, 2nd Edition.

2.3 FABRICATION

- A. Non Fire Rated Doors:
 1. Structural Composite Lumber Core (SCLC) engineered hardwood composite complying with WDMA minimum performance levels for interior applications:

- a. Screw holding strength: 540 lbs. (245Kg) minimum.
 - b. Modulus of rupture: Average of 4,000 psi (27.58 MPa).
 - c. Modulus of elasticity: Average of 600,000 psi (4137 MPa).
 - d. Density: Minimum 38 lbs./cu. ft. (609 Kg/M³) for Staves engineered with single species hardwood composite core.
2. Core Materials:
 - a. Stiles (Vertical Edges): Same species as face veneer.
 - b. Rails (Horizontal Edges): Structural composite lumber (SLC) as specified in core section per minimum requirements.
 - c. Stiles, rails, and mullions shall be joined with both 0.50" wooden dowels, and cope and stick joints and bonded with glue.
 3. Veneers:
 - a. Flush Wood Veneer Door Facing: White Birch (no heartwood), plain sliced veneers.
 - b. Veneer Matching: Book Match.
 - c. Assembly of Spliced Veneers: Running book match.
 - d. Doors in Pairs or Sets: Pair Match required. Door schedule shall reflect pairs and sets by door numbers, including doors separated by mullions.
- B. Fire Rated Doors:
1. Structural Composite Lumber Core (SCLC) engineered hardwood composite complying with WDMA minimum performance levels for interior applications:
 - a. Screw holding strength: 540 lbs. (245Kg) minimum.
 - b. Modulus of rupture: Average of 4,000 psi (27.58 MPa).
 - c. Modulus of elasticity: Average of 600,000 psi 4137 MPa).
 - d. Density: Minimum 38 lbs./cu. ft. (608.7 K/M³) for staves engineered with single species hardwood composite core.
 2. Core and Edge Construction shall utilize non-combustible mineral composite materials and intumescent required for ¾, 1, and 1-1/2 hour ratings per Door Schedule.
 3. 20-minute fire-rating:
 - a. Positive Pressure: Category A (concealed intumescent).
 - 1) Structural Composite Lumber; SCL-20
 - 2) Staves with one species per core; SLC-20
 4. 45, 60, or 90-minute mineral core fire-rated as noted.
 - a. Category A (concealed intumescent).
 5. Acoustical:
 - a. Sound Transmission Class (STC) specified shall be certified by manufacturer based on tests conducted at independent testing agency in accord with ASTM E90-09 and E413-10 (earlier tests are not acceptable).
 - b. Acoustical doors with lites shall be factory glazed to maintain STC rating.
 - c. Provide STC ratings as indicated.
 6. Fire rated doors are indicated in Door Schedule.
- C. Lite and Astragal Details
1. Lite openings shall be furnished with same species wood lite beads.
 2. Metal astragals and door edge may be used for pairs of fire doors.
- D. Vertical Edges (Stiles)
1. Non-rated and 20-minute rated doors shall have edges to match face veneer.
 2. 20-minute rated pairs (No metal edges or astragal required).
 - a. Manufacturer's standard as required for fire approval. (May include veneer banding with structural composite lumber backers or inner plies).
 3. Fire Resistant Composite Core

- a. Manufacturer's standard as required for fire approval. Veneered edge of matching/compatible veneer to face veneer.
- E. Horizontal Edges (Rails)
 - 1. Manufacturer's standard. (MDF top and bottom rails not permitted).
 - 2. Meet positive pressure ratings.
- F. Adhesives
 - 1. Face Adhesive: Type 1
- G. Inner Blocking For Fire Resistant Composite Core Fire Doors
 - 1. Supply hardware reinforcement for surface applied hardware where required by manufacturer to eliminate use of through bolts.
- H. Machining
 - 1. Factory fit and machine doors for frame and finish hardware in accord with hardware and NFPA 80 requirements and dimensions.
 - 2. Do not machine for surface hardware. Apply appropriate fire labels.
 - 3. Do not trim positive pressure rated doors for width.

2.4 ACCESSORIES

- A. Glazing Stops
 - 1. Non-Rated and 20 minute: Manufacturer's Standard Metal Vision Frames.
 - 2. Fire-Rated 45 minutes and above:
 - a. Manufacturer's Standard Metal Vision Frames.
 - b. Verify compatibility of glazing system with positive pressure requirements.
 - 4. Verify compatibility of glazing system with positive pressure requirements.
 - 5. Glazing per Section 08 80 00 – Glazing.
- B. Glass and Glazing in Wood Doors: Provided by manufacturer.
- C. Meeting Edges For Pairs Of Fire Rated Doors
 - 1. Metal edge and astragal or metal edges.
 - 2. Meet positive pressure requirements for Category A (concealed intumescent).
- D. Applied Moldings
 - 1. As selected from manufacturer's standard profiles and install as detailed.
 - 2. Applied moldings to be affixed to doors without use of nails or staples. No visible fasteners are permitted.

2.5 FACTORY FINISH

- A. Doors to be factory finished shall meet WDMA I.S. 1-A-04 specifications for TR-6 catalyzed polyurethane finish system or AWS section 5 specifications for UV curable polyester urethane finish system.
- B. Factory Finish (Basis of Design): Eggers' Gardall - water based stain and UV curable polyester urethane finish system complying with applicable Federal and State regulations for Volatile Organic Compounds (VOC) and Hazardous Air Pollutants (HAP) emission limitations per EPA Clean Air Act.
- C. Stain color shall be selected by Architect from manufacturer's standard colors that match existing wood door finish.
- D. Submit approved samples for factory finishing.
- E. Factory finished doors to be installed just prior to substantial completion.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify substrate opening sizes and tolerances are acceptable and ready to receive work. Notify Contractor/CM of any conditions preventing successful installation.
- B. Do not install doors in frame openings that are not plumb or are out of tolerance for size or alignment. Start of installation indicates installer's acceptance of conditions.
- C. Use three hinges for doors 7'-6" (2.286 m) in height or less and one additional hinge for each incremental 30" (76.2 cm) of height over 7'-6" (2.286 m).

3.2 INSTALLATION

- A. Install fire-rated and non-rated doors in accord with NFPA 80, Manufacturers' printed instructions and ITS-WH/UL requirements.
- B. Trim non-rated door width by cutting equally on both jamb edges.
- C. Trim door height by cutting bottom edges to a maximum 0.75" (19 mm).
- D. Trim fire door height at bottom edge only, in accord with fire rating requirements. Allow fitting clearance of 0.125" (3.33 mm) at each side and at top of door.
- F. Do not trim Positive Pressure rated doors for width.
- G. Pilot drill screw and bolt holes using templates provided by hardware manufacturer. Use threaded through bolts for half surface hinges.
- H. Exercise caution when drilling pilot holes and installing hinges to ensure pilot holes are not over-drilled and screws are not over-torqued. Follow Manufacturer's printed installation instructions for Positive Pressure doors. Do not use self-drilling or combination wood/metal screws on wood doors.
- I. Coordinate installation of doors with installation of frames and hardware.
- J. Coordinate installation of glass and glazing.
- K. Install door louvers and light kits plumb and level.
- L. Reseal or refinish any doors that require site alteration.

3.3 WARRANTY TOLERANCES

- A. Conform to WDMA standards and testing methods for warp, cup, bow and telegraphing.

3.4 ADJUSTING

- A. Adjust doors and hardware for proper function, smooth operation, proper latching and balanced door movement, without force or excessive clearances.

3.5 CLEANING

- A. Clean doors immediately after installation in accord with manufacturer's written Care and Handling Instructions.

3.6 PROTECTION

- A. Protect installed doors from damage.
- B. Replace or repair doors damaged during construction, as directed by Architect.

END OF SECTION

SECTION 08 41 13
ALUMINUM STOREFRONT SYSTEM

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

- A. The provisions of the General Conditions, Supplementary Conditions, Drawings, Specifications, and the Sections included under Division 1, General Requirements and References are included as a part of this Section as though bound herein.

1.2 SUMMARY

- A. Provide labor, materials, services, and equipment necessary to furnish and install work as indicated and as specified herein, which includes, but is not limited to:
 - 1. Aluminum storefront door and window systems.
 - 2. Hardware for aluminum doors will be furnished under Specification Section–Door Hardware, except continuous gear hinges, but installed under this Section.

1.3 REFERENCES

- A. AA (Aluminum Association) – Designation System for Aluminum Finishes
- B. AAMA Series number 11 – Design Wind Loads for Buildings and Boundary Layer Wind Tunnel Testing
- C. AAMA 101 – Standard Specification for Window, Doors, and Skylights
- D. AAMA 200 – Standard Practice for the Installation of Windows with Frontal Flanges for Surface Barrier Masonry Construction
- E. AAMA 502-08 – Voluntary Specification for field Testing of Newly Installed Fenestration Products
- F. AAMA 511 – Voluntary Guideline for Forensic Water Penetration Testing of Fenestration Products
- G. AAMA 606.1 – Voluntary Guide Specifications and Inspection Methods for Integral Color Anodic Finishes for Architectural Aluminum
- H. AAMA 607.1 – Voluntary Guide Specification and Inspection Methods for Clear Anodic Finishes for Architectural Aluminum
- I. AAMA 608.1 – Voluntary Guide Specification and Inspection Methods for Electrolytically Deposited Color Anodic Finishes for Architectural Aluminum
- J. AAMA 701/702 – Combined Voluntary Specifications for Pile Weather-stripping and Replaceable Fenestration Weatherseals
- K. AAMA 1503.1 – Voluntary Test Method for Thermal Transmittance and Condensation Resistance of Windows, Doors and Glazed Wall Sections
- L. ASCE 7 – Minimum Design Loads for Buildings and other Structures
- M. ASTM A123/A123M – Standard Specification for Zinc (Hot Dip Galvanized) Coatings on Iron and Steel Products
- N. ASTM B209 – Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate
- O. ASTM B221 – Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes
- P. ASTM C509 – Standard Specification for Elastomeric Cellular Preformed Gasket and Sealing Material

- Q. ASTM D2000 – Standard Classification System for Rubber Products in Automotive Applications
- R. ASTM D2287 – Standard Specification for Non-rigid Vinyl Chloride Polymer and Copolymer Molding and Extrusion Compounds
- S. ASTM E283 – Standard Test Method for Determining the Rate of Air Leakage Through Exterior Windows, Curtain Walls and Doors Under Specified Pressure Differences Across the Specimen
- T. ASTM E330 – Standard Test Method for Structural Performance of Exterior Windows, Doors, Skylights and Curtain Walls by Uniform Static Air Pressure Difference
- U. ASTM E331 – Standard Test Method for Water Penetration of Exterior Windows, Skylights, Doors, and Curtain Walls by Uniform Static Air Pressure Difference
- V. ASTM E1105 – Standard Test Method for Field Determination of Water Penetration of Installed Exterior Windows, Skylights, Doors, and Curtain Walls by Uniform or Cyclic Static Air Pressure Difference
- W. ASTM F588 – Standard Test Methods for Measuring the Forced Entry Resistance of Window Assemblies, Excluding Glazing Impact
- X. FED L-S-125B – Screening, Insect, Nonmetallic
- Y. FED RR-W-365A – Wire Fabric (Insect Screening)
- Z. FBC – Florida Building Code 6th Edition
- AA. Current Florida Building Code Product Approval

1.4 SUBMITTALS

- A. Product Data: For each product specified include details of construction relative to materials, dimensions of individual components, profiles, manufacturer's specifications and catalog cuts, and finishes. Provide structural test reports that meet all hurricane and impact resistant codes and requirements.
- B. Shop drawings shall show elevations of each door type, door construction details and methods of assembling sections, hardware locations and installation methods, dimensions, and shapes of materials, anchorage and fastening methods, weatherstripping, and finish requirements.
 - 1. Provide schedule of doors and frames using same reference numbers for details and openings as those on Contract Drawings and Schedules.

1.5 PERFORMANCE REQUIREMENTS FOR EXTERIOR STOREFRONT AND WINDOW SYSTEMS

- A. Performance Requirements: Provide aluminum curtain wall systems that comply with performance requirements indicated, as demonstrated by testing manufacturer's assemblies in accordance with South Florida Building Code Test Protocols TAS 201, TAS 202 and TAS 203.
 - 1. Air Infiltration: Completed storefront systems shall have 0.06 CFM/FT² (1.10 m³/h·m²) maximum allowable infiltration when tested in accordance with ASTM E 283 at differential static pressure of 6.24 psf (299 Pa).
- B. Water Infiltration: No uncontrolled water when tested in accordance with ASTM E 331 at test pressure differential of: 12 PSF (575 Pa) (or when required, field tested in accordance with AAMA 503). Fastener Heads must be seated and sealed against Sill Flashing on any fasteners that penetrate through the Sill Flashing.
- C. Wind Loads: Completed storefront system shall withstand wind pressure loads normal to wall plane indicated on structural drawings.

- D. Deflection: Maximum allowable deflection in any member when tested in accordance with ASTM E 330 with allowable stress in accordance with AAMA Specifications for Aluminum Structures.
 - 1. Without Horizontals: $L/175$ or $3/4"$ (19.1mm) maximum.
 - 2. With Horizontals: $L/175$ or $L/240 + 1/4"$ (6.4mm) for spans greater than 13'-6" (4.1m) but less than 40'-0" (12.2m).
- E. Thermal Movement: Provide for thermal movement caused by 180 degrees F. (82.2 degrees C.) surface temperature, without causing buckling stresses on glass, joint seal failure, undue stress on structural elements, damaging loads on fasteners, reduction of performance, or detrimental effects.

1.6 PERFORMANCE REQUIREMENTS FOR INTERIOR STOREFRONTS

- A. Deflection: Maximum allowable deflection in any member when tested in accordance with ASTM E 330 with allowable stress in accordance with AAMA Specifications for Aluminum Structures.
 - 1. Without Horizontals: $L/175$ or $3/4"$ (19.1 mm) maximum.
 - 2. With Horizontals: $L/175$ or $L/240 + 1/4"$ (6.4 mm) for spans greater than 13'-6" (4.1 m) but less than 40'-0" (12.2 m).
- B. Thermal Movement: Provide for thermal movement caused by 180 degrees F. (82.2 degrees C.) surface temperature, without causing buckling stresses on glass, joint seal failure, undue stress on structural elements, damaging loads on fasteners, reduction of performance, or detrimental effects.

1.7 QUALITY ASSURANCE

- A. Doors shall be provided to conform to the Florida Building Code. These requirements supersede Technical Specifications in this Section.
- B. Provide test reports from AAMA Accredited Laboratories.
- C. System shall conform to large and small impact requirements.

1.8 PROJECT CONDITIONS

- A. Field Measurements: Check openings by accurate field measurement before fabrication. Show recorded measurements on shop drawings. Coordinate fabrication schedule with construction progress to avoid delay of the work.

1.9 EHPA REQUIREMENTS (for use only if an EHPA designated area is indicated)

- A. Storefront systems that are indicated to be provided in an EHPA shelter area shall be designed and modified if necessary and installed to comply with structural design loads and all applicable codes. Documentation shall be provided indicating compliance with requirements.

PART 2 – PRODUCTS

2.1 MANUFACTURERS

- A. Basis of Design Product: Subject to compliance with requirements provide the following manufacturer.
 - 1. YKK North America

- B. The following manufacturers are acceptable provided they equal or exceed the material requirements and functional qualities of the basis of design product.
1. Tubelite Division of Indal, Inc., Reed City, Michigan
 2. Wausau Metals Corp., Wausau, Wisconsin
 3. EFCO Corp., Monett, Missouri

2.2 STOREFRONT SYSTEM

- A. Basis of Design
1. Storefront Door
 - a. Basis of Design: YHS 50H medium stile impact system with insulated impact resistant glazing.
 - b. FPA-FL #16554.4.
 2. Storefront Wall and Window System
 - a. Basis of Design: YHS 50 TU, thermally broken impact system with insulated impact resistant glazing.
 - b. FPA – FL #14218.10.

2.3 MATERIALS AND CONSTRUCTION

- A. Sections shall be extruded from 6063-T5 aluminum alloy (A.S.T.M. B221 Alloy GS 10A T5).
- B. Major portions of the door stiles shall be .125 inch in thickness, and glazing molding shall be .050 inch thick.
 1. Mullions shall be as detailed on Drawings and as required for type of door being furnished.
- C. Screws, miscellaneous fastening devices, and internal components shall be of stainless steel, plated, or corrosion-resistant materials of sufficient strength to perform the functions for which they are used.
- D. Wide Stile: Vertical stiles shall be 5 inches, top rail 6-1/2 inches, and bottom rail 10 inches. Corner construction shall consist of both sigma deep penetration and sigma fillet welds and mechanical fastening. Inside joints between the top rail and vertical stiles shall have a continuous bead of sealant. Interior glazing stops shall be square snap-in type with neoprene bulb type glazing. Square stops on exterior side shall be lock-in tamperproof type. No exposed screws shall be required to secure stops.
- E. Door shall be weatherstripped on 3 sides with metal backed pile cloth installed in the door and/or frame. An adjustable weatherstrip astragal with stainless steel backing shall be provided at the meeting stiles of a pair of doors.
 1. Provide compression weatherstripping at fixed stops. At other locations, provide sliding weatherstripping retained in adjustable strip mortised into door edge.
- F. Doors shall have a portion of the top rail closed for mounting security door contacts.
- G. Where aluminum doors are scheduled to receive a concealed overhead stop, the jamb bracket shall be mortised into the frame and the channel mortised into the top of the door. The cut for the arm on the stop side of the door shall not be cut below the stop strip of the frame.
- H. All dissimilar metals must be properly insulated to prevent galvanic action.
- I. All exposed fasteners shall be aluminum or stainless steel.
- J. All aluminum extrusions shall have a minimum wall thickness of .080" and comply with ASTM B221 (ASTM B221M), 6063-T5 Aluminum Alloy.
- K. All units to be "dry-glazed" with EPDM gasket to accept impact rated glass.

2.4 SILL PAN AT EXTERIOR STOREFRONT

- A. Provide .125 inch aluminum sill pan with ¼" upturn at inside edge.
- B. Finish shall match storefront system.

2.5 ENTRANCE DOOR HARDWARE

- A. General:
 - 1. Provide hardware that is compliance with the Miami Dade NOA and/or Florida Product Approval.
 - 2. Opening-Force Requirements:
 - a. Egress Doors: Not more than 8.5 lbf to open the door to its minimum required width.
- B. Opening-Force Requirements:
 - 1. Latches and Exit Devices: Not more than 5 lbf required to release latch.
- C. Pivot Hinges: BHMA A156.4, Grade 1.
 - 1. Offset-Pivot Hinges: Provide top, bottom, and intermediate offset pivots at each door leaf.
- D. Manual Flush Bolts: BHMA A156.16, Grade 1.
- E. Mortise Auxiliary Locks: BHMA A156.5, Grade 1.
- F. Panic Exit Devices: BHMA A156.3, Grade 1, listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for panic protection, based on testing according to UL 305.
- G. Cylinders: To match cylinder manufacturer as specified in 08 71 00 "Door Hardware".
- H. Strikes: Provide strike with black-plastic dust box for each latch or lock bolt; fabricated for aluminum framing.
- I. Operating Trim: BHMA A156.6.
- J. Closers: BHMA A156.4, Grade 1, with accessories required for a complete installation, sized as required by door size, exposure to weather, and anticipated frequency of use; adjustable to meet field conditions and requirements for opening force.
- K. Door Stops: BHMA A156.16, Grade 1, floor or wall mounted, as appropriate for door location indicated, with integral rubber bumper.
- L. Weather Stripping: Manufacturer's standard replaceable components.
 - 1. Compression Type: Made of ASTM D 2000, molded neoprene, or ASTM D 2287, molded PVC.
 - 2. Sliding Type: AAMA 701, made of wool, polypropylene, or nylon woven pile with nylon-fabric or aluminum-strip backing.
- M. Weather Sweeps: Manufacturer's standard exterior-door bottom sweep with concealed fasteners on mounting strip.
- N. Silencers: BHMA A156.16, Grade 1.
- O. Thresholds: BHMA A156.21, raised thresholds beveled with a slope of not more than 1:2, with maximum height of 1/2 inch.

2.6 FABRICATION

- A. General: Fabricate components that, when assembled, will have accurately fitted joints with ends coped or mitered to produce hairline joints free of burrs and distortion. After fabrication, clearly mark components to identify their locations in Project according to shop drawings.
- B. Forming: Form shapes with sharp profiles, straight and free of defects or deformations, before finishing.

- C. Entrances: Fabricate door framing in profiles indicated. Reinforce as required to support imposed loads. Factory-assemble door units and factory install hardware to greatest extent possible. Reinforce door units as required for installing hardware indicated. Cut, drill, and tap for factory installed hardware before finishing components.
 - 1. Interior Doors: Provide ANSI/BHMA A156.16 silencers at stops to prevent metal to metal contact. Provide 3 silencers on strike jamb of single door frames and 2 silencers on head of double door frame.
- D. Storefront frames: Unless otherwise noted on drawings.
 - 1. Depth of frame as required for applicable wind loading.
 - 2. Frame components shall be shear block construction.

2.7 ALUMINUM FINISHES

- A. Clear Anodic Finish: AAMA 611, AA-M12C22A31, Class II, 0.010 mm or thicker.

PART 3 – EXECUTION

3.1 PREPARATION

- A. Openings for aluminum entrances and storefronts shall be prepared to the proper size, plumb, square, level, and in the proper location and alignment as shown on the Architect's Drawings and the final shop drawings.

3.2 INSTALLATION

- A. Aluminum doors shall be securely installed according to the manufacturer's recommendations, and operating hardware shall be checked for proper function and adjustment.
- B. Install entrances plumb and true in alignment with established lines and grades without warp or rack. Lubricate operating hardware and other moving parts according to hardware manufacturer's written instructions.
 - 1. Install surface mounted hardware according to manufacturer's written instructions using concealed fasteners to greatest extent possible.
- C. Install glazing to comply with requirements of Section – Glazing, unless otherwise indicated.
- D. Do not cut aluminum frame stop strip when mounting exit devices and closers.
- E. Provide conduits at frames and card reader locations to accommodate the future installation of card readers at doors indicated on the finish schedule. Conduits shall be run to 6" above the finished ceiling height and accessible to ceiling space.

3.3 ADJUSTING AND CLEANING

- A. Adjust doors and hardware to provide tight fit at contact points and weatherstripping, smooth operation, and weathertight closure.

3.4 PROTECTION

- A. Protect the aluminum doors and their finish against damage from construction activities and harmful substances. Clean the aluminum surfaces as recommended for the type of finish applied.

END OF SECTION

SECTION 08 71 00
DOOR HARDWARE

PART 1 GENERAL

1.1 RELATED DOCUMENTS

- A. The provisions of the General Conditions, Supplementary Conditions, Drawings, Specifications, and the Sections included under Division 1, General Requirements and References are included as a part of this Section as though bound herein.

1.2 SECTION INCLUDES

- A. Provide labor, material, services, and equipment necessary to furnish and install work as indicated and as specified herein, which includes, but is not limited to:
 - 1. Hardware for wood and hollow steel doors.
 - 2. Lock Cylinders for gates, folding partitions, wire cages, and doors.
 - 3. Thresholds.
 - 4. Gaskets.
 - 5. Screws, bolts, expansion shields and related prep work.
 - 6. Hardware layout templates.
 - 7. Keys key cabinet and Knox Box.

1.3 RELATED WORK

- A. Section 01 25 13 – Product Substitution Procedures.
- B. Section 01 31 00 – Project Coordination.
- C. Section 01 33 00 – Submittal Procedures.
- D. Section 01 42 00 – References.
- E. Section 01 45 00 – Quality Control.
- F. Section 01 74 00 – Cleaning and Waste Management.
- G. Section 01 78 00 – Closeout Submittals.
- H. Section 08 11 13 – Hollow Metal Doors and Frames.
- I. Section 08 14 29 – Prefinished Wood Doors.
- J. Section 08 41 00 – Entrances and Storefronts.

1.4 REFERENCES

- A. See Section 01 42 00 – References for additional reference standards, abbreviations, definitions, and acronyms.
- B. ANSI A117.1 - Specifications for Making Buildings and Facilities Accessible to and Usable by Physically Handicapped People.
- C. ANSI/NFPA 80 - Fire Doors and Windows.
- D. AWI - Architectural Woodwork Institute.
- E. BHMA - Builders' Hardware Manufacturers Association.
- F. DHI - Door and Hardware Institute.
- G. Florida Fire Prevention Code.
- H. NAAMM – National Association of Architectural Metal Manufacturers.
- I. NFPA 101 – Life Safety Code, Current Edition.
- J. SDI – Steel Door Institute.

K. Florida Building Code (FBC), 5th Edition.

1.5 COORDINATION

A. Coordinate hardware installation with other affected trades in accord with Section 01 31 00 – Project Coordination.

1.6 QUALITY ASSURANCE

- A. Manufacturers: Company shall specialize in manufacturing door hardware with five years continuous experience.
- B. Hardware Supplier: Company shall specialize in supplying institutional door hardware with five years continuous documented experience, approved by manufacturer.
- C. Hardware Supplier Personnel: Employ Architectural Hardware Consultant (AHC) on project.

1.7 REGULATORY REQUIREMENTS

- A. Conform to Florida Building Code for requirements applicable to fire rated doors, frames, and accessibility for physically disabled.
- B. Conform to Florida Fire Prevention Code and applicable sections of NFPA 101.

1.8 CERTIFICATIONS

- A. Architectural Hardware Consultant shall inspect complete installation and certify that hardware and installation has been furnished and installed in accord with manufacturer's printed instructions and as specified.
- B. Provide two copies of certifications to Architect.

1.9 SUBMITTALS

- A. Submit schedules, samples, parts lists, templates, installation instructions and product data per Section 01 33 00 – Submittals.
- B. Submittals shall identify each door and each set number following numbering system noted on Drawings.
- C. Manufacturing order shall not be placed until hardware schedule has been submitted and reviewed by Architect.
- D. Furnish templates to facilitate work schedule.
- E. Indicate locations and mounting heights of each type of hardware.
- F. Submit samples of hinge, latch set, exit device, door closer, thresholds, illustrating style, color, and finish.
- G. Project samples may be incorporated in Work.
- H. Submit manufacturer, supplier, fabricator, and installer's qualifications in accord with Section 01 33 00 – Submittal Procedures.

1.10 OPERATION AND MAINTENANCE DATA

- A. Submit operation and maintenance data in accord with Section 01 78 00 – Closeout Submittals.
- B. Include data on operating hardware, and inspection procedures related to preventative maintenance.

1.11 DELIVERY, STORAGE, AND HANDLING

- A. Deliver, store, and protect products in original packaging to site in accord with Section 01 66 00 – Project Storage and Handling Requirements.
- B. Hardware Packaging
 - 1. Items shall be individually labeled and identified with door opening code and hardware group to match hardware schedule.
 - 2. Each item shall identify door location by number identified on Door Schedule.
- C. Hardware manufacturers shall deliver via security shipping following items to District Maintenance Dept., 2485 SE Dixie Hwy., Stuart, FL 34996:
 - 1. Two copies of factory key biting schedule.
 - 2. Permanent building keys and construction key voiding devices.
- D. Protect hardware from theft by cataloging and storing in secured area.

1.12 WARRANTY

- A. Provide five-year warranty period in accord with Section 01 78 00 - Closeout Submittals for locksets, latch sets, exit devices hinges and items listed in the hardware schedule excluding overhead door closers.
- B. Provide ten-year warranty period in accord with Section 01 78 00 - Closeout Submittals for overhead door closers.

1.13 MAINTENANCE MATERIALS

- A. Provide special wrenches and tools applicable to different or special hardware component.
- B. Provide maintenance tools and accessories supplied by hardware component manufacturer.

PART 2 – PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

- A. Manufacturers not listed may submit requests for substitution except as noted in accord with Section 01 25 13 – Product Substitution Procedures.
- B. Obtain each kind of hardware from one manufacturer.
- C. Acceptable products and manufacturers are listed below:
 - 1. Hinges: Ives, Hager, Stanley, Bommer.
 - 2. Locks and Latches: Best Access (No Substitution Permitted).
 - 3. Cylinders, Keys, Keying: Corbin/Russwin (No Substitution Permitted).
 - 4. Exit Devices: Von Duprin (No Substitution Permitted).
 - 5. Removable Mullions: Von Duprin (No Substitution Permitted).
 - 6. Door Closers: LCN (No Substitution Permitted).
 - 7. Overhead Stops/holders: Glen Johnson, Rixon.
 - 8. Wall/Floor Stops/Flush Bolts: Ives, Rockwood, Glen Johnson.
 - 9. Kick Plates: Ives, Rockwood, Quality.
 - 10. Thresholds/Weatherstripping: National Guard, Zero, Pemko.
 - 11. Silencers: Ives, Rockwood, Quality, Glen Johnson.
 - 12. Push/Pulls: Quality, Rockwood.
 - 13. Key Cabinet: Lund, Key Control, Telkey.

2.2 HARDWARE FINISH

- A. Hardware shall have the following finishes:
 - 1. Exterior Hinges: Stainless Steel (32D).
 - 2. Interior Hinges/Locks/Exit Devices/Overhead Holders: Satin Chrome (26D).
 - 3. Door Closers: Aluminum.
 - 4. Flat Goods: Stainless Steel (32D) or Satin Chrome (26D).
 - 5. Thresholds: Mill Finish Aluminum.

2.3 HINGES AND PIVOTS

- A. Exterior butts shall be stainless steel (32D). Butts on all out-swinging doors shall be furnished with non-removable pins (NRP). Size: 4½" wide x 4½" high, for exterior doors up to 42" wide and heavy weight 4½" wide x 4½" high hinges for doors over 42" wide.
- B. Interior butts shall be steel, standard weight 4½" wide x 4½" high hinges doors up to 42" wide and heavy weight 4½" wide x 4½" high hinges for doors over 42" wide.
- C. Doors less than 5'-0" high shall have two (2) butts. Furnish one (1) additional butt for each 2'-6" of height or fraction thereof.

2.4 KEYING

- A. Pre-Order Meeting: Hardware supplier shall meet with District's Maintenance Lock Dept. Representative to establish keying order before lock order is placed.
- B. Locks shall be construction master keyed using split key method keyed to School District's restricted keyway.
- C. Hardware supplier shall meet with District's Maintenance Lock Dept. Representative will establish final count of locks and cylinders and transmit release order to Best Access Systems Lock Company for production in amounts established with Hardware Supplier.
- D. Construction keys in following quantities:
 - 1. 12 master keys
- E. Supply permanent keys in following quantities:
 - 1. Six keys for each lock with maximum of 12 keys of keyed alike sets.
 - 2. Five master keys for each building or area grouping. Key groups include:
 - a. Auditorium/Multipurpose/Stage (including adjacent support spaces).
 - b. Food Service (including Kitchen and adjacent support spaces).
 - c. Media Center (including adjacent support spaces).
 - d. Administrative Offices (including adjacent support spaces).
 - e. Classrooms, Resource Rooms and Labs (including adjacent storage area) subdivided into subgroups by floor level or building(s).
 - f. Mechanical/Electrical Rooms.
 - g. Custodial/Receiving Areas.
 - 3. Grand master keys shall be supplied based on size of facility as follows:
 - a. Five (5) Grandmaster keys for Elementary Schools and Ancillary Projects.
 - b. Ten (10) Grandmaster Keys for Middle Schools.
 - c. Twenty (20) Grandmaster keys for High Schools.
 - 4. Keys shall be stamped "DO NOT DUPLICATE".
- F. Key Function
 - 1. Supply locksets with following key functions:

Location	Function
a. Passage	N

- b. Privacy L
- c. Classroom/Office R
- d. Storage/Mechanical Rm D
- e. Electronic Lever Lockset DEL

2.5 KEY CABINETS

- A. Key Cabinet: Lund 1203 with pin tumbler lock.
- B. Cabinet Size: Size for project keys plus 10% spare capacity.
 - 1. Horizontal metal strips for key hook labeling with clear plastic strip cover over labels.
 - 2. Finish: Baked enamel finish, gray color.
- C. Attach key legend in key cabinet with 5-way cross-reference system indicating keyset number, FISH Room number, key code number, hook number and key description.

2.6 KEY VAULT

- A. Recessed Key Vault: Knox Company, Series 4400 Know-Vault, Model 4400-R.
- B. Key Vault shall be keyed to Owner's key system and will be Owner provided.
- C. Manufacturer: Knox Company. Key box shall meet criteria of fire department having jurisdiction at project location.

2.7 CLOSER/MAGNETIC HOLD OPEN SYSTEM

- A. LCN, Series No: 4041.
- B. Furnish closer/electromagnet compete with required accessories necessary for complete working system.
- C. Furnish two-year warranty.

2.8 LOCKSETS

- A. Lever Lock: Best Access Lock Company, heavy duty cylindrical type, Best 93K Series, Lever Design 15D.
- B. Electronic Lever Lock: Best Access Lock Company, heavy duty cylindrical type, Best 93KW7DEU, Lever Design 15D.

2.9 EXIT DEVICES

- A. Von Duprin 98 Series in types and functions listed.
- B. Devices shall be listed under "Panic Hardware" in accident equipment list of Underwriter Laboratories. Fire ratings shall be attached where indicated per UL requirements.
- C. Exit devices shall be tested per ANSI/BHMA A156.3 by BHMA certified testing laboratory. Provide written certification of 1,000,000 cycle testing per Section 01 33 00 – Submittals.
- D. Supply locksets with following key functions:

Location	Function
1. Non Fire Rated	19R NLP, 19R DT, or 19R BE with 560 strike as required.
2. Fire Rated	F19R SE or F19R BE with 570 strike as required.
3. Non Fire Rated (Pairs)	19R NLP, 19R DT, or 19R BE with 570 strike as required.

- 4. Fire Rated (Pairs) F19R SE or F19R BE with 570 strike and F4023 mullion as required.
- 5. Fire Rated (Electronic) ELX981-F X 992L X 06 X 26D.
- 6. Non-fire Rated (Electronic) SD ELL X 98NL X 990NL X 06 X 26D.
- 7. Power Supply PS873B X 4TD
- E. Electrical Power Transfer: EPT-10 X SP28.
- F. Surface strikes shall be roller type with plate underneath to prevent movement and dead-latching feature to prevent latchbolt tampering.

2.10 DOOR CLOSERS

- A. Door closers shall be LCN 4040/4041 Series with non-ferrous covers, forged steel arms, separate valves for adjusting backcheck closing and latching cycles and adjustable spring to provide up to 50% increase in spring power.
- B. Furnish closers with parallel arm mounted on door openings into egress spaces, mounted to permit 180 degree door swing where wall conditions permit, and have non-hold open arms unless otherwise noted.
- C. Door closer cylinders shall be high strength cast iron construction.
- D. Door closers shall be tested in accord with ANSI/BHMA A156.4 by BHMA certified testing laboratory and attest in writing that closers have successfully completed one million cycles.
- E. Door closers shall utilize temperature stable fluid capable of withstanding temperature ranges of 120° F (49°C) to -30°F (-34°C), without requiring seasonal adjustment of closer speed to properly close door.
- F. Closers for fire rated doors shall be provided with temperature stabilizing fluid complying with UCB 7-2 (1997) and UL 10C.
- G. Door closers shall incorporate tamper resistant non-critical screw valves of V-slot design to reduce clogging from particles within closer.
- H. Closers shall have separate and independent screw valve adjustments for latch speed, general speed, and hydraulic backcheck.
- I. Backcheck shall be located to effectively slow swing of door at minimum of 10 degrees in advance of dead stop location to protect door frame and hardware from damage.

2.11 DOOR TRIM

- A. Push/pull plates, armor plates, and kick plates shall be .050 gage stainless steel with US32D finish.
- B. Plates shall be two (2") less than door width with beveled edges, sized as follows:
 - 1. Push and pull plates shall be 4" wide x 16" high mounted 42" from door bottom.
 - 2. Armor plates shall be 36" high less than door width mounted 2" from door bottom.
 - 3. Kick plates 10" high x 2" less than door width mounted 2" from door bottom.

2.12 DOOR STOPS

- A. Door stops shall be furnished for doors to prevent door and hardware damage. Wall bumpers are preferred. Provide floor stops where wall bumpers are not practical. Where neither wall nor floor stops are practical, use surface mounted overhead stops as follows:
 - 1. Wall Stops: Ives WS407CVX Series.
 - 2. Floor Stops: Ives FS436 or FS438.
 - 3. Overhead Stops: Glynn Johnson 450 Series (Interior) and 900 Series (Exterior).

2.13 THRESHOLDS, WEATHERSTRIPPING AND SEALS

- A. Thresholds and weatherstripping shall be as listed in Hardware Schedule.

2.14 DOOR SILENCERS

- A. Door Silencers: Ives SR64 Two (2) per door pair and three (3) per single door frame.

2.15 AUTOMATIC FLUSH BOLTS, SURFACE BOLTS AND COORDINATORS

A. Door Bolts:

1. Manufacturer; H. B. Ives.
 - a. Non Fire-rated: 454-f26D 8".
 - b. Fire-rated: 456-B26D.
2. Manufacturer: Glynn Johnson:
 - a. Non Fire-rated: 1631 or 1632.
 - b. Fire-rated: FB7 or FB8.
3. Manufacturer; DCI.
 - a. Non Fire-rated: 1008-US26D.
 - b. Fire-rated: 842-US26D.

B. Coordinators:

1. Manufacturer: Monarch, B-1277 with B-1278 opening bar.
2. Manufacturer: H. B. Ives, 469-B26D with 478 carry bar.
3. Manufacturer: DCI, 500 with carry bar.

2.16 OVERHEAD RAIN DRIP

- A. Rain Drip: Pemko 346PW at exterior HM Steel door locations or as scheduled herein.

PART 3 – EXECUTION

3.1 INSPECTION

- A. Verify that doors and frames are ready to receive work and dimensions are as indicated on shop drawings.
- B. Beginning of installation shall indicate installer's acceptance of existing conditions.

3.2 INSTALLATION

- A. Install hardware in accord with manufacturer's instructions and requirements of DHI.
- B. Use templates provided by hardware item manufacturer.
- C. Mounting heights for hardware from finished floor to center line of hardware item:
 1. Locksets: 38"
 2. Push/Pulls: 42"
 3. Dead Locks: 48"
 4. Exit Devices: 40"
- D. Conform to of Florida Bldg. Code: Accessibility, 5th Edition.
- E. Set door thresholds in full bed of butyl rubber.

3.3 ADJUST AND CLEAN

- A. Adjust and check operation of each item of hardware and door, to ensure proper function of every item.
- B. Replace items that cannot be adjusted to operate freely and smoothly.
- C. Final adjustment shall be made after ventilating systems are in operation.
- D. Clean hardware and adjacent surfaces after hardware installation.
- E. Instruct Owner's personnel in adjustment and maintenance of hardware and hardware finishes.

3.4 PROTECTION

- A. Protect installed hardware from damage.
- B. Replace damaged hardware.

3.5 HARDWARE SCHEDULE

- A. Attached Schedule is furnished for guidance in preparing Bidder's cost proposal and should not be considered as totally inclusive.
- B. Bidders shall use drawings to prepare hardware quantities. Variations between this schedule and drawings shall be communicated to Architect for resolution.
- C. Quantities listed are for each pair of doors or for each single door.
- D. Hardware Schedule was prepared by: Hardware Consultant's Name, Address, FAX and Phone Number and email address.
- E. Index of Manufacturers:
 - 1. Corbin/Russwin: NGP.
 - 2. Glynn-Johnson: BLY.
 - 3. Hager: HAG.
 - 4. Ives: IVE.
 - 5. LCN Closers: LCN.
 - 6. Best: BES.
 - 7. Von Durprin: VON.
 - 8. Pemko: PEM
 - 9. B/O: supplied by other trades.
- F. Hardware Group Schedules

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Hardware Group No. 06 – Exterior-Card Access

For use on Door #(s):

Provide each SGL door(s) with the following:

QT		DESCRIPTION	CATALOG NUMBER		FINIS	MFR
Y					H	
3	EA	HINGE	5BB1 4.5 X 4.5 NRP		630	IVE
1	EA	POWER TRANSFER	EPT10		⚡ 689	VON
1	EA	ELEC PANIC HARDWARE	RX-EL-9947-NL-OP-110MD		⚡ 626	VON
1	EA	RIM CYLINDER	1E62		626	BES
1	EA	SURFACE CLOSER	4040XP SCUSH		689	LCN
1	EA	PA MOUNTING PLATE	4040-18PA		689	LCN
1	EA	POWER SUPPLY	PS914 900-2RS		⚡ LGR	VON

HURRICANE CODE COMPLIANT OPENING. BALANCE OF HARDWARE BY DOOR MANUFACTURER. CARD ACCESS SYSTEM AND CARD READER TO BE SUPPLIED BY DIV.28

Hardware Group No. 15 – CARD ACCESS

For use on Door #(s):

Provide each SGL door(s) with the following:

QT		DESCRIPTION	CATALOG NUMBER		FINIS	MFR
Y					H	
3	EA	HINGE	5BB1 4.5 X 4.5 NRP		652	IVE
1	EA	STOREROOM LOCK	T581BDC DANE		626	FAL
1	EA	PERMANENT CORE	I.C.CORE		626	BES
1	EA	ELECTRIC STRIKE	6211 FSE		⚡ 630	VON
1	EA	SURFACE CLOSER	4040XP REG OR PA AS REQ		689	LCN
1	EA	WALL STOP	WS406/407CVX		630	IVE

BALANCE OF HARDWARE BY DOOR MANUFACTURER. CARD ACCESS SYSTEM AND CARD READER TO BE SUPPLIED BY DIV.28

Martin County School District
 Citrus Grove Elementary School
 Enhanced Security Project A2

Hardware Group No. 17 – CARD ACCESS

For use on Door #(s):

Provide each SGL door(s) with the following:

QT		DESCRIPTION	CATALOG NUMBER		FINIS	MFR
Y					H	
3	EA	HINGE	5BB1 4.5 X 4.5 NRP		652	IVE
1	EA	POWER TRANSFER	EPT10		✂ 689	VON
1	EA	ELEC PANIC HARDWARE	QEL-99-L-06 24 VDC		✂ 626	VON
1	EA	RIM CYLINDER	1E62		626	BES
1	EA	SURFACE CLOSER	4040XP EDA		689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS		630	IVE
1	EA	WALL STOP	WS406/407CVX		630	IVE
3	EA	SILENCER	SR64		GRY	IVE
1	EA	POWER SUPPLY	PS902		✂ LGR	VON

CARD ACCESS SYSTEM AND CARD READER TO BE SUPPLIED BY DIV.28

3.6 DOOR INDEX

Door#	HwSet#
1-101	17
1-101D1	06
1-101D2	15
1-102	17

END OF SECTION

SECTION 08 80 00
GLAZING

PART 1 GENERAL

1.1 RELATED DOCUMENTS:

- A. The provisions of the General Conditions, Supplementary Conditions, Drawings, Specifications and the Sections included under Division 1, General Requirements and References are included as a part of this Section as though bound herein.

1.2 SECTION INCLUDES

- A. Provide labor, materials, services, and equipment necessary to furnish and install work as indicated and as specified herein, which includes, but is not limited to:
 - 1. Glass and glazing

1.3 REFERENCES

- A. ASCE-7 – Minimum Design Loads for Buildings and other Structures
- B. ANSI Z97.1 – Safety Glazing Materials Used in Buildings - Safety Performance Specifications and Methods of Test
- C. ASTM C-162 – Standard Terminology of Glass and Glass Products
- D. ASTM C864 – Standard Specification for Dense Elastomeric Compression Seal Gaskets, Setting Blocks, and Spacers
- E. ASTM C920 – Standard Specification for Elastomeric Joint Sealants
- F. ASTM C1036 – Standard Specification for Flat Glass
- G. ASTM C1048 – Standard Specification for Heat-Treated Flat Glass - Kind HS, Kind FT Coated and Uncoated Glass
- H. ASTM C1172 – Standard Specification for Laminated Architectural Safety Glass
- I. ASTM C1349 – Standard Specification for Architectural Flat Glass Clad Polycarbonate
- J. ASTM C 1503 – Standard Specification for Silvered Flat Glass Mirror.
- K. ASTM E84 – Standard Test Method for Surface Burning Characteristics of Building Materials
- L. ASTM E152 – Methods for Fire Test of Door Assemblies
- M. ASTM E283 – Standard Test Method For Determining Rate of Air leakage Through Exterior Windows, Curtain Walls and Doors Under Specified Pressure Differences Across the Specimen
- N. ASTM E330 – Standard Test Method for Structural Performance of Exterior Windows, Doors, Skylights and Curtain Walls by Uniform Static Air Pressure Difference
- O. ASTM E1996 – Standard Specification for Performance of Exterior Windows, Curtain Walls, Doors and Impact Protective Systems Impacted by Windborne Debris in Hurricanes
- P. ASTM E2025 – Standard Test Method for Evaluating Fenestration Components and Assemblies for Resistance to Impact Energies
- Q. CPSC 16 CFR 1201 Safety Standards for Architectural Glazing Materials
- R. FBC – Florida Building Code
- S. GANA – Glazing Manual
- T. GANA Laminated Glazing Reference Manual
- U. FGMA – Sealant Manual
- V. NFPA 80 – Standard for Fire Doors and Fire Windows
- W. NFPA 252 – Standard Methods of Fire Test of Doors Assemblies
- X. NFPA 257 – Standards on Fire Test of Window and Glass Block Assemblies

1.4 SUBMITTALS

- A. Manufacturer's Data:
 - 1. Submit two-copies of manufacturer's specifications, and installation instruction for each type of glass, glazing sealant and compound, gasket and associated miscellaneous material required.
 - 2. Include manufacturer's published data, or letter of certification, or certified test laboratory report indicating that each material complies with the requirements and is intended generally for the applications shown.
 - 3. Show by transmittal that the Glazer distributed one copy of each recommendation and instruction.
 - 4. If Safety glass, provide two copies of manufacturer certification of the glass meeting the requirements of CPSC 16 CFR 1201.
- B. Samples: Submit two-samples 12" x 12" in size illustrating glass coloration.
- C. Manufacturer shall certify that product complies with large and small missile impact criteria and have been tested and conform to SSTD and ASTM, Miami-Dade County, TAS 201, 202, and 203.

1.5 SYSTEM PERFORMANCE REQUIREMENTS

- A. General: Provide glazing systems that are produced, fabricated, and installed to withstand normal thermal movement, wind loading, and impact loading, without failure including loss or glass breakage attributable to the following: defective manufacturer, fabrication, and installation; failure of sealants or gaskets to remain watertight and airtight; deterioration of glazing materials; and other defects in construction.
- B. Hurricane rated impact loading on exterior glazing.
- C. Deterioration of Laminated Glass: Defects developed from normal use that are attributed to the manufacturing process and not to causes other than glass breakage and practices for maintaining and cleaning laminated glass contrary to manufacturer's written instructions. Defects include edge separation, delamination materially obstructing vision through glass, and blemishes exceeding those allowed by referenced laminated-glass standard.
- D. Glass Design: Glass thicknesses as indicated are for detailing only. Confirm glass thicknesses by analyzing Project loads and in service conditions. Provide glass lites for the various size openings in the thicknesses and strengths (annealed or heat-treated) to meet or exceed the following criteria:
 - 1. Glass Thicknesses: Minimum glass thickness, nominally, of lites in exterior walls is 6.0 mm.
 - 2. Glass Thicknesses (Hurricane): Select minimum glass thicknesses to comply with ASTM E-1300, according to the following requirements and performance standards:
 - a. Specified Design Wind Loads: 140 mph.
 - b. Safety
 - i) CPSC Cat. I and II
 - c. Security
 - i) UL972
 - ii) Blast Resistance
 - d. Natural Disasters
 - i) Hurricane Small Missile (River Gravel #6 for impact)
 - ii) Hurricane Large Missile (2" x 4" timber weighing 9 lbs.)

- E. Specific hazardous locations: The following shall be considered specific hazardous locations for purposes of glazing.
 - 1. Glazing in ingress and means of egress doors.
 - 2. Glazing adjacent to a door and within the same wall plane as the door whose nearest vertical edge is within 24 inches of the door in a closed position and whose bottom edge is less than 60 inches above the floor or walking surface, unless an intervening interior permanent wall is between the door and the glazing.
 - 3. Glazing in fixed panels having a glazed area in excess of 9 square feet with the lowest edge less than 18 inches above the finish floor level or walking surface within 36 inches of such glazing, unless a horizontal member not less than 1-1/2 inches in width is located between 24 inches and 36 inches above the walking surface.
- F. Normal thermal movement results from the following maximum change (range) in ambient and surface temperatures acting on glass framing members and glazing components. Base engineering calculation on materials' actual surface temperatures due to both solar heat gain and nighttime sky heat loss.
 - 1. Temperature Change (Range): 120 deg F, ambient; 180 deg F, material surfaces.

1.6 LABELS

- A. Glass shall bear labels indicating the manufacturer, type and thickness, and a note "Do Not Remove Label".
- B. All safety glass shall at least a permanent label indicating manufacturer, type, thickness, and compliance with CPSC 16 CFR 1201.
- C. If temporary label, label is to remain on glass until District Building Inspection is complete, then removed and turned into the District Building Department.

1.7 GLASS BREAKAGE

- A. The glazing subcontractor shall be responsible for all glass broken, scratched, damaged, or defective and shall replace same at his expense.

1.8 QUALITY ASSURANCE

- A. Perform Work in accordance with FGMA Glazing Manual, FGMA Sealant Manual, SIGMA and Laminators Safety Glass Association - Standards Manual for glazing installation methods.
- B. Installer Qualifications: Company specializing in performing the work of this section with minimum 5-years documented experience.

1.9 WARRANTY

- A. General: Warranties specified in this Article shall not deprive the Owner of other rights the Owner may have under other provisions of the Contract Documents and will be in addition to and run concurrent with other warranties made by the Contractor under requirements of the Contract Documents.
- B. Manufacturer's Special Warranty on Laminated Glass: Written warranty made out to Owner and signed by laminated-glass manufacturer agreeing to furnish replacements for laminated glass units that deteriorate as defined in "Definitions" Article f.o.b. the nearest shipping point to Project Site, within specified warranty period indicated below:
 - 1. Warranty Period: Five years from date of Substantial Completion.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Primary Glass; provide products from one of the following:
 - 1. PPG, Ford City, Pennsylvania
 - 2. Guardian, Carleton, Michigan
 - 3. Visteon, Detroit, Michigan
 - 4. LOF, Toledo, Ohio
 - 5. AFG, Kingsport, Tennessee
 - 6. Wire Glass
 - a. Pilkington, Don Mills, Ontario, Canada
 - b. Asahi, Miami Beach, Florida
 - c. Nippon, Los Angeles, California
- B. Architectural Glass Fabricators; provide products from one of the following:
 - 1. Primary glass manufacturers
 - 2. Globe-Amerada Glass, Elk Grove Village, Illinois (laminated glass products)
 - 3. Interpane/Spectrum Glass Products, Deerfield, Wisconsin (high performance glass)
 - 4. HGP and affiliates, Moorestown, New Jersey (full line glass fabricator)
 - 5. Viracon, Owatonna, Minnesota (high performance glass et. al)
 - 6. Laminated Glass Corporation, Plymouth Meeting, Pennsylvania
 - 7. Glasstemp, Bensenville, Illinois (glass door manufacturer also)
 - 8. Perilstein Distributing Corporation (PDC), Cheswick, Pennsylvania
- C. Plastic Interlayer Manufacturers, provide products from one of the following:
 - 1. DuPont, Wilmington, Delaware.
 - 2. Saflex, St. Louis, Missouri.
- D. Products of other manufacturers will be considered for acceptance provided they equal or exceed the material requirements and functional qualities of the specified product. Requests for Architect's approval and complete technical data for evaluation must be received at least 14 days prior to bid due date. Additional approved manufacturers will be issued by Addendum.

2.2 GLASS STANDARDS

- A. General
 - 1. Unless indicated otherwise, reference numbers used throughout this Specification Section are from ASTM C 1036 and C 1048. When the end product involves one or more categories, both, the primary glass specifications and the specifications of the additional features or construction shall be met.
- B. Clear Float Glass: Type I (transparent glass, flat), Class 1 (clear), Quality q3 (glazing select).
- C. Tinted Float Glass: Type I (transparent glass, flat), Class 2 (tinted heat absorbing and light reducing), Quality q3 (glazing select). Final shade shall be Architect selected from the manufacturer's standards within the following range:
 - 1. Grey: Visible light transmittance of 41-43 percent and shading coefficient of 0.67 – 0.69 percent for ¼ inch thick glass.
 - 2. Medium Green: Visible light transmittance of 75 percent and shading coefficient of 0.69 percent for ¼ inch thick glass.
- D. Tempered Glass (Safety Glass): Condition C (other than coated glass), kind FT (fully tempered), complying with ANSI Z97.1, ASTM C 1036 and ASTM C 1048 and "Federal CPSC Standard 16 CFR 1201 Category II."

- E. Heat-Treated Float Glass: ASTM C1048; Type I (transparent glass, flat); Quality q³ (glazing select); class, kind, and condition as indicated in examples under Article 4-GLASS USAGE.
- F. Fire Rated Glazing: Shall be listed and labeled by Underwriters Laboratories.
- G. Laminated glass shall meet minimum requirements as specified in ASTM C 1036-85 and laminate shall comply with ANSI Z97.1-1984 CPSC 16 CFR 1201 Category II where required.

2.3 MIRROR GLASS

- A. Safety Glass Mirrors
 - 1. Tapeback: Provide annealed float glass mirrors with manufacturer applied safety tape applied to the back surface and complying with FS DD-G-1403, ANSI Z97.1-1984 CPSC 16 CFR 1201 Category II.
- B. Mirror Glass Production and Fabrication
 - 1. Glass coating: Coat second surface of glass, unless otherwise indicated, with glass coating system complying with FS DD-M-00411 requirements and consisting of successive layers of chemically deposited silver, electrically or chemically deposited copper, and manufacturer's standard protective organic coating.
- C. Mirror Sizes: After application of glass coating, cut mirror glass to sizes as shown on Drawings and in 1/4 inch glass thickness.
- D. Edges: Seal edges after treatment to prevent chemical or atmospheric penetration of backing. Perform edge treatment and sealing in factory immediately after cutting to final sizes.
- E. Provide CRL mirror mount system in satin anodized finish. Continuous top channel shall be two pieces, D1638 channel and D1637 cleat. Bottom and ends shall have D638 channel. System shall be as manufactured by C.R. Lawrence Company, Inc. (800-421-6144) or an approved equal.

2.4 GLASS USAGE

- A. Exterior Insulated (Hurricane) – Large and Small Impact Rated
 - 1. Glass for all exterior door storefront, exterior door lites, and window openings: 1-3/16 inch insulated laminated glass complying with the following:
 - a. Insulated laminated Lite 1-3/16" Laminate – ¼" Clear – 0.090" Clear PVB – ¼" Clear, ½" air space, ¼" Tinted, Low-E on #5 surface
 - b. Performance Characteristics
 - Thermal
 - Winter U-factor/U-Value (Btu/hr-ft²-F°): 0.28
 - Solar Heat Gain Coefficient: between .25 and .27
 - Optical
 - Visible Light Transmittance: between 32% and 36%
 - Visible Light Reflectance (outside): less than 9%
 - Visible Light Reflectance (inside): less than 7%
 - c. Laminated glass products to be fabricated in autoclave with heat, plus pressure, free of foreign substances and air pockets.
 - d. Interlayer material: Polyvinyl Butyral sheets
 - e. Tint: Colored tint as selected by the Architect.
 - f. Impact rated as required by FBC Product Approval System.
- B. Fire Rated Glass
 - 1. Shall meet the safety glazing requirements of CPSC 16 CFR 1201, and
 - 2. Have the proper fire rating for the assembly (see plans for assembly fire ratings).

- a. SAFTI – Superlite 1-W acceptable for Cat II location per CPSC
 - b. Pilkington – Pyroshield Plus acceptable for Cat I location per CPSC
 - c. Cat I location is glass area less than or equal to 9 SF, and Cat II is glass area greater than 9 SF.
3. All glass shall have label indicating fire rating and safety glazing rating.
- C. Interior
1. Glass for Vestibule Doors, Sidelights, and Transoms: 1/4 inch thick clear tempered glass.
 2. Glass for Interior Fire Rated Doors and Windows: 1/4 inch fire rated glazing, polished both sides.
 3. Glass for Interior Non-Fire Rated Doors and Windows: 1/4 inch clear tempered safety glass.
 4. Large Mirrors: Where indicated.

2.5 GLAZING GASKETS

- A. Polyvinyl Chloride Glazing Gaskets: Shall be extruded, flexible PVC gaskets of the profile and hardness shown or as required for watertight construction, complying with ASTM D2287.

2.6 MISCELLANEOUS GLAZING MATERIALS

- A. Setting Blocks: Neoprene, 70-90 Durometer hardness, with proven compatibility of sealants used.
- B. Spacers: Provide neoprene, 40-50 Durometer hardness, with proven compatibility of sealants used.
- C. Compressible Filler Rod: Shall be closed-cell or waterproof jacketed rodstock of synthetic rubber or plastic foam with proven compatibility with sealants used. Rod shall be flexible and resilient with 5-10 PSI compression strength for 25 percent deflection.
- D. Cleaners, Primers and Sealers: Type recommended by sealant or gasket manufacturer.

2.7 ACCESSORIES

- A. Aluminum T-Trim:
1. Extruded aluminum TEE model # E-11177 EA as manufactured by Eagle Mouldings. Trim shall be used around decorative glass at per detail 5/A3.5

2.8 OTHER MATERIALS

- A. Provide other materials not specifically described but required for a complete and proper installation.

PART 3 EXECUTION

3.1 INSTALLATION OF GLASS

- A. General Requirements:
1. Follow recommendations of the glass manufacturer and the sealant, gaskets and glazing materials manufacturer, except if the codes or listed references are more restrictive.
 2. Where a combination of sealing materials is required for glazing in the same frame, the manufacturer must certify that all glazing materials furnished are compatible with each other.

3. Where setting blocks and spacer shims require setting into a glazing compound or sealant, contractor may butter them with the compound or sealant, then place them in position and allow to firmly setting prior to installation of glass.
- B. Sash and Frame Preparation and Acceptance
1. Inspect all window sash, frames, and surrounds glazed under this section and notify the Contractor of any defects, improper materials, or workmanship of other conditions that will affect the satisfactory installation of glass.
 - a. Do not proceed with glazing until such conditions are acceptable.
 - b. Absence of notification, or the beginning of glazing, will indicate acceptance of all previously placed related work executed by other trades.
 2. Other trades will execute the following work; but before starting glazing work, the glazier shall verify compliance with the requirements listed.
 - a. That the sash and frames are firmly anchored in proper position, plumb and square within 1/8" nominal dimensions on approved shop drawings.
 - b. That the rivet, screw, bolt or nail heads, welding fillets and other projections are removed from glazing rabbets to provide the specified clearances.
 - c. That all corners and fabrication intersections are sealed and sash and frames are weather-tight.
 - d. That rabbets at seals weep to outside and all rabbets are of sufficient depth and width to receive the glass and provide the required overlap of the glass.
 - e. That all sealing surfaces of steel sash and frames are primer painted.
- C. Preparation of Glass and Rabbets:
1. Clean the sealing surfaces of glass and the sealing surfaces of rabbets and stop beads before applying any glazing compound or gaskets.
 2. Use only the approved solvents and cleaning agents recommended by the compound manufacturer.
- D. Positioning Glass:
1. Center in glazing in the frame and rabbet to maintain specified clearances at perimeter on all four sides.
 2. Maintain centered position of glass in rabbet and provide the required sealer thickness (1/8" maximum) on both sides of glass.
 3. Whenever glass dimensions are larger than 50 united inches, provide setting blocks at the sill and spacer shims on all four sides; locate setting blocks one-quarter way in from each end of glass.
- E. Stop Bead Glazing; Use Putty or Elastic Glazing Compound for bedding glass in hollow metal frames, except if otherwise specified in this document.
1. Apply ample back putty or compound to rabbet so that it will ooze out when pressing glass into position and completely cover glass in rabbet.
 - a. Place setting blocks and spacer shims as required, and press glass into position.
 2. Secure glass in place by the application of stop beads.
 - a. Bed stop beads against glass and bottom of rabbet with compound and/or putty, leaving proper thickness between glass and stop beads.
 - b. Secure stop beads in place with suitable fastenings.
 - c. Strip surplus compound or putty from both sides of glass and tool to provide clean sight lines.

3.2 REPLACEMENT AND CLEANING:

- A. Upon completion of work, all glass shall be free from cracks and other defects.
- B. Any defective or broken glass that may appear before acceptance or within the 1-year warranty period shall be removed and replaced with new glass without additional cost to the Owner; excepting glass which is broken by a specific cause relating to building occupancy not relating to this contract.
- C. Thoroughly wash and clean all glass upon completion of the work and just prior to occupancy of the building.

END OF SECTION

DIVISION

9

FINISHES

SECTION 09 22 16
NON-STRUCTURAL METAL FRAMING

PART 1 GENERAL

1.1 RELATED DOCUMENTS

- A. The provisions of the General Conditions, Supplementary Conditions, Drawings, Specifications and the Sections included under Division 1, General Requirements and References are included as a part of this Section as though bound herein.

1.2 SECTION INCLUDES

- A. Provide labor, material, services and equipment necessary to furnish and install work as indicated and as specified herein, which includes, but is not limited to:
 - 1. Non-load bearing metal studs, support framing, bridging, bracing, strapping, attachments and accessories required for complete partition walls, soffits, bulkheads, and ceiling assemblies as indicated.
 - 2. Area separation and shaft wall framing products.

1.3 RELATED SECTIONS

- A. Section 01 25 13 – Product Substitution Procedures.
- B. Section 01 31 00 – Project Coordination.
- C. Section 01 33 00 – Submittal Procedures.
- D. Section 01 43 39 – Mockups
- E. Section 01 45 00 – Quality Control.
- F. Section 01 66 00 – Product Storage and Handling Requirements.
- G. Section 01 78 00 – Closeout Submittals.
- H. Section 09 29 00 – Gypsum Board.
- I. Section 09 91 00 – Painting.

1.4 REFERENCES

- A. See Section 01 42 00 – References for additional reference standards, abbreviations, acronyms and definitions.
- B. AISI - Standard for Cold-Formed Steel Framing General Provisions.
- C. AISI - North American Specification (NASPEC) for the Design of Cold-Formed Steel Structural Members - 2001.
- D. American Society of Testing Materials (ASTM):
 - 1. ASTM A653/A653M-13: Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy Coated (Galvannealed) by the Hot-Dip Process
 - 2. ASTM A780/A789M-09: Standard Practice for Repair of Damaged and Uncoated Areas of Hot-Dip Galvanized Coatings
 - 3. ASTM A1003/A1003M-15: Standard Specification for Steel Sheet, Carbon, Metallic- and Nonmetallic-Coated for Cold-Formed Framing Members
 - 4. ASTM C645-14: Standard Specification for Nonstructural Steel Framing Members
 - 5. ASTM C754-15: Standard Specification for Installation of Steel Framing Members to Receive Screw-Attached Gypsum Panel Products.
 - 6. ASTM C840-13: Specification for Application and Finishing of Gypsum Board.

7. ASTM C1513-13: Standard Specification for Steel Tapping Screws for Cold-Formed Steel Framing Connections.
8. ASTM E84-15a: Standard Test Method for Surface Burning Characteristics of Building Materials.
9. ASTM E90-09: Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements.
10. ASTM E119-14: Standard Test Methods for Fire Tests of Building Construction and Materials.
11. ASTM E413-10: Classification for Rating Sound Insulation.
- E. Gypsum Association (GA): GA-600 - Fire Resistance Design Manual.
- F. Steel Stud Manufacturers Association (SSMA): Product Technical Guide, Current Edition).

1.5 DESIGN REQUIREMENTS

- A. Design steel in accord with American Iron and Steel Institute Publication "Specification for the Design of Cold-Formed Steel Structural Members", except as otherwise shown or specified.
- B. Design loads: As indicated on the Architectural Drawings. 5 PSF minimum design lateral load is required for interior walls by building code. Shaftwall framing minimum design lateral load is 15 PSF.
- C. Framing systems for interior non-load bearing walls shall withstand design loads for lateral deflections less than $L/180$.
- D. Framing system to accommodate deflection of primary building structure and construction tolerances.
- E. Fire-Test-Response Characteristics:
 1. For fire-resistance-rated assemblies that incorporate non-load-bearing steel framing, provide materials and construction identical to those tested in assembly indicated according to ASTM E119-14 by independent testing laboratory.
 2. Products used in assembly shall carry classification label from testing laboratory.
- F. Sound Transmission Characteristics (STC):
 1. For gypsum assemblies wall and ceilings with STC rated requirements, provide materials and construction methods that are identical to requirements of ASTM E90-09.
 2. Testing or inspection agencies shall be certified and independent organizations.

1.6 SUBMITTALS

- A. Comply with Section 01 33 00 – Submittal Procedures.
- B. Submit manufacturer's product literature and data sheets for specified products.
- C. Manufacturer's certification of product compliance with codes and standards.

1.7 QUALITY ASSURANCE

- A. Comply with Section 01 45 00 – Quality Control.
- B. Product manufacturers shall be current members of Steel Stud Manufacturers Association (SSMA).
- C. Provide full time quality control over fabrication and erection complying with applicable codes and regulations of government agencies having jurisdiction.
- D. Conduct pre-installation meeting to verify project requirements, substrate conditions, and manufacturer's installation instructions.
- E. Submit manufacturer's storage and product installation instructions.

- F. Submit documentation verifying materials and components are from single manufacturer.
- G. Installer shall submit qualifications demonstrating five consecutive years of installing specified products of similar and equivalent work scope.

1.8 MOCKUPS

- A. Comply with Section 01 43 39 – Mockups.
- B. Prepare 8' (2.44 m) x 8' (2.44 m) wall section where directed by Architect to demonstrate, quality of substrate framing, material application and finished gypsum board surface on one side of partition mockup.
- C. Do not proceed with additional work until mockup is approved by Architect.
- D. Mockup may be incorporated into finished work product providing mockup remains available for inspection until end of framing and gypsum board work.

1.9 DELIVERY, STORAGE AND HANDLING

- A. Comply with Section 01 66 00 – Product Storage and Handling Requirements.
- B. Notify manufacturer of damaged materials received prior to installing.
- C. Deliver materials in manufacturer's original, unopened, undamaged containers with identification labels intact.
- D. Store materials inside building, protected from exposure to water, wind or other harmful weather conditions.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Approved Manufacturer's:
 - 1. Clark Dietrich Building Systems, 9100 Centre Point Dr., Suite 210 West Chester, OH 45069; Tel: 513-870-1100, 800-543-7140; Fax: 513-870-874-1300; Website: www.clarkdietrick.com.
- B. Manufacturers listed below are approved providing their products are equal to those specified as basis of design:
 - 1. Marino/Ware, Inc., 400 Metuchen Rd., South Plainfield, NJ 07080; Tel: 1-800-627-4661, 908-757-9000; Fax: 908-753-8786; Website: www.marinoware.com.
- C. Requests for substitutions by other manufacturers will be considered in accord with Section 01 25 13 – Product Substitution Procedures.

2.2 MATERIALS

- A. Steel: Galvanized Steel meeting requirements of ASTM A1003/A1003M-15.
 - 1. Coating: Galvanized G40 (Z120) coating minimum, complying with ASTM C645-14.

2.3 COMPONENTS

- A. Nonstructural Studs: Cold-Formed galvanized steel C-studs. Material: Galvanized steel meeting or exceeding the requirements of ASTM A754-15 for conditions indicated below:
 - 1. Flange Length: 1.25" (32 mm) 125 flange, web depth 1-5/8" and 3-5/8" and as indicated on Drawings.
 - 2. Minimum Material Thickness: Traditional 20ga or UltraSTEEL 20 EQ.

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3. Punch Outs: 12" (305 mm) from base and every 48" (1219 mm) thereafter.
- B. Nonstructural Track: Cold-Formed galvanized steel runner tracks.
 1. Flange Length: 1.25" (32 mm) T125 flange.
 2. Web: Track web to match stud web size.
 3. Minimum Material Thickness: Traditional 20ga or UltraSTEEL 20 EQ.
 4. Minimum Material Thickness: Track thickness to match wall stud thickness.
- C. Deflection Track: Cold-Formed Deep Leg Runner Slip Track.
 1. Leg Length: As required by design.
 2. Minimum Material Thickness: To match stud thickness.
- D. Channel (CRC Cold Rolled Channel):
 1. Size: 150U50-54, 1.5" (38 mm) 54mils (16 ga.).
- E. Furring Channel: Furring walls and suspended ceiling applications.
 1. Size: 087F125-30 .875" (22 mm) Furring Channel 30 mils (20 ga Drywall).
 2. Size: 087F125-33 .875" (22 mm) Furring Channel 33 mils (20 ga Structural).
 3. Sizes and locations as indicated on Drawings.
- F. Resilient Channel: Cold-Formed Resilient Channel System to decrease sound transmissions.
 1. Size: Two Leg .50" x 1.25" Resilient Channel.
- G. Area Separation Wall System: Lightweight non-load-bearing gypsum panel assembly designed to provide fire resistive protection at common walls, complying with ASTM C754-15 for conditions indicated.
- H. Drywall Corner Beads: Cold-Formed galvanized steel beads.
 1. 103 USG Durabead Deluxe Metal Corner Bead 1.25" x 1.25" (32 mm x 32 mm).
- I. Drywall Trims: Cold-Formed galvanized steel trims.
 1. U-Trim (Mudable) Size: .625" (15.9 mm).
 2. J-Trim (Reveal) Size: .625" (15.9 mm).
- J. Framing Accessories: Accessories required in this project.
 1. Flat Strapping for Backing Strip.
 2. Flat Strapping and bridging for lateral bracing.
 3. Angles.
 4. SwiftClip Fixed Connection Angles.
- I. Fasteners: Self-drilling, self-tapping screws; complying with ASTM C1513-13 - Standard Specification for Steel Tapping Screws for Cold-Formed Steel Framing Connections.
- J. All Window & Door opening stud framing Studs: Cold-Formed galvanized steel C-studs.
Material: Galvanized steel meeting or exceeding the requirements of ASTM A754-15 for conditions indicated below:
 1. Flange Length: 1.25" (32 mm) 125 flange, web depth 1-5/8" and 3-5/8" and as indicated on Drawings.
 - a. Minimum Material Thickness: Traditional 18ga.
 - b. Punch Outs: 12" (305 mm) from base and every 48" (1219 mm) thereafter.
 - c. Double Studs at each jamb, sill & head of door & window openings.
- K. Touch-Up Paint:
 1. Comply with Section 09 91 00 – Painting.
 2. Comply with ASTM A780/A780M-09 (2015): Standard Practice for Repair of Damaged and Uncoated Areas of Hot-Dip Galvanized Coatings.

PART 3 EXECUTION

3.1 INSPECTION

- A. Inspect supporting substrates and structures for compliance of proper conditions for installation and performance of non-structural metal framing.

3.2 PREPARATION

- A. Prepare attachment surfaces for plumb, level, and proper alignment for accepting cold-formed structural framing.

3.3 FABRICATION

- A. Prior to fabrication of framing, submit product submittal sheets to Architect for approval.
- B. Framing components may be preassembled into panels prior to erecting. Prefabricate panels to be plumb and square, with components attached to prevent racking and minimizes distortion during lifting and transport.
- C. Cut framing components square for attachment to perpendicular members or as required for angular fit against abutting members.
- D. Plumb, align and securely attach studs to flanges of both upper and lower runners, except that for interior, non-load bearing walls where studs need not be attached to upper or lower runners.
- E. Splices in members other than top and bottom runner track are not permitted.
- F. Provide temporary bracing where required, until erection is complete.

3.4 INSTALLATION – NON-AXIAL LOAD-BEARING PARTITION WALLS

- A. Runners shall be securely anchored to supporting structure.
- B. Jack studs or cripples shall be installed below window sills, above window and door heads, and elsewhere to furnish supports.
- C. Lateral bracing shall be provided by use of gypsum board and gypsum sheathing, metal studs, or cold-rolled steel angles or channels.
- D. Provisions for structure vertical movement shall be provided where indicated.
- E. Partition walls shall extend to bottom of deck above floor, unless otherwise noted.
- F. Handling and lifting of prefabricated panels shall not cause distortion in members.

3.5 PROTECTION

- A. Protect installed products until completion of project.
- B. Touch-up, repair or replace damaged products before substantial completion of final installation.

END OF SECTION

SECTION 09 29 00
GYPSUM BOARD SYSTEM

PART 1 GENERAL

1.1 RELATED DOCUMENTS

- A. The provisions of the General Conditions, Supplementary Conditions, Drawings, Specifications, and the Sections included under Division 1, General Requirements and References are included as a part of this Section as though bound herein.

1.2 SECTION INCLUDES

- A. Provide labor, materials, services, and equipment necessary to furnish and install work as indicated and as specified herein, which includes, but is not limited to:
 - 1. Gypsum Board Partition Systems
 - 2. Gypsum Board Accessories
 - 3. Joint Treatment
 - 4. Textured Finish

1.3 REFERENCES

- A. ASTM C36/C36M – Standard Specification for Gypsum Wallboard
- B. ASTM C79/C79M – Standard Specification for Treated Core and Non-treated Core Gypsum Sheathing Board
- C. ASTM C442/C442M – Standard Specification for Gypsum Backing Board and Coreboard, and Gypsum Shaftliner Board
- D. ASTM C475 – Standard Specification for Joint Compound and Joint Tape for Finishing Gypsum Board
- E. ASTM C630/C630M – Standard Specification for Water Resistant Gypsum Backing Board
- F. ASTM C645 – Standard Specification for Nonstructural Steel Framing Members
- G. ASTM C754 – Standard Specification for Installation of Steel Framing Members to Receive Screw Attached Gypsum Panel Products
- H. ASTM C931/C931M - Standard Specification for Exterior Gypsum Soffit Board
- I. ASTM E695 – Standard method for Measuring Relative Resistance of Wall, Floor, and Roof Construction to Impact loading
- J. ASTM D3273 – Standard Test Method for Resistance to Growth of Mold on the Surface of Interior Coatings in an Environmental Chamber
- K. ASTM D5420 – Standard Test Method for Impact Resistance of Flat Rigid Plastic Specimen By Means of a Striker Impacted by Falling Weight (Gardner Impact)
- L. ASTM E119 – Standard Test Methods for Fire Tests of Building Construction and Materials
- M. ASTM C840 – Standard Specification for the Application and Finishing of Gypsum Board
- N. GA 201 – Using Gypsum Board for Walls and Ceilings
- O. GA-216 – Recommended Specifications for the Application and Finishing of Gypsum Board
- P. GA-600 – Fire Resistance Design Manual
- Q. Florida Building Code (FBC)

1.4 SUBMITTALS

- A. Product Data: Submit manufacturer's product data sheets and printed installation instructions for each product or system proposed for use.

1.5 QUALITY ASSURANCE

- A. Perform gypsum board systems work in accordance with recommendations of ASTM C754, C840, and GA-216 except as otherwise specified in this Section.
- B. Regulatory Requirements:
 - 1. Fire-rated Assemblies: Listed and rated by Underwriter's Laboratories, Inc. or generic fire resistance ratings listed in GA-600.
 - 2. Fire-Hazard Classification: Listed and labeled by Underwriter's Laboratories, Inc.

1.6 COORDINATION

- A. Prior to and during installation, coordinate with work of other trades to facilities required openings and finishes.
- B. Conduct pre-construction meeting with drywall contractor, architect, owner, project coordinator, and others involved with process.

1.7 DELIVERY, STORAGE AND HANDLING

- A. Store the material off the floor in dry area to prevent damage from moisture or excessive handling.
- B. Follow manufacturer's requirements for on site storage and handling of materials.

1.8 PROJECT CONDITIONS

- A. Environmental Conditions, General: Establish and maintain environmental conditions for applying and finishing gypsum board to comply with ASTM C840 and with gypsum board manufacturer's recommendations.
- B. Room Temperatures: For non-adhesive attachment of gypsum board to framing, maintain not less than 40 degrees F. For adhesive attachment and finishing of gypsum board, maintain not less than 50 degrees F. for 48 hours prior to application and continuously after until dry. Do not exceed 95 degrees F. when using temporary heat sources.
- C. Ventilation: Ventilate building spaces, as required, for dry joint treatment materials. Avoid drafts during hot dry weather to prevent finishing materials from drying too rapidly.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturer shall be one of the following however products of other manufacturers will be considered for acceptance provided they equal or exceed the material requirements and functional qualities of the specified product.
 - 1. National Gypsum Corp.
 - 2. U.S. Gypsum Corp.
 - 3. Georgia-Pacific Corp.
- B. All gypsum board products shall have minimum mold growth ASTM D3273 rating of 10.

- C. Do not use drywall manufactured in China.

2.2 MATERIALS

- A. Furring Channels: USG metal stud channel, 1½" deep, roll-formed sections of 20-ga galvanized steel, ASTM C645.
- B. Gypsum Wallboard (General and above 8' AFF): 5⁄8" thick, ASTM C36/C36M, tapered edge, fire rated Type X. (Note: At radius walls the Contractor has the option to install ¼" and/or ⅜" thick gypsum wallboard in layers.)
- C. Gypsum Wallboard (Corridors, stairways, cafeteria, stage, and gymnasium up to at least 8' AFF minimum): Abuse resistant brand, 5⁄8" thick, ASTM C36/C36M, tapered edge, fire rated Type X. (Note: At radius walls the Contractor has the option to install ¼" and/or ⅜" thick gypsum wallboard in layers.)
 - 1. Acceptable abuse resistant drywall:
 - a. Fiber Rock VHI by USG
 - b. Or approved equal.
- D. Water Resistant Gypsum Wallboard: 5⁄8" thick, tapered edge.
 - 1. Provide at "wet" areas (areas subject to contact with water), as shown on plans.
- E. Cementitious backer board for tile and wet locations: Complying with ANSI A118.9 of thickness indicated and in maximum lengths available to minimize end-to-end butt joints. Ends and edges shall be square cut and finished smooth; formed in a continuous process of aggregated Portland cement slurry; and reinforced with vinyl coated, woven glass-fiber mesh embedded in both surfaces.
 - 1. Thickness: Manufacturer's standard thickness, but not less than 7/16 inch, unless otherwise indicated.
 - 2. Products: Subject to compliance with requirements, provide one of the following products:
 - a. Wonderboard Multi-Board; Custom Building Products.
 - b. DonCrete Cementitious Tile Backer Board; Domtar Gypsum.
 - c. Durock Cement Board; United States Gypsum Co.
- F. Gypsum Backing Board: Standard or Fire Rated type, square edges, ASTM C442/C442M.

2.3 MISCELLANEOUS MATERIALS

- A. Joint treatment materials and adhesives shall be as recommended by the gypsum board manufacturer. Joint tape shall be paper-reinforcing tape, unless otherwise recommended by gypsum board manufacturer for use with setting type compound.
 - 1. Setting Type Joint Compounds for Gypsum Board: Factory packaged, job mixed, and chemical hardening powder products formulated for use indicated.
 - a. Where setting type joint compounds are indicated as a taping compound only or for taping and filling only, use formulation that is compatible with other joint compounds applied over it.
 - b. For prefilling gypsum board joints, use formulation recommended by gypsum board manufacturer.
 - c. For filling joints and treating fasteners of water resistant gypsum backing board behind base for ceramic tile, use formulation recommended by gypsum board manufacturer.
 - d. Drying Type Joint Compounds for Gypsum Board: Factory packaged vinyl based products complying with the following requirements for formulation and intended use.
 - e. Ready Mixed Formulation: Factory mixed product.
 - 1) Topping compound formulated for finish (third) coats.
 - 2) All-purpose compound formulated for topping compound.

- f. Toxicity/IEQ: Sheetrock Joint Tape. Paper; fiberglass joint tape not permitted.
- B. Joint Compound for Cementitious Backer Board: Material recommended by cementitious backer unit manufacturer.
 - 1. Toxicity/IEQ: Lime compound. All purpose joint and texturing compound containing inert fillers and natural binders. Pre-mixed compounds shall be free of antifreeze, vinyl adhesives, preservatives, biocides, and other slow releasing compounds.
- C. Joint compound for gypsum sheathing board. G.P. setting type joint compound.
 - 1. Toxicity/IEQ: Lime compound. All purpose joint and texturing compound containing inert fillers and natural binders. Pre-mixed compounds shall be free of antifreeze, vinyl adhesives, preservatives, biocides, and other slow releasing compounds.
- D. Joint Tape for Cementitious Backer Board: Polymer-Coated, open glass-fiber mesh recommended by cementitious backer unit manufacturer.
 - 1. Toxicity/IEQ: Sheetrock Joint Tape, Paper: fiberglass joint tape not permitted.
- E. Screws for Gypsum Board (ASTM C1002): Phillips head galvanized steel Type "S" or "S-12" self-drilling screws, length and type as required and recommended by gypsum board manufacturer.
- F. Screws for Gypsum Sheathing Board.
 - 1. Type S-12, Bugle head, self-tapping, rust-resistant, fine tread for heavy gauge steel.
 - 2. Type S, bugle head, rust resistant, sharp point, and fine thread for light gauge steel or furring.
- G. Accessories for Interior Installation: Corner bead, edge trim, and control joints complying with ASTM C1047 and requirements indicated below:
 - 1. Material: Formed metal with metal complying with the following requirements:
 - a. Steel sheet zinc coated by hot-dip or electrolytic process, or steel sheet coated with aluminum or rolled zinc.
 - b. Do not use plastic accessories.
 - 2. Shapes indicated below by reference Figure 1 designations in ASTM C1047:
 - a. Corner bead on outside corners, unless otherwise indicated.
 - 1) Product shall be similar to "Dur-A-Bead Corner Bead (103)"; USG or as approved by board manufacturer and Architect.
 - b. L-bead with face flange only; face flanged formed to receive joint compound. Use L-beads for edge trim (perimeter relief).
 - 1) Product shall be similar to "No. 200-B Metal Trim"; USG or as approved by board manufacturer and Architect.
 - c. One-piece control joint formed with V-shaped slot and removable strip covering slot opening.
 - 1) Product shall be similar to "No. 093 Control Joint"; USG or as approved by board manufacturer and Architect.
- H. Sheathing Tape: 2-1/2 inch wide, 10 by 10 self-adhering fiberglass reinforced joint tape like No. 8086 Contractor Sheathing Tape as produced by the 3M Company of St. Paul, Minnesota.
- I. Spot Grout: ASTM C475, setting type joint compound recommended for spot grouting hollow metal doorframes.
- J. Texture Compound: Acrylic texture coating DS4000 as manufactured by TWI.
 - 1. Finish: Match Existing
- K. Asphalt Saturated Organic Felt: ASTM D 226, Type I (No. 15 asphalt felt), nonperforated.
- L. Foam Gaskets: Closed cell vinyl foam adhesive backed strips that allow fastener penetration without foam displacement, 1/8 inch thick, in width to suit metal stud size indicated.
- M. Gypsum board sheathing sealants, caulk, tape:
 - 1. Don Corning 795 or equivalent; Pecora 895 or equivalent
 - 2. Borden HPPG Elmer's siliconized acrylic latex caulk or equivalent.
 - 3. 2" wide 10 x 10 glass mesh quick tape or equivalent.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Examine adjacent construction for conditions that prevent proper installation of drywall systems.
- B. Do not proceed until defects are corrected.

3.2 METAL FRAMING INSTALLATION

- A. General:
 - 1. Install metal framing in accordance with ASTM C754 except as otherwise specified.
 - 2. Install the members true to line and level to provide surface flatness with maximum variation of 1/8" in 10' in any direction.
 - 3. Install metal studs at 16" o.c. unless noted otherwise.
- B. Metal Furring Channels
 - 1. Secure to masonry walls and around door and window openings, intersections, and corners with low velocity power driven anchors.
 - 2. Install metal furring at 16" o.c. vertically.
 - 3. Extend furring on exterior walls full height of wall.

3.3 GYPSUM BOARD SYSTEM INSTALLATION

- A. Gypsum Board Application and Finishing Standards: Install and finish gypsum panels to comply with ASTM C840 GA -201, GA-216 and GA-600.
- B. Work shall be provided in accordance with the manufacturer's printed instructions and as specified herein. Where fire rating requirements for systems are indicated on the Drawings or in the schedules, install components in accordance with manufacturer's instructions to comply with indicated fire rating requirements.
- C. Wallboard joints shall be butted tightly together. Maximum allowable gap at end joints shall be 1/8 inch. Support end joints on framing members.
 - 1. On partitions/walls apply gypsum panels vertically, unless parallel application is required for fire-resistive-rated assemblies. Use maximum length panels to minimize end joints.
 - 2. Install ceiling boards in direction, either parallel or perpendicular to framing members, which results in the least number of joints. Install in maximum practical lengths to span with minimum number of end (butt) joints. Stagger end joints of adjoining boards.
 - 3. Where ceiling or walls consist of 2 layers, face layer shall be installed perpendicular to base layer. Base layer to be screw attached and face layer to be strip laminated per manufacturer's instructions and screw attached to base layer in accordance with gypsum board application and finishing standards. Lay out joints so that tapered edges do not align with edges of openings.
 - 4. Fire Rated Walls: Construct required rated wall using thickness of Type "X" gypsum board required by code, installed to code requirements.
 - 5. Do not attach wallboard to head track.
 - 6. Provide a minimum of 1/4 inch perimeter relief where board abuts different materials. Trim edges with U-bead edge trim, where edges of gypsum panels are exposed. Seal joints between edges and abutting structural surfaces with acoustical sealant.
 - 7. Provide no less than 1/4", nor more than 3/8", space at bottom of board above floor.

- D. Wall Tile Substrates: For substrates indicated to receive thin-set ceramic tile and similar rigid applied wall finishes, comply with the following:
 - 1. Install cementitious backer units where tile is to be installed to comply with ANSI A108.11. Refer to Tile Specification.
- E. Soffits and Ceilings: Apply exterior gypsum soffit board panels perpendicular to supports, with end joints staggered over supports. Install with 1/4 inch open space where panels abut other construction or structural penetrations.
 - 1. Fasten with corrosion-resistant screws.
- F. Openings cut in gypsum board to fit electrical outlets, plumbing, and piping shall fit snugly and shall be small enough to be covered by plates and escutcheons. Both face and back paper shall be cut for cutouts that are not made by use of a saw.
- G. Fasteners: Install fasteners no closer than 3/8 inch to end or edge. Space fasteners approximately 7 inches o.c., opposite each other on adjacent ends or edges. Begin fastening from center of wallboard and proceed toward outer end or edges.
- H. Apply pressure on gypsum board, adjacent to fasteners being driven, to ensure that gypsum board will be secured tightly to framing member. Check for looseness at fasteners. Drive fastener with shank reasonably perpendicular to face of board.
- I. Drive screws with power screwdriver as recommended by gypsum board manufacturer. Surface of head shall be below surface of paper without cutting paper.
- J. Joint and corner treatment shall be in accordance with the manufacturer's printed instructions to provide a finished surface, ready for painting. Surface shall be free of dimples, excess finishing compound, ridges, or untrue corners.
 - 1. Install edge trim where edge of gypsum panels would otherwise be exposed or semi-exposed. Provide edge trim type with face flange formed to receive joint compound except where other types are indicated.
- K. Provide control joints in gypsum board partitions, bulkheads, ceilings, and soffits as follows:
 - 1. Partition, furring, or column fireproofing abuts a structural element (except floor) or dissimilar wall or ceiling.
 - 2. Ceiling or soffit abuts a structural element, dissimilar wall or partition or other vertical penetration.
 - 3. Construction changes within plane of partition or ceiling.
 - 4. Partition or furring run exceeds 40 feet, unless noted otherwise.
 - 5. Ceiling dimensions exceed 50 feet in either direction.
 - 6. Exterior soffits exceed 30 feet in either direction.
 - 7. Wings of "L", "U", and "T"-shaped ceiling areas are joined.
 - 8. Expansion or control joints occur in the exterior wall.
 - 9. Less than ceiling height frames should have control joints extending to the ceiling from both corners. Ceiling height door frames may be used as control joints. Treat window openings in same manner as doors.
 - 10. USG Control Joint No. 093: Apply over face of gypsum board where specified. Cut to length with a fine-toothed hacksaw (32 teeth per inch). Cut end joints square, butt together, and align to provide neat fit. Attach control joint to gypsum board with fasteners spaced 6 inches o.c. maximum along each flange. Remove plastic tape after finishing with joint compound or veneer finish.
 - a. Leave a 1/2 inch continuous opening between gypsum boards for insertion of surface-mounted joint.
 - b. Interrupt wood floor and ceiling plates with a 1/2 inch gap, wherever there is a control joint in the structure.
 - c. Do not attach gypsum board to steel studs on one side of control joint.
 - d. Provide separate supports for each control joint flange.

- e. Provide an adequate seal behind control joint where sound or fire ratings are prime considerations.
- L. Maximum variation in flatness required is $\frac{1}{8}$ " in 10'.
- M. Install sound-attenuation blankets, where indicated, prior to installing gypsum panels unless blankets are readily installed after panels have been installed on one side.
- N. Install ceiling board panels across framing to minimize the number of abutting end joints and to avoid abutting end joints in the central area of each ceiling.
 - 1. Stagger abutting end joints of adjacent panel not less than one framing member.
- O. Install gypsum panels with face side out.
 - 1. Do not install imperfect, damaged, or damp panels.
 - 2. Butt panels together for a light contact at edges and ends with not more than $\frac{1}{16}$ " of open space between panels.
 - 3. Do not force into place.
 - 4. Install all wall board with $\frac{1}{4}$ " to $\frac{1}{2}$ " separation from floor surface in accordance with manufacture's recommendation.
- P. Locate both edge or end joints over supports, except in ceiling applications where providing intermediate supports or gypsum board back blocking behind end joints.
 - 1. Do not place tapered edges against cut edges or ends.
 - 2. Stagger vertical joints on opposite sides of partitions.
 - 3. Avoid joints other than control joints at corners of framed openings where possible.
- Q. Attach gypsum panels to steel studs so leading edge or end of each panel is attached to open (unsupported) edges of stud flanges first.
- R. Attach gypsum panels to framing provided at openings and cutouts.
- S. Spot grout hollow metal doorframes for solid-core wood doors, and hollow metal doors.
 - 1. Apply spot grout at each jamb anchor clip and immediately insert gypsum panels into frames.
- T. Form control and expansion joints at locations indicated and as detailed, and as recommended by manufacturer with space between edges of adjoining gypsum panels, as well as supporting framing behind gypsum panels.
- U. Cover both faces of steel stud partition framing with gypsum panels in concealed spaces (above ceilings, etc.), except in chases braced internally.
 - 1. Except in concealed applications indicating or requiring sound, fire, air, or smoke ratings, may use scraps of not less than 8 s.f. in.
 - 2. Fit gypsum panels around ducts, pipes, and conduits.
 - 3. Where partitions intersect open concrete coffers, concrete joists, and other structural members projecting below underside of floor/roof slabs and decks, cut gypsum panels to fit profile formed by coffers, joists, and other structural members; allow $\frac{1}{4}$ " - $\frac{3}{8}$ " wide joints to install sealant.
- V. Isolate perimeter of non load-bearing gypsum board partitions at structural abutments, except floors, as detailed.
 - 1. Provide $\frac{1}{4}$ " - $\frac{1}{2}$ " wide spaces at these locations and trim edges with U-bead edge trim where edges of gypsum panels are exposed.
 - 2. Seal joints between edges and abutting structural surfaces with acoustical sealant.
- W. In STC-rated gypsum board assemblies, seal construction at perimeters, behind control and expansion joints, openings, and penetrations with a continuous bead of acoustical sealant at both faces of the partitions.
 - 1. Comply with ASTM C 919 and manufacturer's recommendations for location of edge trim and closing off sound-flanking paths around or through gypsum board assemblies, including sealing partitions above acoustical ceilings. Contractor to coordinate with all required fire/smoke rated separations.

- X. Space the fasteners in gypsum panels according to GA-216, finishing standard, and manufacturer's recommendations.

3.4 ACCESSORIES INSTALLATION

- A. Corner Beads: Install on external corners, with screws spaced 8" o.c. both sides.
- B. Trim: Install over face-layer gypsum board with fasteners spaced 8" o.c. Install where gypsum board surfaces meet dissimilar surfaces and at other detailed locations.
- C. Corner beads and trim may be either galvanized metal or plastic.

3.5 JOINT TREATMENT

- A. Treat joints, interior angles, fastener depressions, and finishing trim on face-layer gypsum board, including gypsum board in ceiling plenums.
- B. Pre-fill, tape, fill, and finish in accordance with manufacturer's directions.
- C. Apply a thin skim coat of joint compound over entire surface of gypsum board.
- D. Sand finish coat and leave surfaces smooth, uniform, and free of fins, depressions, cracks and other imperfections.
- E. Provide draft stopping in any concealed or furred space of the extruded insulation at the ceiling line and horizontally and vertically at 10'-0" o.c. maximum spacing. Provide at locations where interior wall(s) intersect or abut the exterior wall, at no more than 10' intervals in large rooms with walls over 20', and as required by FBC.
 - 1. Draft stopping may be ½" drywall, solid minimum 22-gauge metal strip, or ½" minimum mineral wool.
 - 2. Anchor draft stopping independent of the extruded insulation.
- F. Finish level shall be as indicated:
 - a. All spaces: level 4 with textured finish unless noted otherwise.

3.6 FINISHING GYPSUM BOARD ASSEMBLIES

- A. Levels of Finish: The following levels of finish are established as a guide for specific final finishes in accordance with GA-214.
 - 1. Level 0: No taping, finishing, or accessories required. This level of finish shall be used in temporary construction only.
 - 2. Level 1: Joints and interior angles shall have tape embedded in joint compound. Surface shall be free of excess joint compound. Tool marks and ridges are acceptable. This finish level shall be used in plenum areas above ceilings, in attics, in areas where the assembly is concealed.
 - 3. Level 2: Joints and interior angles shall have tape embedded in joint compound, and one separate coat of joint compound applied over joints, angles, fastener heads, and accessories. Surface shall be free of excess joint compound. Tool marks and ridges are acceptable. This finish level shall be used where water resistant gypsum backing board (ASTM C630) is used as a substrate for tile only.
 - 4. Level 3: Joints and interior angles shall have tape embedded in joint compound, and two separate coats of joint compound applied over joints, angles, fastener heads, and accessories. Joint compound shall be smooth and free of tool marks and ridges. Note: It is recommended that the prepared surface be coated with a primer/sealer prior to the application of final finishes. See painting/wall covering specification in this regard. This final level shall be used in areas that are to receive heavy textured, thick (1/8 inch or greater) wall coverings.

5. Level 4: Joints and interior angles shall have tape embedded in joint compound, and three separate coats of joint compound applied over joints, angles, fastener heads, and accessories. Joint compound shall be smooth and free of tool marks and ridges. Note: Prepare surface to be coated with a primer/sealer prior to the application of final finishes. This finish level shall be used where textured finishes, wall coverings, and painted (flat or eggshell) finishes are to be applied.
 6. Level 5: Joints and interior angles shall have tape embedded in joint compound and three separate coats of joint compound applied over joints, angles, fastener heads, and accessories. A thin skim coat of joint compound, or a material manufactured especially for this purpose, shall be applied to the entire surface. The surface shall be smooth and free of tool marks and ridges. Note: Prepare surface to be coated with a primer/sealer prior to the application of finish paint. This finish level shall be used with semi-gloss or gloss painted finishes and where indicated on the Room Finish Schedule.
- B. Use the following joint compound combination as applicable to the finish levels specified:
1. Embedding and First Coat: Setting type joint compound. Fill (Second) Coat: Setting type joint compound. Finish (Third) Coat: Ready mixed, drying type, all purpose or topping compound.

3.7 SITE ENVIRONMENTAL PROCEDURES

- A. Indoor Air Quality:
1. Temporary ventilation: Provide temporary ventilation for work of this Section.
 2. Multi-layer gypsum board: Screw attachment. Adhesive attachment will not be permitted.
- B. Waste Management: As specified.
- C. Select panel sizes and layout panels to minimize waste; reuse cut offs to the greatest extent possible.

END OF SECTION

SECTION 09 51 23
ACOUSTICAL TILE CEILINGS

PART 1 GENERAL

1.1 RELATED DOCUMENTS

- A. The provisions of the General Conditions, Supplementary Conditions, Drawings, Specifications, and the Sections included under Division 1, General Requirements and References are included as a part of this Section as though bound herein.

1.2 SECTION INCLUDES

- A. Provide labor, material, services, and equipment necessary to furnish and install work as indicated and as specified herein, which includes, but is not limited to:
 - 1. Ceiling tiles, metal grid, ceiling suspension system and related accessories required for complete and functioning ceiling system.
 - 2. Removal and recycling of existing acoustical tile ceilings in renovation projects.

1.3 RELATED SECTIONS

- A. Section 01 25 13 – Product Substitution Procedures.
- B. Section 01 31 00 – Project Coordination.
- C. Section 01 33 00 – Submittal Procedures.
- D. Section 01 42 00 – References.
- E. Section 01 45 00 – Quality Control.
- F. Section 01 74 00 – Cleaning and Waste Management.
- G. Section 01 78 00 – Closeout Submittals.
- H. Section 23 37 00 – Air Outlets and Inlets.
- I. Section 26 09 23 – Lighting Control Devices.
- J. Section 26 51 00 – Interior Lighting.
- K. Section 27 60 00 – Sound reinforcement System.

1.4 REFERENCES

- A. Comply with Section 01 42 00 – References for additional reference standards, abbreviations, definitions and acronyms.
- B. American Society of Testing Materials (ASTM):
 - 1. ASTM C423-09: Sound Absorption and Sound Absorption Coefficients by the Reverberation Room Method
 - 2. ASTM C635-13: Standard Specification the Manufacture, Performance, and Testing of Metal Suspension Systems for Acoustical Tile and Lay-in Panel Ceilings.
 - 3. ASTM C636-13: Recommended Practice for Installation of Metal Ceiling Suspension Systems for Acoustical Tile and Lay-in Panels
 - 4. ASTM C641-09: Specification for Steel Sheet, Zinc-Coated (galvanized) Carbon Steel Wire
 - 5. ASTM A653-13: Specification for Steel Sheet, Zinc-Coated (galvanized) or Zinc-Iron Alloy-Coated (galvanized) by the Hot-Dip Process
 - 6. ASTM E84-14: Test Method for Surface Burning Characteristics of Building Materials

7. ASTM E119-12a: Standard Test Method for Fire Test of Building Construction and Materials
8. ASTM E795-05(12): Standard Practice for Mounting Test Specimens During Sound Absorption Tests
9. ASTM E1264-08e1: Standard Classification of Acoustical Ceiling Products
10. ASTM E1414-11a: Standard Test Method for Airborne Sound Attenuation Between Rooms Sharing a Common Ceiling Plenum
11. ASTM E1477-98a (2013): Standard Test Method for Luminous Reflectance Factor of Acoustical Materials by Use of Integrating Sphere Reflectometer
- C. Ceilings and Interior Systems Contractors Association (CISCA):
 1. Acoustical Ceilings: Use and Practice.
 - B. Ceiling Systems Handbook.
- D. International Organization of Standardization (ISO):
 1. ISO 11654:1997 – Sound Absorbers for use in Buildings – Rating of Sound Absorption
 2. ISO 14024:1999 – Environmental Labels and Declarations- Type I Environmental Labeling – Principles and Procedures
 3. ISO 14025:2006 – Environmental Labels and Declarations- Type III Environmental Labeling – Principles and Procedures
- E. Underwriter’s Laboratories (UL): Fire Resistance Directory and Building Material Directory

1.5 SUBMITTALS

- A. Comply with Section 01 33 00 – Submittal Procedures.
- B. Submit product data for each type of product specified.
- C. Submit samples for verification purposes of each type of exposed finish required, prepared on samples of size indicated below and of same thickness and material indicated for final unit of Work.
- D. Where finishes involve normal color and texture variations, include sample sets showing full range of variations expected.
- E. Submit 150 mm (6") square samples of each acoustical panel type, pattern, and color.
- F. Submit two (2) 300 mm (12") long samples of exposed suspension system members, including moldings, for each color and system type required.

1.6 QUALITY ASSURANCE

- A. Comply with Section 01 45 00 – Quality Control.
- B. Comply with CISCA “Ceiling Systems Handbook” and “Acoustical Ceilings: Use and Practice.
- C. Fire Performance Characteristics: Provide acoustical ceilings in accord with ASTM indicated:
 1. ASTM E 84-14: Flame Spread of 25 or less, and Smoke Developed of 50 or less.
 2. ASTM E 1264-08e1: Tile products rated Class A.
- D. Single Source Responsibility for Ceiling Units: Obtain each type of acoustical ceiling unit from a single source with resources to provide products of consistent quality in appearance and physical properties without delaying progress of Work.
- E. Single Source Responsibility for Suspension System: Obtain each type of suspension system from single source with resources to provide products of consistent quality in appearance and physical properties without delaying progress of Work.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Comply with Section 01 66 00 – Product Storage and Handling.
- B. Deliver acoustical ceiling units and suspension system components to Project site in original, unopened packages and store in fully enclosed space.
- C. Protect from damage due to moisture, direct sunlight, surface contamination, and other causes.
- D. Before installation, permit tiles to reach room temperature and attain stabilized moisture content.
- E. Handle acoustical ceiling units carefully to avoid chipping edges or damaging units. Replace damaged units.

1.8 PROJECT CONDITIONS

- A. Environmental Limitations: Do not install interior acoustical ceilings until interior spaces are enclosed and weatherproof, wet finish work is completed and nominally dry, work above ceilings is complete, and ambient temperature and humidity are continuously maintained per manufacturer's printed product installation instructions.

1.9 EXTRA MATERIALS

- A. Furnish extra materials described below that match products installed, are packaged with protective covering for storage, and are identified with labels describing contents.
- B. Acoustical Ceiling Units: Furnish two boxes of 2' (608 mm) x 2' (608 mm) replacement tiles on project site for Owner's use upon completion of work.

1.10 WARRANTY

- A. Comply with Section 01 78 00 – Submittal Documents.
- B. Submit printed warranty executed by manufacturer agreeing to repair or replace acoustic panels from sagging or warping, grid system from rusting or other manufacturing defects for ten years from date of project's substantial completion.
- C. Warranty shall not cover abuse or acts of God.

PART 2 PRODUCTS

2.1 APPROVED MANUFACTURERS

- A. Armstrong World Industries, Inc., P.O. Box 3001, Lancaster, PA 17604; Tel: 877-276-7876; Fax: 800-572-8324; Website: www.armstrong.com.
- B. USG Interiors, subsidiary of USG Corp., 550 West Adams St. Chicago, IL 60661-3637; Tel: 800-950-3839; Website: www.usg.com.
- C. Certainteed Corporation, subsidiary of Saint Goblain, P.O. Box 860, 750 East Swedesford Rd., Valley Forge, PA 19482; Tel: 800-233-8990, 610-341-7777; Website: www.certainteed.com.
- D. Other manufacturers may request approval in accord with Section 01 25 13 – Product Substitution Procedures.

2.2 PRODUCTS

- A. Tiles shall be 24" (608 mm) x 24" (608 mm) x 3/4" (19.5 mm) thick white, non-directional, with 15/16" (23.8 mm) wide white grid unless noted otherwise.
- B. Ceiling Tile Locations:
 - 1. ACT-1 (Non wet areas such as Classrooms, Offices, Media Center, Cafeteria & Stage):
 - a. Armstrong World Industries "Fine Fissured" Square Lay-in.
 - b. CertainTeed Corp. "Baroque"
 - c. USG Interiors Radar Climaplus

2.3 ACOUSTICAL CEILING UNITS

- A. Standard for Acoustical Ceiling Units: ASTM E 1264-08e1 classifications as designated by reference to types, patterns, acoustical ratings, and light reflectance, unless otherwise indicated.
- B. Mounting Method for Measuring NRC: Type E 400 (plenum mounting in which face of test specimen is 15-3/4" (400 mm) away from the test surface) per ASTM E 795-05(12).
- C. Colors and Patterns: Provide products to match appearance characteristics indicated under each product type.

2.4 SUSPENSION SYSTEM

- A. Standard for Metal Suspension Systems: Comply with applicable ASTM C 635-13 requirements.
- B. Finishes and Colors: Provide manufacturer's standard factory applied finish for type of system indicated.
- C. Attachment Devices: Size for 5 times design load indicated in ASTM C 635-13, Table 1, Direct Hung unless otherwise indicated.
- D. Wire Hangers, Braces, and Ties: ASTM C 641-09, Class 1 zinc coating, soft temper.
 - 2. Gage: Provide wire sized so that stress at 3 times hanger design load (ASTM C 635-13, Table 1, Direct-Hung), will be less than yield stress of wire, but provide not less than 2.69 mm (0.106") diameter wire.
- E. Edge Moldings and Trim: Metal or extruded aluminum of types and profiles indicated or, if not indicated, manufacturer's standard moldings for edges and penetrations that fit type of edge detail and suspension system indicated. Provide column surround trim at round columns.
- F. Retention Clips (For Fire Rated Ceiling Assemblies): Armstrong #414 or equal by other approved acoustical panel manufacturers.
- G. Ceiling Cloud Trim: Armstrong Axiom Classic Trim #AX4STR

2.5 NON-FIRE-RESISTANCE-RATED DIRECT-HUNG SUSPENSION SYSTEMS

- A. Wide-Face Capped Double-Web Steel Suspension System: Main and cross-runners roll-formed from pre-painted or electrolytic zinc-coated cold-rolled steel sheet, with pre-finished 23 mm (15/16") wide metal caps on flanges; other characteristics as follows:
 - 1. Structural Classification: Intermediate Duty System.
 - 2. End Condition of Cross-Runners: Override (stepped) or butt-edge type, as standard with manufacturer.
 - 3. Cap Material and Finish: Steel sheet painted white.

2.6 MISCELLANEOUS MATERIALS

- A. Tile Adhesive: Type recommended by tile manufacturer, bearing UL label for Class 0-25 flame spread.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Examine substrates and structural framing to which ceiling system attaches or abuts, with Installer, for compliance with requirements specified in this and other sections that affect installation and anchorage of ceiling system.
- B. Proceeding with installation shall be deemed installer's acceptance of surface conditions to which ceiling system is attached or abutting.

3.2 PREPARATION

- A. Coordination: Furnish layouts for preset inserts, clips, and other ceiling anchors whose installation is specified in other sections.
- B. Furnish concrete inserts and similar devices to other trades for installation well in advance of time needed for coordination of other work.
- C. Measure each ceiling area and establish layout of acoustical units to balance border widths at opposite edges of each ceiling. Avoid use of less than half width units at borders, and comply with reflected ceiling plans.

3.3 INSTALLATION

- A. General: Ceiling systems installation shall be in accord with manufacturer's written instructions and CISCA "Ceiling Systems Handbook", and Standard for Installation of Ceiling Suspension Systems: ASTM C 636-13.
- B. Arrange acoustical units as indicated.
 - 1. Where ACT units are installed, provide retention clips in accord with ceiling panel manufacturer's recommendations.
- C. Suspend ceiling hangers from building structural members and as follows:
 - 1. Install hangers plumb and free from contact with insulation or other objects within ceiling plenum that are not part of supporting structural or ceiling suspension system.
 - 2. Splay hangers only where required to miss obstructions and offset resulting horizontal forces by bracing, counter-splaying, or other equally effective means.
 - 3. Where width of ducts and other construction within ceiling plenum produces hanger spacing that interferes with location of hangers at spacing required to properly support standard suspension system members, install supplemental suspension members and hangers in form of trapezes or equivalent devices.
 - 4. Size supplemental suspension members and hangers to support ceiling loads within performance limits established by referenced standards.
 - 5. Secure wire hangers by looping and wire tying, either directly to structures or to inserts, eye-screws, or other devices that are secure and appropriate for substrate, and in manner that will not cause deterioration or otherwise fail due to age, corrosion, or elevated temperatures.

6. Secure flat, angle, channel, and rod hangers to structure, including intermediate framing members, by attaching to inserts, eye-screws, or other devices that are secure and appropriate for structure to which hangers are attached and for type of hanger involved, and in manner that will not cause deterioration or fail due to age, corrosion, or elevated temperatures.
 7. Space hangers not more than 48" (1216 mm) along each member supported directly from hangers, unless otherwise shown, and provide hangers not more than 8" (200 mm) from ends of each member.
 8. Lighting, speakers or other items inserted into ceiling tiles shall be supported by building structure and not by ceiling tile or grid.
- D. Install edge moldings of type indicated at perimeter of acoustical ceiling area and where necessary to conceal edges of acoustical units.
 - E. Install acoustical panels in coordination with suspension system, with edges concealed by support of suspension members. Scribe and cut panels to fit accurately at borders and at penetrations.

3.4 CLEANING

- A. Clean exposed surfaces of acoustical ceilings, including trim, edge moldings, and suspension members.
- B. Comply with manufacturer's printed instructions for cleaning and touch-up of minor finish damage.
- C. Remove and replace work that cannot be successfully cleaned and repaired to permanently eliminate evidence of damage.

END OF SECTION

SECTION 09 65 20
RESILIENT FLOORING

PART 1 GENERAL

1.1 RELATED SECTIONS

- A. The provisions of the General Conditions, Supplementary Conditions, Drawings, Specifications, and the Sections included under Division 1, General Requirements and References are included as a part of this Section as though bound herein.

1.2 SECTION INCLUDES

- A. Provide labor, material, services, and equipment necessary to furnish and install work as indicated and as specified herein, which includes, but is not limited to:
 - 1. Work consists of vinyl composition tile flooring, composite sheet flooring, vinyl base, accessories and surface preparation required for complete installation.

1.3 RELATED SECTIONS

- A. Section 01 25 13 – Product Substitution Procedures
- B. Section 01 33 00 – Submittal Procedures
- C. Section 01 42 00 – References
- D. Section 01 45 00 – Quality Control
- E. Section 01 66 00 – Project Storage and Handling Requirements
- F. Section 01 78 00 – Closeout Submittals
- G. Section 03 54 16 – Hydraulic Cement Underlayment

1.4 REFERENCES

- A. See Section 01 42 00 – References for abbreviations, acronyms, definitions and reference standards.
- B. American Society for Testing and Materials (ASTM):
 - 1. D570-98 (2010) e1: Standard Test Method for Water Absorption of Plastics.
 - 2. D2047-11: Standard Test Method for Static Coefficient of Friction of Polish-Coated Flooring Surfaces as Measured by the James Machine.
 - 3. E648-14c: Test Method for Critical Radiant Flux of Floor-Covering Systems Using a Radiant Heat Energy Source.
 - 4. E662-15: Test Method for Specific Optical Density of Smoke Generated by Solid Materials.
 - 5. F510/F510M-14: Standard Test Method for Resistance to Abrasion of Resilient Floor Covering Using an Abrader with a Grit Feed Method.
 - 6. F710-11: Standard Practice for Preparing Concrete Floors and Other Monolithic Floors to Receive Resilient Flooring.
 - 7. F970-07(2011): Standard Test Method for Static Load Limit.
 - 8. F1066-04(2014)e1: Standard Specification for Vinyl Composition Floor Tile
 - 9. E1428-15a: Standard Test Method for Evaluating the Performance of Antimicrobials in or on Polymeric Solids Against Staining by Streptomyces Species (A Pink Stain Organism).
 - 10. F925-13: Standard Test Method for Resistance to Chemicals of Resilient Flooring

11. F1515-03 (2008): Standard Test Method for Measuring Light Stability of Resilient Flooring by Color Changes.
12. F1869-11: Standard Test Method for Measuring Moisture Vapor Emission Rate of Concrete Subfloor using Anhydrous Calcium Chloride.
13. G21-15: Standard Practice for Determining Resistance of Synthetic Polymeric Materials to Fungi.

1.5 SUBMITTALS

- A. Comply with Section 01 33 00 – Submittal Procedures.
- C. Submit product data, including installation instructions before starting work.
- D. Submit manufacturer's standard size samples of each type, color, and finish of resilient flooring and required accessories including full range of flooring color and pattern variations available from proposed manufacturer.
- E. Manufacturer's Safety Data Sheet (MSDS) for adhesive.
- F. Submit manufacturer's printed documentation indicating compliance to slip-resistant coefficient requirements.
- G. Submit manufacturer's written instructions for recommended maintenance practices for installed resilient flooring to include:
 1. Schedule: Frequency and type of maintenance defined.
 2. Equipment: Equipment and tools specified by generic language or manufacturer's name.
 3. Materials: Chemicals required to maintain flooring by brand name, quantities, and proper solutions.

1.6 QUALITY ASSURANCE

- A. Comply with Section 01 45 00 – Quality Control.
- B. Regulatory Requirements:
 1. Resilient tile flooring systems shall have minimum slip-resistant coefficients:
 - a. 0.5 for leveled floors such as assembly areas including cafeterias, multipurpose spaces and music rooms.
 - b. 0.6 for accessible routes such as interior corridors.
 - c. 0.8 for inclined floors such as ramps.
 2. Non-compliance of slip-resistant coefficient factor will be grounds for removal and disposal of installed flooring system, properly preparing floor substrate and installation of required slip-resistant flooring system at no additional expense.
 3. Taber Abrasionmeter Testing:
 - a. Weight loss of each tile shall average no more than 0.60 grams when ten tiles are abraded with aluminum oxide grit and S-39 leather wheel for 2000 cycles according to ASTM F510-14.
- C. Installer shall provide documentation of five years successful experience completing similar resilient tile installations.
- D. Preinstallation Conference:
 1. Conduct meeting at site prior to commencing tile work related to installation with parties associated with work.
 2. Review site conditions, procedures, and coordination required with related work.
- E. Mockups:
 1. Comply with Section 01 43 39 – Mockups.
 2. Provide mockup of each type of installation using approved materials and installation procedures.

3. Obtain A/E's acceptance of mock-up prior to start of resilient tile installation.
4. Approved mockup may be incorporated into project.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Comply with Section 01 66 00 – Product Storage and Handling.
- B. Deliver products in manufacturer's unopened original dry packaging, with tags and labels intact.
- C. Provide equipment and personnel to handle materials to prevent damage from dropping, careless storage, and handling.
- D. Store material in weather protected space with temperature between 65°- 90° F (18° – 32° C).

1.8 SITE CONDITIONS

- A. Maintain room and material temperature between 65° F (18° C) and 90° F (32° C) for 48 hours before, during, and 48 hours after installation. Maintain minimum 65° F. (18° C) thereafter.
- B. Prior to installation, painting shall be completed, air-conditioning system is operational, and exterior thresholds are installed.

1.9 WARRANTY

- A. Comply with Section 01 78 00 – Closeout Documents.
- B. Furnish manufacturer's warranty covering manufacturing defects for a period of 2 years and 10 years for traffic wear resistance, excluding abusive treatment.
- C. Installer shall warrant in writing to correct conditions due to faulty installation or replace defective materials after project completion, including loss of adhesion to substrate.

PART 2 PRODUCTS

2.1 MATERIALS

- A. Products and manufacturers specified are approved for project. Other manufacturers may submit requests for product substitution in accord with Section 01 25 13 – Product Substitution Procedures.

2.2 SUPPLIER: AVA by Novalis Innovative Flooring; distributed by Capri cork email: sales@avaflor.com website: www.avaflor.com.

2.3 SUBSTITUTIONS: Refer to Division 1 Project Requirements for Product Substitution procedures.

2.4 PRODUCT OPTIONS

- A. AVA SMPL HPC Floating Plank
 1. Gauge: 2.5 mm (nominal)
 2. Wear layer: 0.5 mm (20.0
 3. Core Specification: 4.0 mm high performance vinyl core, 1050 kg/m³ density
 4. Acoustical Backing: 1.0 mm cork underlayment
 5. Size: Planks: 7' x 48' planks

6. Carton: Planks: 22.836 sq. ft.
7. Edges: Straight Edge
8. Installation Method: Floating /Triple Lock Locking Mechanism
9. Color Planks:
Tangent Collection; Color: Charcoal; SKU; T20-600
10. Cobalt Tangent HPC construction is also available with any of the AVA DSGN, SNSE, STYL or SPRK colors/patterns for a minimum order of 4000 sf per color/patterns; lead times will apply.

2.5 PERFORMANCE: Physical properties of Cobalt Planks and Tiles shall conform to the published technical specifications for each individual product. Technical data can be found at www.cobaltsurfaces.com.

2.6 ACCESSORY PRODUCTS

- A. Provide matching trims, moldings and reducing strips specifically designed for luxury vinyl flooring. Architect / Designer shall specify the type and color of each molding. Follow industry or manufacturer's guidelines for proper use and installation of all moldings.
- B. Cleaning Products: Architect can specify per the latest edition of the maintenance instructions (available from www.avaflor.com).
- C. Resilient Tile Base:
 1. Manufacturers:
 - a. Armstrong World Industries, 2500 Columbia Ave., Lancaster, PA. 17603; Tel: 717-397-0611; Website: www.armstrong.com.
 - b. Flexco Corp., 1401 East 6th St., Tuscumbia, AL 35674; Tel: 800-633-3151; Fax: 800-346-9075; Website: www.flexcofloors.com.
 - c. Tarkett Collection by Johnsonite, Inc., 16910 Munn Rd., Chagrin Falls, OH 44023; Tel: 800-899-8916, 440-543-8916; Fax: 440-543-8920; Website: www.johnsonite.com.
 - d. Burke Mercer Industries, Inc., 2250 South Tenth St., San Jose, CA 95112; Tel: 800-447-8442; Website: www.burkemercerflooring.com.
 - e. Roppe Corp., 1602 N. Union St., P.O. Box 1158, Fostoria, OH 44830-1158.
 2. Base:
 - a. 0.125" (3.18 mm) thick, 4" (101 mm) high, Type TP rubber base with cove profile.
 - b. Colors shall be judged equivalent, as determined by A/E.
 - c. At corners, provide inside/outside corners as applicable to specific corner, to extend 4" (101 mm) (minimum) beyond corners.
- D. Accessories:
 1. Manufacturer (Basis of Design): Armstrong World Industries, 2500 Columbia Ave., 3001, Lancaster, PA. 17603; Tel: 717-397-0611; Website: www.armstrong.com.
 2. Transition Strips: Homogeneous vinyl, tapered edges in colors selected by A/E.
 - a. Carpet to tile reducer: VT0.
 - b. Carpet to concrete: VT2.
 - c. Tile to concrete: VT8.
 3. Tile Adhesive: Non-toxic with zero VOC content, waterproof, stabilized type as recommended by resilient tile flooring manufacturer.
- E. Subfloor Filler:
 1. Leveling concrete patching compound and leveling concrete underlayment shall be in accord with Section 03 30 00 – Concrete, Para. 2.5.

PART 3 EXECUTION

3.1 INSPECTION

- A. Notify Contractor/CM of work surface conditions detrimental to proper installation of work. Do not proceed until conditions have been corrected in manner acceptable to installer.
- B. Substrate surfaces shall be thoroughly cleaned of debris and have been reviewed for flatness and levelness per Section 03 30 00 – Concrete. Surface irregularities shall be filled or leveled as required.
- C. Verify condition of substrate by testing concrete in accord with ASTM F1869-11 and obtain results of 5lbs. (2.27 kg) or less of vapor transmission (MVER), surface alkali of 9 or less as measured by ph test paper, and be free of carbonization and dust.
- D. Proceeding with installation indicates installer's acceptance of substrate conditions.

3.2 PREPARATION

- A. Comply with ASTM F710-11, manufacturer's printed recommendations, and as specified for surface preparation.
- B. Concrete flatness and levelness shall comply with Section 03 30 0 – Concrete Para. 3.06. Grind down ridges and irregularities or fill to comply with requirements.
- C. Remove loose impediments from substrate with power vacuum.
- D. Fill cracks, holes, and depressions with cementitious based or underlayment as noted in Part 2 - Products.
- F. Remove paint, oils, bond breakers, waxes, and sealers from surface. Inorganic solvents shall not be used.
- G. See Section 03 54 16 – Hydraulic Cement Underlayment for preparation of uneven and damaged flooring.

3.3 INSTALLATION

- A. Lay resilient flooring, base and accessories with adhesive cement in accord with manufacturer's recommendations in patterns indicated.
- B. Layout:
 - 1. Butt tightly to vertical surfaces, thresholds, nosings, and edges.
 - 2. Scribe, as necessary, around obstructions to produce neat joints, laid tight, even, and straight.
 - 3. Extend flooring into toe spaces, door reveals, into closets, and similar openings.
 - 4. Install border tiles next to walls of not less than one half tile and of approximately equal size around the perimeter of room.
- C. Fill surface imperfections such as cracks, depressions, or rough areas with underlayment.
- D. Provide ventilation in areas where adhesive is being used. When natural ventilation is inadequate, use safety-spark-proof fans and prohibit smoking.
- E. Transition (Edge) Strips:
 - 1. Install vinyl transition (edge) strips wherever exposed edges of resilient flooring materials occur.
 - 2. Where resilient flooring stops at doorways, set transition thresholds directly under doors in closed position.

3.4 CLEANING, POLISHING AND PROTECTION

- A. Remove excess adhesive and other soilings from floors and adjacent surfaces, using neutral type cleaners as recommended by resilient flooring manufacturer.
- B. Do not use acids or other caustic solutions as cleaning agents.
- C. Clean and apply six (6) coats of liquid wax floor finish in accord with manufacturer's printed instructions.
- D. Prohibit traffic on floors for 48 hrs. Protect installed flooring from damage by covering with clean, heavy duty building paper from time of cleaning until work area is complete.
- E. Do not allow movement of heavy objects over flooring which could damage flooring or finish.
- F. Replace flooring damaged by subsequent construction operations.

END OF SECTION

SECTION 09 65 21
RESILIENT TILE FLOORING REFINISHING

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

- A. The provisions of the General Conditions, Supplementary Conditions, Drawings, Specifications, and the Sections included under Division 1, General Requirements and References are included as a part of this Section as though bound herein.

1.2 SUMMARY

- A. Provide labor, material, services, and equipment necessary to furnish and install work as indicated and as specified herein, which includes, but is not limited to:
 - 1. Vinyl Composition Tile Refinishing

1.3 ACTION SUBMITTALS

- A. Product Data: Submit technical data on each item specified including certification by manufacturer that products supplied for installation comply with local regulations controlling use of volatile organic compounds (VOC's).

1.4 INFORMATION SUBMITTALS

- A. Maintenance Data: Submit maintenance manuals for flooring materials provided to be included in Operation and Maintenance Manuals.

1.5 QUALITY ASSURANCE

- A. Manufacturer's Qualifications: Provide products from a firm that makes the indicated products as a regular production item and with not less than five (5) years experience.
- B. Refinisher Qualifications: An entity that employs refinishers who are trained for refinishing assemblies with not less than three (3) years experience.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Deliver refinishing products to Project site in original manufacturer's unopened cartons and containers each bearing names of product and manufacturer, Project identification, and shipping and handling instructions.

1.7 FIELD CONDITIONS

- A. Close spaces to traffic during refinishing.

PART 2 – PRODUCTS

2.1 MISCELLANEOUS MATERIALS

- A. VCT Floor Stripper: Flooring manufacturer’s standard floor stripper used to remove floor finishes, dirt, grime, oil, stains, tar, gum adhesives and scuffmarks.
- B. VCT Floor Finish: Low odor, ultra-high solids acrylic, white opaque liquid coating. Drying time shall be no more than 30 minutes in standard conditions. Non-Volatile Solids (%) 25.5 +/- 0.5. Coverage rate – approximately 2,500 sq. ft. per gallon Product shall: have a 3-year strip and re-coat cycle; be scuff, scratch and abrasion resistant; respond to ultra-high speed burnishing; and has a refractive index not less than 1.3861 and a maximum of 1.3898. UL classified for slip resistance.
 - 1. National Chemical Laboratories (NCL), Inc.: “24/7 Extended Performance Floor Finish”

PART 3 – EXECUTION

3.1 REFINISHING

- A. Vacuum the floor to pick up all dust and debris. Scrape off anything that is stuck on the floor so that the finish does not seal it onto the floor surface.
- B. Mix stripper and cold water in a bucket according to label instructions. Mop the floor with a generous amount of stripper and allow it to set without drying for seven to 10 minutes.
- C. Agitate the stripper using a floor machine with a stripping pad. Move the machine in a circular motion across the floor surface. Vacuum up the floor stripper with a wet-dry vacuum equipped with a mounted squeegee. Apply stripper, agitate and rinse again if there is a heavy buildup.
- D. Line one bucket with a trash bag so that you can dispose of the floor finish after you have completed the job. Fill the bucket a quarter full with floor finish, and fill another bucket half full with water. Soak the mop in the water and thoroughly wring the mop. Dip the mop in the floor finish and wring it again.
- E. Mop the finish onto the vinyl floor, moving the mop in a figure-eight pattern to ensure complete coverage. Begin at the corner that is farthest from the entrance. Apply the finish to the perimeter of the floor and then to one small segment of the open floor at a time, working toward the entrance. Allow the first coat to dry 30 minutes.
- F. Buff the floor so that the second coat of finish will adhere to the first coat. Apply a second coat of finish to the floor and apply additional coats until the floor looks wet when it is dry. Let the final coat dry at least 12 hours.

END OF SECTION 09 65 21

SECTION 09 91 00
PAINTING

PART 1 GENERAL

1.1 RELATED DOCUMENTS

- A. The provisions of the General Conditions, Supplementary Conditions, Drawings, Specifications, and the Sections included under Division 1, General Requirements and References are included as a part of this Section as though bound herein.

1.2 SECTION INCLUDES

- A. Provide labor, material, services, and equipment necessary to furnish and install work as indicated and as specified herein, which includes, but is not limited to:
- B. Surface preparation and field application of paints and coatings.
1. Exposed interior items and surfaces.
 2. Surface preparation, priming and finish coats specified are in addition to shop priming and surface treatment specified elsewhere.
- C. Paint exposed surfaces, except where paint schedule indicates surfaces or materials to remain unpainted.
- D. If paint schedule do not specifically mention items or surfaces, paint to match adjacent materials or surfaces.
- E. If paint schedule does not indicate color or finish, the Architect will select color or finish from manufacturer's standard colors or finishes.
- F. Painting includes field painting of exposed and covered pipes and ducts, color coding, hangars, exposed steel and iron work, and primed metal surfaces of mechanical and electrical equipment.
- G. Do not paint prefinished items, concealed building surfaces, finished metal surfaces, operating parts, and labels.
1. Prefinished items include the following factory finished components:
 - a. Architectural woodwork and casework.
 - b. Finished mechanical and electrical equipment.
 - c. Light fixtures.
 - d. Distribution cabinets.
 2. Concealed surfaces include walls or ceilings in the following normally concealed spaces:
 - a. Furred areas.
 - b. Ceiling plenums.
 - c. pipe chases.
 - d. Duct shafts.
 3. Finished metal surfaces include the following:
 - a. Anodized aluminum.
 - b. Stainless Steel.
 - c. Pre-finished aluminum or steel.
 4. Operating parts include moving parts of operating equipment and the following items:
 - a. Valve and damper operators.
 - b. Linkages.
 - c. Sensing devices.
 - d. Motor and fan shafts.

- G. Do not paint over Underwriter's Laboratories (UL), Factory Mutual (FM), or other code-required labels, equipment names, identification, performance rating, or other nomenclature plates.

1.3 RELATED SECTIONS

- A. Section 01 25 13 – Request for Substitution
- B. Section 01 31 00 – Project Management and Coordination
- C. Section 01 33 00 – Submittal Procedures
- D. Section 01 42 00 – References
- E. Section 01 45 00 – Quality Control
- F. Section 01 74 00 – Cleaning and Waste Management
- G. Section 01 78 00 – Closeout Submittals
- H. Section 10 14 00 – Signage
- I. Section 21 05 53 – Identification for fire Suppression Piping and Equipment
- J. Section 22 05 53 – Identification for Plumbing Piping and Equipment

1.4 REFERENCES

- A. See Section 01 42 00 – References for additional reference standards, acronyms, abbreviations and definitions.
- B. American Society of Testing Materials (ASTM):
 - 1. ASTM D1614: Standard Terminology for Paint, Related Coatings, Materials and Applications
 - 2. ASTM D4442-15: Standard Test Method for Direct Moisture Content Measurement of Wood and Wood Based Materials
- C. NACE (National Association of Corrosion Engineers) - Industrial Maintenance Painting.
- D. NPCA (National Paint and Coatings Association) - Guide to U.S. Government Paint Specifications.
- E. PDCA (Painting and Decorating Contractors of America) - Painting - Architectural Specifications Manual.
- F. SSPC (Steel Structures Painting Council) - Steel Structures Painting Manual.
 - 1. SP 1 - Solvent Cleaning.
 - 2. SP 2 - Hand Tool Cleaning.
 - 3. SP 3 - Power Cleaning.

1.5 SUBMITTALS

- A. Comply with Section 01 33 00 - Submittals.
- B. Product Data: Provide manufacturer's specifications and data sheets for each paint and coating product indicating the following:
 - 1 Product Characteristics.
 - 2 Surface preparation instructions.
 - 3 Primer requirements.
 - 4 Storage and handling requirements.
 - 5 Application methods.
 - 6 Precautionary requirements.
- C. Provide a list of required coatings indicating each material and cross referencing each specific coating, finish system and application by manufacturer's product number, color and classification.

1. Include manufacturer's technical information, label analysis and application instructions for each product.
 2. Provide certification that products comply with regulations controlling use of volatile organic compounds (VOC).
- D. Samples:
1. Submit manufacturer's color charts indicating full range of colors for each product indicated.
 2. Submit two 9" (22.9 cm) x 9" (22.9 cm) samples of each product illustrating selected colors, sheens and textures for each product.
- E. Manufacturer's Instructions: Indicate special surface preparation procedures, substrate conditions requiring special attention.
- F. Provide manufacturer's warranties for each product used.

1.6 QUALIFICATIONS

- A. Manufacturer: Company shall specialize in manufacture of the products specified with minimum ten years continuous documented manufacturing experience.
- B. Applicator: Company specializing in performing the work of this section with five years minimum continuous documented experience on similar project scope.

1.7 REGULATORY REQUIREMENTS

- A. Conform to applicable codes for flame and smoke rating requirements for finishes.

1.8 MOCK UP PANELS

- A. Comply with Section 01 45 00 – Quality Control.
- B. Provide a complete room field sample illustrating coating color, texture, and finish.
- C. Locate mockups where directed by Architect and Owner's Project Manager.
- D. Work samples that are accepted may remain as part of completed work.
- E. Work is not to proceed until mockups are approved.

1.9 DELIVERY, STORAGE, AND HANDLING

- A. Comply with Section 01 66 00 – Product Storage and Handling Requirements for delivery, storage, protection and handling of products.
- B. Deliver products to site in sealed and labeled containers; inspect to verify acceptability.
- C. Container label to include manufacturer's name, type of paint, brand name, lot number, batch date, color name and number, surface coverage, surface preparation, drying time, cleanup requirements, environmental issues, VOC content, and instructions for mixing.
- D. Store paint materials at minimum ambient temperature of 45° F (7° C) and maximum of 90° F (32° C) in ventilated area and as required by manufacturer's instructions.

1.10 ENVIRONMENTAL REQUIREMENTS

- A. Do not apply materials when surface and ambient temperatures are outside temperature ranges required by paint product manufacturer.
- B. Minimum Application Temperatures for Latex Paints: 45° F (7° C) for interiors.
- C. Minimum Application Temperature for Varnish and Stain Finishes: 65° F (18° C) for interior unless required otherwise by manufacturer's instructions.

- D. Provide lighting level of 80 foot-candles measured mid-height at substrate surface.
- E. Dispose of waste in accord with applicable regulations.

1.11 PRE-INSTALLATION MEETING

- A. Comply with Section 01 31 00 – Project Coordination for sequencing of trades to allow timely work start and completion.
- B. Pre-installation meeting shall be held minimum of one week prior to scheduled work start to verify acceptable condition of substrate surfaces to be painted, sequencing and protection of work until substantial completion.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Acceptable Manufacturer:
 - 1. The Sherwin-Williams Company, 101 Prospect Avenue NW, Cleveland, OH 44115; Tel: 1 800-321-8194; Fax: 216-566-1392; website: www.sherwin-williams.com.
- B. Other manufacturers may submit their products for approval per Section 01 25 13 – Substitutions Procedures. Manufacturers shall specify which Sherwin Williams products conform to products proposed for substitution.

2.2 MATERIALS

- A. Paintings and Coatings:
 - 1. Ready mixed, unless otherwise indicated.
 - 2. Process pigments to soft paste consistency, capable of being readily and uniformly dispersed to homogeneous coating; good flow and brushing properties.
 - 3. Capable of drying or curing free of streaks or sags.
- B. Accessory Materials: Coating application accessories shall be in accord with manufacturer's recommendations for patching materials, sealers, cleaning agents, cleaning cloths, primers, sanding paper, clean up materials, and other materials not specifically indicated but required to achieve specified finishes.

2.3 FINISHES

- A. Refer to schedule in Paragraphs 3.7 and 3.8 for interior surface finishes.
- B. Paint colors will be selected by Owner. Contractor/CM shall submit color samples to Architect who shall prepare color board for Owner's review and approval.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that surfaces are ready to receive work as instructed by the product manufacturer.
- B. Examine surfaces scheduled to be finished prior to commencement of work. Report any condition that may potentially affect proper paint application.
- C. Do not begin work until surfaces are ready to receive paint coatings. Start of work indicates acceptance of surfaces.
- D. Test shop applied primer for compatibility with subsequent cover materials.

- E. Measure moisture content of surfaces using an electronic moisture meter. Do not apply finishes unless moisture content of surfaces are below the following maximums:
 - 1. Plaster and Gypsum Wallboard: 12%.
 - 2. Masonry, Concrete, and Concrete Unit Masonry: 12%.
 - 3. Interior Wood: 15%, measured in accord with ASTM D4442-15.
 - 4. Concrete Floors: 8%.

3.2 PREPARATION

- A. Remove or mask electrical plates, hardware, light fixture trim, escutcheons and fittings prior to preparing surfaces or finishing.
- B. Correct defects and clean surfaces that affect work. Remove existing coatings that exhibit loose surface defects.
- C. Seal surface marks which may bleed through surface finishes.
- D. Remove mildew on surfaces per manufacturer's written recommendations.
- E. Aluminum Surfaces Scheduled for Paint Finish: Remove surface contamination by steam or high-pressure water. Remove oxidation with acid etch and solvent washing. Apply etching primer immediately following cleaning.
- F. Gypsum Board Surfaces: Fill minor defects with filler compound. Spot prime defects after repair.
- G. Galvanized Surfaces: Remove surface contamination and oils and wash with solvent. Apply coat of etching primer.
- H. Concrete and Unit Masonry Surfaces Scheduled to Receive Paint Finish: Remove dirt, loose mortar, scale, salt or alkali powder, and other foreign matter. Remove oil and grease with a solution of tri-sodium phosphate; rinse well and allow to dry. Remove stains caused by weathering of corroding metals with solution of sodium metasilicate after thoroughly wetting with water. Allow to dry.
- I. Plaster Surfaces: Fill hairline cracks, small holes, and imperfections with latex patching plaster. Make smooth and flush with adjacent surfaces. Wash and neutralize high alkali surfaces.
- J. Uncoated Steel and Iron Surfaces: Remove grease, mill scale, weld splatter, dirt and rust. Where heavy coatings of scale are evident, remove by power tool, wire brushing or sandblasting; clean by washing with solvent. Apply treatment of phosphoric acid solution, ensuring weld joints, bolts, and nuts are similarly cleaned. Spot prime paint after repairs.
- K. Shop Primed Steel Surfaces: Sand and scrape to remove loose primer and rust. Feather edges to make touch-up patches inconspicuous. Clean surfaces with solvent. Prime steel surfaces.
- L. Interior Wood Items Scheduled to Receive Finish: Wipe off dust and grit prior to priming. Seal knots, pitch streaks, and sappy sections with sealer. Fill nail holes and cracks after primer has dried; sand between coats.
- R. Interior Wood Items Scheduled to Receive Transparent Finish: Wipe off dust and grit prior to sealing, seal knots, pitch streaks, and sappy sections with sealer. Fill nail holes and cracks after primer has dried; sand lightly between coats.
- S. Wood and Metal Doors Scheduled for Painting: Seal top and bottom edges with primer and paint per Schedule.

3.3 APPLICATION

- A. Apply products in accord with manufacturer's written installation instructions.
- B. Do not apply paint coatings finishes to surfaces that are not dry, immediately before or after rain, during foggy conditions, or when temperature is less than 50° F (10° C).
- C. Apply each coat to uniform finish.

- D. Apply each coat of paint slightly darker than preceding coat unless otherwise approved.
- E. Sand wood and metal lightly between coats to achieve required finish.
- F. Vacuum clean surfaces free of loose particles. Use tack cloth just prior to applying next coat.
- G. Allow applied coat to dry before next coat is applied.
- H. Where clear finishes are required, tint fillers to match wood. Work fillers into the grain before set. Wipe excess from surface.
- I. Prime concealed surfaces of interior woodwork scheduled to receive stain or varnish finish with gloss varnish reduced 25% with mineral spirits.

3.4 FINISHING MECHANICAL AND ELECTRICAL EQUIPMENT

- A. Coordinate with Mechanical and Electrical Specifications and Drawings for schedules of color-coding and identification banding of equipment, ductwork, piping, and conduit.
- B. Paint shop primed equipment.
- C. Remove unfinished louvers, grilles, covers, and access panels on mechanical and electrical components and paint separately.
- D. Prime and paint insulated and exposed pipes, conduit, boxes, insulated and exposed ducts, hangers, brackets, collars and supports, in finished areas, except where items are pre-finished.
- E. Paint interior surfaces of air ducts, and convactor and baseboard heating cabinets that are visible through grilles and louvers with one coat of flat black paint, to visible surfaces. Paint dampers exposed behind louvers, grilles and to match face panels.
- F. Paint exposed conduit and electrical equipment occurring in finished areas.
- G. Paint both sides and edges of plywood backboards for electrical and telephone equipment before installing equipment.
- H. Color code equipment, piping, conduit, and exposed ductwork in accord with requirements indicated. Color band and identify with flow arrows, names, and numbering.
- I. Reinstall electrical cover plates, hardware, light fixture trim, escutcheons and fittings removed prior to finishing.

3.5 FIELD QUALITY CONTROL

- A. Field inspection and testing will be performed in accord with Section 01 45 00 – Quality Control.

3.6 CLEANING

- A. Clean work under provisions of 01 74 00 – Cleaning and Waste Management.
- B. Collect cotton waste material that may constitute a fire hazard, place in closed metal containers and remove daily from site.

3.7 PAINT TYPE AND NUMBER OF COATS

- A. Painting schedules are intended to identify type of finishes which are required for various surfaces, and to identify surfaces to which each finish is to be applied. Refer to Room Finish Schedule.
- B. Requirements for quality, function, size, gauges, grades, textures, and color of materials are designated by manufacturer's brands, types, and number of coats required and other requirements that are to be furnished to conform to requirements of work.
- C. Where specific finishes are indicated by code designation, refer to identified types of coatings.

- D. Primers indicated under Material Identification is intended for particular substrate surface specified. Where same numbered finish are scheduled, but for another substrate, provide primer compatible with substrate and finish.
- E. Where substrate has compatible and satisfactory prime coat applied, prime coat specified for numbered finish may be omitted. Test prime coat for compatibility before applying additional coats.

3.9 INTERIOR PAINTING SCHEDULE

- A. Concrete Surfaces (Poured Concrete, Pre-Cast Concrete, Cast-In-Place Concrete, Tilt-Wall Concrete Panels, Concrete Beams, Ceilings, Stairs, Joists, and Columns).
 - 1. Egg Shell Finish (Low Odor/Low VOC):
 - a. 1st Coat: S-W Loxon Acrylic Masonry Primer, A24W8300 Series (8.0 mils wet/3.2 mils dry).
 - b. 2nd Coat: S-W ProGreen 200 Interior Latex Enamel, B20W3200 Series (4.0 mils wet/1.6 mils dry).
 - c. 3rd Coat: S-W ProGreen 200 Interior Latex Enamel, B20W3200 Series (4.0 mils wet/1.6 mils dry).
 - 2. Semi Gloss Finish (Low Odor/Low VOC):
 - a. 1st Coat: S-W Loxon Acrylic Masonry Primer, A24W8300 Series (8.0 mils wet/3.2 mils dry).
 - b. 2nd Coat: S-W ProGreen 200 Interior Latex Semi Gloss, B31W2200 Series (4.0 mils wet/1.3 mils dry).
 - c. 3rd Coat: S-W ProGreen 200 Interior Latex Semi Gloss, B31W2200 Series (4.0 mils wet/1.3 mils dry).
 - 3. Flat Finish (Low Odor/Low VOC):
 - a. 1st Coat: S-W Loxon Acrylic Masonry Primer, A24W8300 Series (8.0 mils wet/3.2 mils dry).
 - b. 2nd Coat: S-W ProGreen 200 Interior Latex Flat, B30W651 Series (4.0 mils wet/1.3 mils dry).
 - c. 3rd Coat: S-W ProGreen 200 Interior Latex Flat, B30W651 Series (4.0 mils wet/1.3 mils dry).
- B. Masonry (CMU- smooth, split, scored and fluted concrete units).
 - 1. Flat Finish:
 - a. 1st Coat: S-W PrepRite Block Filler, B25W25 Series (75-125 s.f./gal.).
 - b. 2nd Coat: S-W ProGreen 200 Interior Latex Flat, B30W651 (4.0 mils wet/1.8 mils dry).
 - c. 3rd Coat: S-W ProGreen 200 Interior Latex Flat, B30W651 (4.0 mils wet/1.8 mils dry).
 - 2. Egg Shell Finish:
 - a. 1st Coat: S-W PrepRite Block Filler, B25W25 Series (75-100 s.f./gal.3.6 mils).
 - b. 2nd Coat: S-W ProGreen 200 Interior Latex Eg-Shel, B20W2200 Series (4.0 mils wet/1.6 mils dry).
 - c. 3rd Coat: S-W ProGreen 200 Interior Latex Eg-Shel, B20W2200 Series (4.0 mils wet/1.6 mils dry).
 - 3. Semi Gloss Finish:
 - a. 1st Coat: S-W PrepRite Block Filler, B25W25 Series (75-125 s.f./gal.).
 - b. 2nd Coat: S-W ProGreen 200 Interior Latex Semi Gloss, B31W600 Series (4.0 mils wet/1.6 mils dry).

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- c. 3rd Coat: S-W ProGreen 200 Interior Latex Semi Gloss, B31W600 Series (4.0 mils wet/1.6 mils dry).
 - C. Metal Surfaces (Aluminum if not prefinished, Galvanized Steel metal doors, frames, railings, exposed ductwork, pipes and conduits and ferrous metal surfaces).
 - 1. Flat Finish:
 - a. 1st Coat: S-W Industrial ProCryl Universal Primer, B66-310 Series (5-10 mils wet/2-4 mils dry).
 - b. 2nd Coat: S-W ProGreen 200 Interior Latex Semi Gloss, B30W651 Series (4.0 mils wet/1.8 mils dry).
 - c. 3rd Coat: S-W ProGreen 200 Interior Latex Semi Gloss, B30W651 Series (4.0 mils wet/1.8 mils dry).
 - 2. Egg Shell Finish:
 - a. 1st Coat: S-W Industrial ProCryl Universal Primer, B66-310 Series (5-10 mils wet/2-4 mils dry).
 - b. 2nd Coat: S-W ProGreen 200 Interior Latex Eg-Shel, B20W651 Series (4.0 mils wet/1.6 mils dry).
 - c. 3rd Coat: S-W ProGreen 200 Interior Latex Eg-shel, B20W651 Series (4.0 mils wet/1.6 mils dry).
 - D. Metal (Exposed Structural Steel Columns, Trusses, Beams, Miscellaneous Ornamental Iron and Ferrous Metals).
 - 1. Flat Finish:
 - a. 1st Coat: S-W Industrial ProCryl Universal Primer, B66-310 Series (5-10 mils wet/2-4 mils dry).
 - b. 2nd Coat: S-W ProGreen 200 Interior Latex Flat, B30W651 Series (4.0 mils wet/1.8 mils dry).
 - c. 3rd Coat: S-W ProGreen 200 Interior Latex Flat, B30W651 Series (4.0 mils wet/1.8 mils dry).
 - 2. Egg Shell Finish:
 - a. 1st Coat: S-W Industrial ProCryl Universal Primer, B66-310 Series (5-10 mils wet/2-4 mils dry).
 - b. 2nd Coat: S-W ProGreen 200 Interior Latex Eg-Shel, B20W651 Series (4.0 mils wet/1.6 mils dry).
 - c. 3rd Coat: S-W ProGreen 200 Interior Latex Eg-Shel, B20W651 Series (4.0 mils wet/1.6 mils dry).
 - 3. Semi Gloss Finish:
 - a. 1st Coat: S-W Industrial ProCryl Universal Primer, B66-310 Series (5-10 mils wet/2-4 mils dry).
 - b. 2nd Coat: S-W ProGreen 200 Interior Latex Semi Gloss, B31W600 Series (4.0 mils wet/1.6 mils dry).
 - c. 3rd Coat: S-W ProGreen 200 Interior Latex Semi Gloss, B31W600 Series (4.0 mils wet/1.6 mils dry).
 - E. Wood Surfaces (Windows, Sills, Door Trim, Wall Paneling and other wood surfaces not factory finished or indicated otherwise).
 - 1. Flat Finish:
 - a. 1st Coat: S-W PrepRite ProBlock Latex, B51 Series, (4.0 mils wet/1.4 mils dry).
 - b. 2nd Coat: ProGreen 200 Interior Latex Flat, Series B30W651 (4.0 mils wet/1.8 mils dry).
 - c. 3rd Coat: ProGreen 200 Interior Latex Flat, Series B30W651 (4.0 mils wet/1.8 mils dry).

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2. Egg Shell Finish:
 - a. 1st Coat: S-W PrepRite ProBlock Latex, B51 Series, (4.0 mils wet/1.4 mils dry).
 - b. 2nd Coat: ProGreen 200 Interior Latex Eg-Shel, Series B20W651 Series (4.0 mils wet/1.6 mils dry)
 - c. 3rd Coat: ProGreen 200 Interior Latex Eg-Shel, Series B20W651 Series (4.0 mils wet/1.6 mils dry)
 3. Semi Gloss Finish:
 - a. 1st Coat: S-W PrepRite ProBlock Latex, B51 Series, (4.0 mils wet/1.4 mils dry).
 - b. 2nd Coat: ProGreen 200 Interior Latex Semi-Gloss, Series B31W600 Series (4.0 mils wet/1.6 mils dry)
 - c. 3rd Coat: ProGreen 200 Interior Latex Semi-Gloss, Series B31W600 Series (4.0 mils wet/1.6 mils dry)
 4. Stain and Varnish Satin Finish:
 - a. 1st Coat: S-W MinWax 250 VOC Oil Stain.
 - b. 2nd Coat: Wood Classics® Waterborne Polyurethane Varnish (4mils wet/1.0 mil dry).
 - c. 3rd Coat: Wood Classics® Waterborne Polyurethane Varnish (4mils wet/1.0 mil dry).
- F. Drywall and Plaster Surfaces (Walls, columns, ceilings, soffits, bulkheads, light shelves and soffits).
1. Flat Finish:
 - a. 1st Coat: ProGreen 200 Interior Latex Primer, Series B28W8200 Series (4.0 mils wet/1.5 mils dry).
 - b. 2nd Coat: ProGreen 200 Interior Latex Flat, Series B30W651 Series (4.0 mils wet/1.4 mils dry).
 - c. 3rd Coat: ProGreen 200 Interior Latex Flat, Series B30W651 Series (4.0 mils wet/1.4 mils dry).
 2. Egg Shell Finish:
 - a. 1st Coat: ProGreen 200 Interior Latex Primer, Series B28W8200 Series (4.0 mils wet/1.5 mils dry).
 - b. 2nd Coat: ProGreen 200 Interior Latex Eg-Shel, Series B30W651 Series (4.0 mils wet/1.6 mils dry).
 - c. 3rd Coat: ProGreen 200 Interior Latex Flat, Series B30W651 Series (4.0 mils wet/1.6 mils dry).
 3. Semi Gloss Finish:
 - a. 1st Coat: ProGreen 200 Interior Latex Primer, Series B28W8200 Series (4.0 mils wet/1.5 mils dry).
 - b. 2nd Coat: ProGreen 200 Interior Latex Semi-Gloss, Series B31W600 Series (4.0 mils wet/1.6 mils dry).
 - c. 3rd Coat: ProGreen 200 Interior Latex Semi-Gloss, Series B31W600 Series (4.0 mils wet/1.6 mils dry).
- G. Epoxy System (Water Base)
1. Gloss Finish
 - a. 1st Coat: S-W ProGreen 200 Interior Latex Primer, B28W600 (4-mil wet, 1.5-mil dry)
 - b. 2nd Coat: S-W Waterbased Catalyzed Epoxy, B70W211 / B60V15
 - c. 3rd Coat: S-W Waterbased Catalyzed Epoxy, B70W211 / B60V15 (2.5 - 3-mil dry per coat)

END OF SECTION

10

DIVISION

SPECIALTIES

SECTION 10 14 00
SIGNAGE

PART 1 GENERAL

1.1 RELATED DOCUMENTS

- A. The provisions of the General Conditions, Supplementary Conditions, Drawings, Specifications, and the Sections included under Division 1, General Requirements and References are included as a part of this Section as though bound herein.

1.2 SECTION INCLUDES

- A. Provide labor, materials, services, and equipment necessary to furnish and install work as indicated and as specified herein, which includes, but is not limited to:
 - 1. Tactile/raised letter plastic signs
 - 2. Individual plastic characters signs
 - 3. Signs of silk-screened characters on plastic
 - 4. Required sign type:
 - a. Interior room, space, and area ID signs
 - b. International symbols of accessibility for accessible spaces and exits
 - c. Accessible routes
 - d. Tactile "exit" signs
 - e. Hazard and safety signs
 - f. Evacuation plans

1.3 REFERENCES

- A. ANSI A117.1 – Specifications for Making Buildings and Facilities Accessible To and Usable By Physically Handicapped People
- B. FBC – Florida Building Code
- C. NFPA 101: 7.10.1.3

1.4 SUBMITTALS

- A. Submit shop drawings as specified.
- B. Indicate sign styles, lettering font, foreground and background colors, locations, overall dimensions of each sign and anchorage.
- C. Provide complete interior sign schedule showing sign type, location, and verbiage.
- D. Samples: Submit two sample signs in size illustrating type, style, letter font, and colors specified, and method of attachment.
- E. Provide manufacturer's installation instructions, templates, and attached devices.
- F. Colors shall be as selected by the Architect.

1.5 QUALIFICATIONS

- A. Manufacturer: Company specializing in manufacturing the products specified in this section with minimum three years documented experience.

1.6 REGULATORY REQUIREMENTS

- A. Conform to applicable codes for requirements for the physically handicapped, safety and egress.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Deliver, store, protect, and handle products to site.
- B. Package signs, labeled in name groups
- C. Store adhesive attachment tape at ambient room temperatures

1.8 ENVIRONMENTAL REQUIREMENTS

- A. Do not install signs when ambient temperature is lower than recommended by manufacturer.
- B. Maintain this minimum temperature during and after installation of signs.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturer shall be one of the following however products of other manufacturers will be considered for acceptance provided they equal or exceed the material requirements and functional qualities of the specified product and acceptance is provided by the architect in writing prior to bidding.
 - 1. ASI Sign Systems, Indianapolis, Indiana; Cincinnati, Ohio; Cleveland, Ohio
 - 2. Andco Industries Corp., Greensboro, North Carolina
 - 3. Baron Signs, Lake Park, Florida
 - 4. Multi-Graphics, Inc. Pelham, Georgia

2.2 FLORIDA AMERICANS WITH DISABILITIES ACT REQUIREMENTS

- A. Manufacturer shall conform to tactile, Braille, letter size, and other requirements as required by Florida Accessibility Code for Building Construction and ANSI A117.1.
- B. ADA requirements supersede technical specifications in this Section.

2.3 BUILDING SIGNAGE – GENERAL

- A. General; applies to all signs except as noted:
 - 1. Material shall be minimum 1/8" clear matte acrylic stock with 3/8" radius corners.
 - a. Interior signs – Shall be material of non-petroleum base phenolic resin using sand carving process to create the raised lettering, which is an integral part of the sign.
 - b. Paint shall be Matthews Acrylic Polyurethane system or equal.
 - i) Shall be low VOC
 - ii) Shall be UV Stable
 - iii) Shall be lead and chromate free
 - iv) Minimum life expectancy of 10-years
 - 2. Applied lettering not allowed.
 - 3. Letters and background colors selected by Architect from manufacturer's standard colors.
 - 4. Mounting:
 - a. Shall be with adhesives and non-removable oval head screws.
 - b. Mount at locations as directed by Architect.

- c. Mount at 60" above finished floor to the center of the sign.
 5. Graphic Process with Braille in one of the following, but no applied lettering method allowed:
 - a. Provide raised (photopolymer process)
 - b. Engraved letters
 - c. Sand craved process
 6. Letters:
 - a. Letters and numbers shall have width to height ratio between 3:5 and 1:1 and stroke width to height ratio between 1:5 and 1:10.
 - b. Letters and numbers to be raised $\frac{1}{32}$ " upper case sans serif font with Grade 2 Braille.
 - c. Raised characters shall be $\frac{5}{8}$ " high minimum and 2" high maximum.
 - d. Pictograms shall have the equivalent verbal description directly below the pictogram.
 7. Characters and backgrounds must be matte or other non-glaze surface and of contrasting colors.
 8. All signs shall comply with chapter 11 FBC.
- B. Room Name and Number Signs
 1. Provide a sign for each room or space to include name and room number.
 - a. Minimum size of 3" high by 6" wide for signs, longer where nomenclature demands
 2. Mount number as directed by Architect.
 3. All spaces listed in Finish Schedule plus if more than one door is to a space, additional signs will be required one by number of doors to space.
- C. Storage Signs
 1. Provide and install at mechanical and electrical rooms a sign mounted on the door to read as follows: " STORAGE NOT ALLOWED"
 2. Signs shall be matte acrylic plastic, red background with white letters 1 " high by width needed for copy and Braille, with $\frac{3}{8}$ " radius corners.
 3. Mount on doors with non-removable oval head screws verify number signs required.
- D. Toilet Room Handicapped Signs
 1. Furnish and install one sign depicting National Handicapped Symbol (wheelchair) at each toilet room, equipped with facilities for the handicapped.
 - a. Size shall be 6" by 10.5".
- E. Fire Extinguisher, No Exit and Pull Station Sign
 1. Copy to read: "No Exit", "Fire Pull Station Inside", And "Fire Extinguisher Inside"
 2. Red letters, same material, size and mounting as in A. General.
 3. NO EXIT sign shall have letter size as per NFPA 101 section 7.10.8.3.
 4. Braille sign not required for fire extinguisher.
 5. See plans for locations.
- F. Fire Rated/Smoke Partition Labeling
 1. Field label all fire rated walls above ceiling level, with fire rating shown on the construction plans.
 - a. Provide minimum $\frac{1}{2}$ " high block lettering stenciled on wall above finished ceiling, if in a storage, mechanical, electrical, or similar unfinished room, install at approximately 84 inches above floor.
 - b. *(Contractor to use rating from permit plans)* HOUR FIRE RATED WALL, PROTECT ALL OPENING AND THROUGH WALL PENETRATION PER CODE REQUIREMENTS.
 2. Field label all smoke partitions above ceiling level.
 - a. Provide minimum $\frac{1}{2}$ " high block lettering stenciled on wall above finished ceiling, if storage, mechanical, electrical, or unfinished room, install at 84" above floor.

- b. SMOKE PARTITION, PROTECT ALL OPENING AND THROUGH WALL PENETRATION PER CODE REQUIREMENTS.

G. Mechanical, Electrical, Data, and Similar Rooms

- 1. Provide a sign saying "NO STORAGE" meeting the General requirements.
- 2. If these rooms have pair of doors, provide sign saying "THIS DOOR TO REMAIN CLOSED AND LATCHED TOP AND BOTTOM, EXCEPT DURING THE TRANSFER OF EQUIPMENT".
 - a. Sign shall have 1" high block letters and be permanently attached (Attached in way as to maintain the rating of the door) to the inactive door near the latch side 60 inches from finished floor to center of sign.
 - b. Braille not required for this sign.

PART 3 EXECUTION

3.1 INSTALLATION

- A. Install all signs in strict accordance with manufacturer's instructions and FADA requirements.
- B. Room signs to be mounted 60" to center above finish floor on walls adjacent to the latch side of any door opening.

3.2 CLEANING

- A. After installation, thoroughly clean all exposed surfaces and restore all damaged material to its original condition or replaced with new material.

3.3 WARRANTY

- A. This Contractor shall fully guarantee all materials and labor under this section for a period of 5-years from date of final acceptance of the building against all defects in both workmanship and materials and he shall promptly correct and/or replace such faulty work if so notified.

END OF SECTION

SECTION 10 26 00
DOOR AND WALL PROTECTION

PART 1 GENERAL

1.1 RELATED DOCUMENTS

- A. The provisions of the General Conditions, Supplementary Conditions, Drawings, Specifications, and the Sections included under Division 1, General Requirements and References are included as a part of this Section as though bound herein.

1.2 SECTION INCLUDES

- A. Provide labor, materials, services, and equipment necessary to furnish and install work as indicated and as specified herein, which includes, but is not limited to:
 - 1. Corner Guards

1.3 REFERENCES

- A. FBC – Florida Building Code
- B. American Society for Testing and Materials (ASTM)
- C. Underwriters Laboratories (UL)

1.4 SUBMITTALS

- A. Product data and detailed specifications for each system component and installation accessory required, including installation methods for each type of substrate.
- B. Provide shop drawings showing locations, extent and installation details of corner guards.
 - 1. Show methods of attachment to adjoining construction.
- C. Submit the following samples, as proposed for this work, for verification of color, texture, pattern and end cap attachment/alignment:
 - 1. One, 12" long sample of each model specified including end cap and mounting hardware.
- D. Product test reports from a qualified independent testing laboratory showing compliance of each component with requirements indicated.
- E. Maintenance data for wall protection system components for inclusion in the operating and maintenance manuals specified in Division 1.

1.5 QUALITY ASSURANCE

- A. Installer qualifications: Engage an installer who has not less than 3-years experience in installation of systems similar in complexity to those required for this project.
- B. Manufacturer's qualifications: Shall be not less than 5-years experience in the production of specified products and a record of successful in-service performance.
- C. Code compliance: Assemblies shall conform to all applicable and referenced codes.
- D. Fire performance characteristics: Provide wall protection system components with a UL label indicating that they are identical to those tested in accordance with ASTM- E84-91A for Class 1 characteristics listed below:
 - 1. Flame spread 25 or less
 - 2. Smoke developed: 450 or less

- E. Impact Strength: Provide assembled wall protection units tested in accordance with the applicable provisions of ASTM F476 76 and FBC 1608.
- F. Color match, unless otherwise indicated, provide wall protection components that are color matched in accordance with the following:
 - 1. A delta-E difference of no greater than 1.0, using the Hunter (Lab) Scale.
- G. Single source responsibility: Provide all components of the wall protection system manufactured by the same company to ensure compatibility of color, texture, and physical properties.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials to the project site in unopened original factory packaging clearly labeled to show manufacturer.
- B. Store the materials in original, undamaged packaging in a cool, dry place out of direct sunlight and exposure to the elements.
 - 1. Maintain a minimum room temperature of 40° F and max of 100° F.

1.7 PROJECT CONDITIONS

- A. Environmental requirements: Installation areas must be enclosed and weatherproof before installation commences.
- B. Maintain ambient temperature above 65° F during, and for 24 hours after installation.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturer shall be the following however products of other manufacturers will be considered for acceptance provided they equal or exceed the material requirements and functional qualities of the specified product and acceptance is provided by the Architect in writing prior to bidding.
 - 1. Acrovyn

2.2 MATERIALS

- A. Vinyl/Acrylic:
 - 1. Extruded material shall be high impact with pebblette grain texture and thickness of .078" (1.98) thickness with 2" x 2" legs
 - 2. Height: Full height.
 - 3. Chemical and stain resistance shall be per ASTM D-1308 standards.
 - 4. Colors: Match existing or as selected by the Architect.
- B. Aluminum: Extruded aluminum retainers should be 6063-T6 alloy of thickness indicated, with a minimum strength and durability properties as specified in ASTM B221.
- C. Fasteners:
 - 1. Provide non-corrosive fasteners compatible with aluminum retainers.
 - 2. Manufacturer shall supply all necessary fasteners.

2.3 CORNER GUARDS

- A. Surface-mounted corner guards.
 - 1. Surface-mounted guards consisting of continuous aluminum retainer with snap-on cover.

2. Provide color matched end caps for both partial and full height applications.
3. Attachment hardware shall be appropriate for wall construction.

2.4 ACCESSORIES

- A. Fasteners: Size-mounting hardware for required load and substrate conditions.

2.5 FABRICATION

- A. General: Fabricate wall protection systems to comply with requirements indicated for design, dimensions, detail, finish, and member sizes.
- B. Preassemble components in the shop to the greatest extent possible to minimize field assembly.
- C. Fabricate components with tight seams and joints with exposed edges rolled.
 1. Provide surfaces free of chipping, dents, and other imperfections.

2.6 FINISHES

- A. General: Comply with NAAMM "Metal Finishes Manual" for recommendations relative to applications and designations of finishes.
- B. Aluminum mill finish: AA-MIO
- C. Wood Finish: AWI 60-degree gloss per ASTM D523.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verification of conditions:
 1. Examine areas and conditions of work area and identify conditions detrimental to proper or timely completion.
 2. Do not proceed with work until unsatisfactory conditions are corrected.

3.2 PREPARATION

- A. Surface preparation: Prior to installation, clean substrate to remove dirt, debris and loose particles. Perform additional preparation procedures as required by manufacturer's instructions.
- B. Protection: Take all necessary steps to prevent damage to material during installation as required in manufacturer's installation instructions.

3.3 INSTALLATION

- A. Install the work of this section in strict accordance with the manufacturer's recommendations, using only approved mounting hardware, and locating all components firmly into position, level, and plumb.
- B. Adjust installed end caps as necessary to ensure tight seams.
- C. Install at all outside wall corners and set bottom 6" A.F.F.

3.4 CLEANING

- A. General: Immediately upon completion of installation, clean vinyl covers and accessories in accordance with manufacturer's recommended cleaning method.

- B. Remove surplus materials, rubbish, and debris resulting from installation as work progresses and upon completion of work.

3.5 PROTECTION

- A. Protect installed materials to prevent damage by other trades.
- B. Use easily removable materials that do not leaving residue or permanent stains.

END OF SECTION

SECTION 10 73 12
WALL SUPPORT CANOPIES

PART 1 GENERAL

1.1 RELATED DOCUMENTS

- A. The provisions of the General Conditions, Supplementary Conditions, Drawings, Specifications, and the Sections included under Division 1, General Requirements and References are included as a part of this Section as though bound herein.

1.2 SECTION INCLUDES

- A. Provide labor, material, services, and equipment necessary to furnish and install work as indicated and as specified herein, which includes, but is not limited to:
 - 1. Extent of aluminum wall support canopies, fascia and trim covers, and accessories required for complete and functioning wall support canopies system.
 - 2. Design, fabricate and install welded, extruded aluminum wall support canopies with protective finish and illumination of covered areas.
 - 3. Canopy system shall include integral water drainage system.

1.3 RELATED DOCUMENTS

- A. Section 01 25 13 – Substitution Procedures
- B. Section 01 31 13 – Project Coordination
- C. Section 01 33 00 – Submittal Procedures
- D. Section 01 42 00 – References
- E. Section 01 45 00 – Quality Control
- F. Section 01 66 00 – Product Storage and Handling Requirements
- G. Section 01 78 00 – Closeout Submittals
- H. Section 31 00 00 – Earthwork
- I. Section 03 30 00 – Cast-in-Place Concrete
- J. Section 07 62 00 – Sheet Metal Flashing and Trim
- K. Section 07 92 00 – Joint Sealants
- L. Section 26 05 33 – Raceways and Boxes for Electrical Systems
- M. Section 26 56 00 – Exterior Lighting

1.4 REFERENCES

- A. Comply with Section 01 42 00 – References for additional applicable references and codes, abbreviations, definitions, and acronyms.
- B. Florida Building Code, 6th Edition.
- C. American Architectural Manufacturers Association (AAMA):
 - 1. AAMA Specification AA-M-10C-22A-21
- D. ANSI/ASCE 7-10 - Wind Loads.
- E. American Society of Testing Materials (ASTM):
 - 1. ASTM B221-14: Standard Specification for Aluminum and Aluminum-Alloy Extruded Bar, Rod, Wire, Profiles, and Tube.
 - 2. ASTM B211-12e1: Standard Specification for Aluminum and Aluminum Alloy Rolled or Cold Finished Bar, Rod and Wire.

1.5 SUBMITTALS

- A. Comply with Section 01 33 00 – Submittal Procedures.
 - 1. Submit shop drawings including plans, elevations, and details, with dimensions and grades, for approval by Architect.
 - 2. Submit manufacturer's product information, specifications, and installation instructions for review by Architect.
 - 3. Submit design calculations for wall support canopy system signed by a Professional Engineer, registered in the State of Florida, verifying the wall supported canopy system design meets wind loading per Fig. 1609 of FBC and requirements of ASCE 7-10, live and dead loads, and other load requirements.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Comply with Section 01 66 00 – Product Storage and Handling.
- B. Deliver, store, and protect products as instructed by manufacturer.
 - 1. Promptly inspect shipment to assure the products comply with requirements, quantities are correct, and products are undamaged.
 - 2. Stack materials to prevent twisting, bending, or abrasion, and to provide ventilation. Slope metal sheets to ensure drainage.
 - 3. Prevent contact with materials during storage, which may cause discoloration or staining.

1.7 QUALITY ASSURANCE

- A. Comply with Section 01 45 00 – Quality Control.
- B. Aluminum wall supported canopy system shall be from one manufacturer.
- C. Manufacturer shall specialize in aluminum wall supported canopy systems with minimum five years documented experience in manufacturing wall supported canopy system products.
 - 1. Installer shall be company with minimum five continuous years documented experience in erecting wall support canopy system products and be approved as certified installer by manufacturer.

1.8 WARRANTY

- A. Provide five-year warranty to include coverage for structural integrity, water tightness and finish beginning from date of Substantial Completion.

1.9 PERFORMANCE

- A. Delegated-Design: For the canopy system to comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified Florida registered professional engineer responsible for their preparation.

PART 2 PRODUCTS

2.1 APPROVED MANUFACTURERS

- A. Dittmar Architectural Aluminum, 1006 Shepard Rd., Winter Springs, FL 32708-2018, Tel: 1-800-822-1755; Fax: (407) 695-4430, Website: www.dittdeck.com.

- B. Perfection Architectural Aluminum, 2310 Mercator Dr., Orlando, FL 32807, Tel: (407) 671-6225, Fax: (407) 671-8252, Website: www.perfectionarch.com.
- C. Peachtree Protective Covers, Inc., 1477 Rosedale Dr., Hiram, GA 30141, Tel: (770)439-2120, Fax: (770) 439-2122, Website: www.peachtreecovers.com.
- D. Other manufacturers shall comply with Section 01 25 13 – Product Substitution Procedures.

2.2 SYSTEM

- A. Provide wall supported cantilevered aluminum canopy system supported by wall mounted support members above canopy.

2.3 COMPONENTS

- A. Aluminum members: Extruded aluminum alloy 6063, heat treated to T-6 temper.
- B. Finish: Satin anodized 204-R1 complying with Aluminum Association Specification AA-M-10C-22A-21.
- C. Beams: Open-top tubular extrusions; thickened top edges designed to receive deck members in self-flashing manner.
- D. Extruded structural ties: Installed in top of beams.
- E. Deck: Extruded self-flashing sections interlocking into composite unit with camber to offset dead load deflection providing positive drainage.
- F. Welded plates: Closures at deck ends.
- G. Fascia: Manufacturer's standard "J" shape, 0.04" (1.016mm) aluminum.
- H. Fasteners: Aluminum, 18-8 non-magnetic stainless steel, 300 series stainless steel, or 410 stainless steel sealed with neoprene "O" ring seals beneath 0.625" (15.875mm) outside diameter conical washers.
- I. Fascia rivets: 0.1875" (4.7265mm) x 0.50" (12.7mm) grip range aluminum rivets with aluminum mandrel.
- J. Gaskets shall be dry seal pressure type of manufacturer's standard material.
- K. Hanger Assemblies: Provide extruded aluminum hanger rods in manufacturer's standard shapes and sizes to meet the loads seen by canopy

2.4 FABRICATION

- A. Beams:
 - 1. Factory welded with mitered corners into one-piece rigid bents.
 - 2. Welds shall be smooth and uniform using inert gas shielded arc, with 100% penetration.
 - 3. Grind welds where interfering with adjoining structure to ensure flush connection.
 - 4. Field welding is not permitted.
- B. Rigid mechanical joints shall be used when shipping size limitations occur.
- C. Deck shall be extruded modules that interlock to provide self-flashing.
- D. Interlocking joints shall be positively fastened at eight inches on center to form monolithic structural unit to develop full strength of sections.
- E. Fastenings shall have minimum shear strength of 350 pounds each.
- F. Deck shall be assembled with sufficient camber to offset dead load deflection and provide positive drainage.

- G. Gutter Frame Construction: Factory assemble gutter fascia frames to form a one-piece welded frame. Make welds smooth and uniform using an inert gas shielding arc. Perform suitable edge preparation to assure 100% penetration. Grind welds only where interfering with adjoining structure to allow for flush connection. Field welding is not permitted. Gutter frames constructed by mechanically fastening components together are not acceptable.

2.5 FACTORY FINISH

- A. Aluminum Surfaces: Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes. Sections shall be free of scratches and other serious surface blemishes and chemically cleaned.
- B. Clear Anodic Finish: Class 1, AAMA 2605, AA-M12C22A41, Mechanical finish, nonspecular as fabricated, chemical finish, 0.7 mils or thicker.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Examine areas and conditions where wall supported canopies are to be installed. Notify Contractor/CM of unsatisfactory conditions prior to starting work.
- B. Start of work indicates acceptance of existing site conditions.
- C. Confirm bent locations, dimensions and elevations indicated on shop drawings prior to fabrication.

3.2 ERECTION

- A. Comply with manufacturer's written installation instructions.
- B. Wall supported canopies shall be erected true to line, level and plumb. Aluminum columns in concrete shall be protected with clear acrylic coating to prevent electrolytic reaction.
- C. Water discharge shall not be allowed to drain across walkways.
- D. Concrete splash blocks shall be provided in size and location to prevent washout of lawn or landscape.
- E. Grade adjacent area for water to drain away from walkways.
- F. Light fixtures shall be located as indicated. Coordinate with electrical contractor. Provide aluminum panels to match column dimensions and finishes.
- G. Wiring to lighting fixtures shall be run underground in conduits into covered wiring panel chases. Devices, screws, bolts, crimps conduits, connections and fasteners shall be concealed.

3.3 CLEANING

- A. Walkway components shall be cleaned and debris removed upon completion.

3.4 PROTECTION

- A. Protect materials during and after installation. Remove and replace damaged and defective members.
- B. Provide warning tape or other method of barriers that identifies that access to area is unauthorized until work is complete.

END OF SECTION

12

DIVISION

FURNISHINGS

SECTION 12 21 16
VERTICAL LOUVER BLINDS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. The provisions of the General Conditions, Supplementary Conditions, Drawings, Specifications, and the Sections included under Division 1, General Requirements and References are included as a part of this Section as though bound herein.

1.2 SUMMARY

- A. Section Includes:
 - 1. Provide labor, material, services, and equipment necessary to furnish and install work as indicated and as specified herein, which includes, but is not limited to:
 - a. Vertical louver blinds.

1.3 REFERENCES

- A. ASTM E84 – Standard Methods of Fire Tests for Flame Propagation of Textiles and Films.
- B. CPSC – U.S. Consumer Product Safety Commission.
- C. WCSC – Window Covering Safety Council.
- D. FBC – Florida Building Code.

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Shop Drawings: For louver blinds include fabrication and installation details.
- C. Samples: For each exposed product and for each color available, 12 inches long. Include samples of accessories involving color selection.

1.5 INFORMATIONAL SUBMITTALS

- A. Product Test Reports: For vertical louver blinds with polymer louvers that have been tested for compliance with NFPA 701 for tests performed by a qualified testing agency.

1.6 QUALITY CONTROL

- A. Manufacturer's Qualifications: Provide products from a firm that makes the indicated products as a regular production item and with not less than ten (10) years experience.
- B. Installer Qualifications: An entity that employs installers and supervisors who are trained and approved by manufacturer for both installation of specified materials and assemblies with not less than five (5) years experience.

1.7 MAINTENANCE MATERIAL SUBMITTALS

- A. Furnish extra materials, from the same product run, that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Louver Blinds: Full-size units equal to 5 percent of quantity installed for each size, color, texture, pattern, and finish indicated, but no fewer than two (2) units.

1.8 DELIVERY, STORAGE, AND HANDLING

- A. Deliver vertical louver blinds in factory packages, marked with manufacturer and product name, and location of installation using same designations indicated on Drawings.
- B. Products shall be handled and stored to prevent damage to materials, finishes and operating mechanisms.

1.9 FIELD CONDITIONS

- A. Environmental Limitations: Do not install louver blinds until construction and wet-work and finish work in spaces, including painting, is complete and dry and ambient temperature and humidity conditions are maintained at the levels indicated for Project when occupied for its intended use.
- B. Field Measurements: Where louver blinds are indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication and indicate measurements on Shop Drawings. Allow clearances for operating hardware of operable glazed units through entire operating range. Notify Architect of installation conditions that vary from Drawings. Coordinate fabrication schedule with construction progress to avoid delaying the Work.

1.10 WARRANTY

- A. Warranty: Manufacturer shall warrant the product against defects in materials or workmanship and agrees to repair or replace components that fail within specified warranty period. The warranty period shall commence at the time of substantial completion and extend for a period of three (3) years.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturer shall be the following however products of other manufacturers will be considered for acceptance provided they equal or exceed the material requirements and functional qualities of the specified product and acceptance is provided by the Architect in writing prior to bidding.
 1. Springs Window Fashions LLC

2.2 VERTICAL LOUVER BLINDS

- A. Basis of Design: "Graber G-71 Super-Vue"
- B. Louvers: Louvers shall be solid PVC crowned louver 3-1/2" wide.
- C. Headrail: Channel, extruded aluminum alloy 6063-T5 with long edges returned or rolled and ends capped. Headrail shall be 1-15/16" wide by 1-3/8" high with average wall thickness of .050" and encloses operating mechanisms including carrier-spacing mechanism that provides uniform vane spacing when blinds are traversed fully across headrail with satin finish.

- D. Carriers shall be made of molded acetyl and traverse on self-lubricated wheels for smooth operation. Carriers shall be centrally located making the headrail reversible. Stems shall be made of clear, non-yellowing, UV-stabilized nylon and are impact-resistant. Carriers and stems shall be replaceable without demounting the headrail.
- E. Rotation control shall consist of #10 nickel-plated steel bead chain and a dual rack and pinion gear system providing 180° direct rotation. The pinion rod shall be extruded aluminum 0.30" diameter. Standard E-Z Open™ feature will automatically rotate louvers to the open position when the traverse cord is operated.
- F. Traversing control shall be a pantograph system made of hard-tempered, 18 gauge (0.046") plated steel, ensuring precise and proportional louver spacing. Traverse cord is #3 braided polyester with a fiberglass core, 0.094" diameter and is equipped with a cord weight and cord clip. The cord clip is anchored to the wall or window jamb during installation in accordance with CPSC recommendations.
- G. Valance: Manufacturer's standard with vane insert.
- H. Mounting Brackets: With spacers and shims required for blind placement and alignment indicated. Provide intermediate support brackets to produce support spacing recommended by blind manufacturer for weight and size of blind.

2.3 LOCATION

- A. Location: As indicated on the drawings.

2.4 FINISH

- A. Vane Colors: See Drawings for selection or as selected by Architect.
- B. Components: Provide materials exposed to view matching or coordinating with vanes unless otherwise indicated.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances, operational clearances, and other conditions affecting performance of the Work.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. Install vertical louver blinds level and plumb, aligned and centered on openings, and aligned with adjacent units according to manufacturer's written instructions.
- B. Locate so exterior vane edges are not closer than 2 inches from interior faces of glass and not closer than 1-1/2 inches from interior faces of glazing frames through full operating ranges of blinds.
- C. Install mounting and intermediate brackets to prevent deflection of headrails.
- D. Install with clearances that prevent interference with adjacent blinds, adjacent construction, and operating hardware of glazed openings, other window treatments, and similar building components and furnishings.

3.3 ADJUSTING

- A. Adjust vertical louver blinds to operate free of binding or malfunction through full operating ranges.

3.4 CLEANING AND PROTECTION

- A. Clean vertical louver blind surfaces after installation according to manufacturer's written instructions.
- B. Provide final protection and maintain conditions in a manner acceptable to manufacturer and Installer that ensures that louver blinds are without damage or deterioration at time of Substantial Completion.
- C. Replace damaged vertical louver blinds that cannot be repaired in a manner approved by Architect before time of Substantial Completion.

END OF SECTION 12 21 16

SECTION 12 48 12
ENTRANCE FLOOR MATS

PART 1 GENERAL

1.1 RELATED DOCUMENTS

- A. The provisions of the General Conditions, Supplementary Conditions, Drawings, Specifications, and the Sections included under Division 1, General Requirements and References are included as a part of this Section as though bound herein.

1.2 SECTION INCLUDES

- A. Provide labor, materials, services, and equipment necessary to furnish and install work as indicated and as specified herein, which includes, but is not limited to:
 - 1. Surface-type foot grille mats.

1.3 SUBMITTALS

- A. Submit manufacturer's specifications and installation instructions for each type of entrance mat.
- B. Include methods of installation for each type of substrate.
- C. Submit samples for each type and color of exposed entrance mat, frames, and accessories required.
- D. Provide 12" square samples of mat materials and 12" lengths of frame members.

1.4 MAINTENANCE DATA

- A. Maintenance Data: Submit manufacturer's printed instructions for cleaning, drying, maintaining, and re-handling of removable entrance mat units.

1.5 FIELD MEASUREMENTS

- A. Verify that field measurements are as indicated on shop drawings.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturer shall be the following however products of other manufacturers will be considered for acceptance provided they equal or exceed the material requirements and functional qualities of the specified product.
 - 1. Forbo Entrance Systems

2.2 MATERIALS AND FABRICATION

- A. General: Provide colors/patterns/profiles of materials, including metals and metal finishes, as indicated on drawings or by this specification or, where not indicated, as selected by Architect from manufacturer's standard colors/ patterns/ profiles.

1. Shop-fabricate the entrance mat work to greatest extent possible, in sizes as indicated on plans.
 2. Where not otherwise indicated, provide single unit for each mat installation, but do not exceed manufacturer's maximum size recommendation for units intended for removal and cleaning.
 3. Where joints in mats are necessary, space them symmetrically and away from normal traffic lanes.
 4. Miter corner joints in framing elements, with hairline joints, or provide prefabricated corner units without joints.
 5. Where possible, verify sizes by field measurement prior to shop fabrication.
- B. Entrance Mat Systems:
1. Provide model Forbo coral mats entrance system approved equal.
 2. Vinyl edge accessories to accommodate mat application as indicated per manufacturer.
 3. All building entrance doors shall have mats provided except for mechanical/electrical room doors.
 4. All entrance mats are to provide 6'-0" minimum travel length in accordance with LEED – EQ Credit 5.
 5. Color: As selected by the Architect from the manufacturer's standard color palette. Provide samples for approval.
 6. Mat size shall be 6'-0" deep and 6" wider than the door opening on each side.
 7. The Contractor is to verify quantity of mats to be provided.

PART 3 EXECUTION

3.1 INSTALLATION

- A. Install surface-type units to comply with manufacturer's instructions, at locations indicated and coordinated with entrance locations and traffic patterns.
1. Anchor the fixed surface type frame members to floor with devices spaced as recommended by manufacturer.

END OF SECTION

23

DIVISION

HEATING, VENTILATION AND AIR-CONDITIONING

SECTION 23 02 00
BASIC MATERIALS AND METHODS FOR HVAC SYSTEMS

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.
- B. Refer to Division 1 for all requirements pertaining to General Provisions.

1.2 WORK INCLUDED

- A. Access doors.
- B. Piping and equipment identification.
- C. Electrical requirements.
- D. Painting.
- E. Concrete work.
- F. Fabricated steel supports.
- G. Excavation, trenching and backfilling.
- H. Placing of equipment.

1.3 RELATED WORK

- A. DIVISION 9 - FINISHES (Access Doors - Painting).
- B. DIVISION 3 - CONCRETE.
- C. DIVISION 31- SITEWORK (Excavation).

1.4 APPLICABLE PUBLICATIONS

- A. The publications listed below form a part of this Section to the extent referenced.
 - 1. American Institute of Steel Construction (AISC) Publications
 - 2. American National Standards Institute (ANSI) Standards
 - 3. American Society for Testing and Materials (ASTM) Publications
 - 4. American Welding Society (AWS) Publications
 - 5. Underwriters Laboratories, Inc. (UL) Standards

1.5 SUBMITTALS

- A. General: Where submittals are required, comply with Division 1 requirements.
- B. Shop Drawings: Submit drawings of fabricated steel supports where proposed supports are not in accordance with details on drawings, or where drawings do not detail supports. Submittal for acceptance is required.
- C. Product Data: Submittal for other than fabricated steel supports is not required. Product data for the following shall be included in the operation and maintenance manuals. Submittal for acceptance is not required.
 - 1. Access doors.
 - 2. Piping and equipment identification.

PART 2 – PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

- A. Access Doors:
 - 1. Acudor
 - 2. Elmodor Manufacturing, Co.
 - 3. Karp Metal Associates, Inc.
 - 4. Larsen's Manufacturing Co.
 - 5. Milcor
- B. Piping and Equipment Identification:
 - 1. Communications Technology Corp.
 - 2. Craftmark Identification Systems, Inc.
 - 3. EMED Co., Inc.
 - 4. Florida Marking Products, Inc.
 - 5. Marking Services, Inc.
 - 6. Seton Name Plate Corp.
 - 7. W.H. Brady Co., Signmark Division

2.2 FABRICATION

- A. Access doors:
 - 1. Access doors: UL labeled where installed in fire rated walls, partitions, and ceilings. Door rating shall be not less than wall, partition, or ceiling rating.
 - 2. Frames: 16 gauge steel, flush trim, with corners welded and ground smooth, masonry anchor strap for masonry walls, bolt holes for mounting in framed openings.
 - 3. Non-fire rated doors: 13 gauge steel, concealed continuous piano hinge with dust flap, flush screwdriver operated lock with stainless steel cam and studs.
 - 4. Fire rated doors: 20 gauge steel welded pan type, concealed continuous piano hinge with stainless steel pins, key-operated latch bolt, interior latch release, automatic door closer, automatic door latch when door closes. The door panel shall contain 2- inch thick insulation in sandwich type construction.
 - 5. Finish of doors and frames: Prime coat of rust inhibitive baked enamel, except as specified otherwise.
 - 6. Finish of doors and frames in wet areas, and in areas with surfaces subject to wet cleaning: No. 4 satin stainless steel.
- B. Piping and Equipment Identification:
 - 1. Pipe markers: Sub-surface printed plastic, with protective undercoating. Markers shall be permanently curled for snap-on installation for pipe sizes (including insulation) up to 6" diameter. For external diameters above 8". Marker shall be secured using cable ties for indoor use and stainless steel banding or ultraviolet resistant plastic for exterior use. Markers for outdoor installation shall be over-laminated with Tedlar™ on polyester ultraviolet damage and fading. Markers shall identify the pipe contents and direction of flow through 360 degree visibility range. Marker size, letter size, letter color, wording and background color shall be in accord with ANSI A13.1 – Scheme for the Identification of Piping Systems. Based on Marking Services Inc. Model MS-970 Coiled Plastic Markers for indoor use and Model MS-995 Maxilar Marker for exterior use.
 - 2. Valve tags: Contractors Option:
 - a. Indoor:

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- 1) 19 gauge brass, 1-1/2 inch round, with 1/4 inch high black pipe service letter abbreviation above 1/2 inch high black valve number. Pipe service letter abbreviation shall be in accord with legend on drawings. Valve tag attachment shall be 4 ply 0.018 copper wire meter seal or #6 solid brass bead chain with locking link. Based on Marking Services Inc.
- 2) 1/16 inch thick plastic, 1-1/2" round, with 1/4 inch high black pipe service abbreviation above 1/2 inch high black valve number. Pipe service letter abbreviation shall be in accord with legend on drawings. Color of valve tag shall match pipe marker color. Valve tag attachment shall be 4 ply 0.018 copper wire meter seal or #6 solid brass bead chain with locking link. Based on Marking Services Inc.
- b. Outdoor Service:
 - 1) 19 gauge brass, 1-1/2 inch round, with 1/4 inch high black pipe service letter abbreviation above 1/2 inch high black valve number. Pipe service letter abbreviation shall be in accord with legend on drawings. Valve tag attachment shall be 4 ply 0.018 copper wire meter seal or #6 solid brass bead chain with locking link. Based on Marking Services Inc.
 - 2) 19 gauge Type 304 stainless steel, 1-1/2" round, with 1/4 inch high pipe service abbreviation above 1/2 inch high black valve number. Pipe service letter abbreviation shall be in accord with legend on drawings. Color of valve tag shall match pipe marker color. Valve tag attachment shall be 4 ply 0.018 stainless wire meter seal or #6 Type 304 stainless steel bead chain with locking link. Based on Marking Services, Inc.
3. Valve chart frame: Self-closing, satin-finished, extruded aluminum with glass window, 8-1/2 inch by 11 inch chart size.
4. Equipment nameplates:
 - a. Indoor: Shall be 1/16 inch thick plastic with black satin surface and white core. Lettering shall be engraved through the surface color to expose the core color. Plate size shall be a minimum of 2-1/2 inch by 4 inch, with 3/4 inch high lettering for equipment and 3/4 inch by 2-1/2 inch, with 3/16 inch high lettering for ceiling grid labeling. Equipment identifying name and number shall be in accord with schedules on the Contract Documents. Plate manufacturer shall furnish pre-drilled hole locations for pop riveting. Where pop riveting is not suitable, a suitable adhesive for permanently attaching plate to equipment shall be provided.
 - b. Outdoor: Shall be 125 Mil rigid plastic constructed of printed legend sealed between two layers of chemically-resistant plastic to resist ultraviolet damage. Plate size shall be a minimum of 2-1/2 inch by 4 inch, with 3/4 inch high lettering for equipment. Equipment identifying name and number shall be in accord with schedules on the Contract Documents. Plate manufacturer shall furnish pre-drilled hole locations for pop riveting. Where pop riveting is not suitable, a suitable adhesive for permanently attaching plate to equipment shall be provided.
 - c. Based on Marking Services Inc. Model MS-215 Max-Tex.
- C. Electrical Requirements: Product description not applicable to this Section.
- D. Painting: Product specified in Division 9 - FINISHES.
- E. Concrete Work: All work is provided under Division 3.
- F. Fabricated Steel Supports:
 1. Steel angles, channels, and plate shall be in accordance with ASTM A36.
 2. Steel members, including fasteners, exposed to weather shall be galvanized.
- G. Excavation, Trenching, and Backfilling: Product description not applicable.
- H. Placing of Equipment: Product description not applicable.

PART 3 – EXECUTION

3.1 GENERAL

- A. Installation of materials and equipment shall be in accord with the manufacturer's written instructions, except as specified.

3.2 INSTALLATION

- A. Access Doors:
 - 1. Furnish access doors for installation under Division 9 - FINISHES.
 - 2. Deliver access doors to the appropriate trade well in advance of the time they are needed so as to avoid unnecessary delay of the work.
 - 3. Access doors shall be sized as indicated on drawings. If no size is given, provide access door of size suitable for servicing equipment or valve. Unless otherwise noted, the minimum size for an access door shall be 12" x 12".
 - 4. Access doors shall be provided where indicated and if not indicated, where required.
 - 5. Access doors shall be installed so as to allow full door swing.
 - 6. Where full swing and access is not possible, removable doors shall be provided.
 - 7. Access doors not required in lay-in-tile ceilings.
- B. Piping and Equipment Identification:
 - 1. Install pipe markers adjacent to each valve and fitting, at each branch connection, on each side of wall, floor, and ceiling penetrations, where entering and leaving underground areas, and at minimum 40 foot spacing on horizontal and vertical pipe runs. Markers shall be arranged for easy reading at eye level.
 - 2. Provide valve tags on all valves exposed or concealed unless otherwise noted.
 - 3. Attach valve tag to stem of each valve to be tagged. Valve numbers shall follow in sequence the Owner's existing valve numbers, where applicable.
 - 4. Provide a marker for each valve and equipment to be tagged, located above lift-out tile ceilings. The marker shall be 1/16 inch thick plastic with a satin surface and white core. Color of the marker shall match color of piping identification system. Lettering shall be engraved through the surface color to expose the core color. Plate size shall be 3/4 inch by 2-1/2 inch, with 3/16 inch high lettering for ceiling grid labeling. Plate manufacturer shall furnish suitable adhesive for permanently attaching plate to ceiling grid.
 - 5. Provide a minimum of 4 valve charts. Chart information shall indicate job name, Contractor name, date of installation, valve number, valve location, valve type, valve purpose, and system in which installed. Mount framed chart in equipment room and insert copy of chart in each operating and maintenance manual under separate tabbed section labeled "Valve Chart". Where project drawings include a piping flow schematic, request AutoCad file from Engineer and label all of the valves according to the valve chart and frame in an 18" x 24" frame in main mechanical or pump room.
 - 6. Provide air and water flow diagrams installed in waterproof, laminated frames on the wall in each Mechanical Room. Air flow diagrams shall show locations of dampers, sensors, and exhaust fans associated with the air handling unit. Water flow diagrams shall show shut-off valves and control valve locations.
 - 7. Permanently affix nameplate to each item of equipment using stainless steel pop rivets. Where irregular surface impede direct attachment of plates, affix plate to sheet metal bracket and attach bracket to equipment with screws, bolts or suitable adhesive from nameplate manufacturer.

8. Refrigeration System - Additional Requirements:
 - a. Marking and Signage:
 - (1) Provide a permanent sign containing the following information:
 - (a) Name and address of installer.
 - (b) Kind of refrigerant.
 - (c) Lbs. of refrigerant.
 - (d) Field test pressure applied.
 - (2) Provide a permanent sign: Main electrical supply, i.e., main compr. disc.
 - (3) Provide metal tags with 0.5" letters:
 - (a) Shut-off valves to each vessel, i.e., L.P. receiver shut-off.
 - (b) Relief valve.
 - (4) Piping shall be marked as either:
 - (a) Refrigerant - High Pressure - Liquid or Hot Gas.
 - (b) Refrigerant - Low Pressure - Suction, Pumped Liquid Supply or Pumped Liquid Return.
- C. Electrical Requirements: Refer to Division 26 for electrical requirements.
- D. Painting:
 1. All equipment shall be furnished with a factory- applied galvanized, prime paint, or finish paint finish. Touch-up damaged surfaces of equipment immediately.
 2. Paint for galvanized surfaces shall be in accordance with ASTM A780 using zinc rich compound.
 3. Paint wooden mounting backboards with two coats of gray enamel prior to making attachments to the board.
 4. For quality control refer to DIVISION 9 - FINISHES.
 5. Remove all dirt, rust, scale, grease, pipe dope, solder flux, and welding slag from all surfaces to be painted.
 6. Paint immediately, under this Division, all damaged galvanized surfaces. Paint galvanized metal surfaces behind grilles with two coats of flat black paint.
 7. Apply rust inhibitive primer to ferrous surfaces of shop fabricated steel supports.
 8. Paint immediately under this division all field and shop welded joints in piping or equipment supports with 2 coats of grey metal primer.
 9. All exposed piping shall have a PVC jacket, per ANSI Standard with the following colors:
 - a. Chilled water supply Dark blue
 - b. Chilled water return Light blue
 - c. Condensate piping Orange
- E. Concrete Work:
 1. Concrete pads and curbs for supports of equipment shall be a minimum of 4" high with chamfered edges and sized for approved equipment. Furnish drawings to Division 3 Contractor.
 2. Surfaces of concrete shall be troweled smooth. When forms are removed, fill voids with cement and rub smooth with rubbing stone.
 3. Do not pour concrete when ambient temperature is less than 40°F and falling.
- F. Fabricated Steel Supports:
 1. Because of the small scale of the drawings, details of equipment support are not always shown. It shall be the responsibility of the contractor to provide supports as required for safe and adequate support.
 2. Fabricated steel supports and ladders may be shop or field-fabricated and shall be in accord with details on drawings.

3. When details are not indicated, the contractor shall submit proposed support detail for review. The contractor shall bear all cost in producing this detail in the bid. This includes but is not limited to structural engineering support.
 4. Steel members shall be saw cut, with corners ground smooth, and shall be assembled with welded or bolted connections at Contractor's option. Connections shall be in accord with specified AISC Publications.
- G. Excavation, Trenching, and Backfilling:
1. Definitions:
 - a. Satisfactory material includes all materials except those classified "unsatisfactory", "unyielding" or "unstable".
 - b. Unsatisfactory material includes those materials containing roots, organic matter, trash, debris, frozen materials, stones larger than 3 inches in any dimension, and materials classified by ASTM D 2487 as OL, OH, and PT.
 - c. Unyielding material consists of rock and gravelly soils with stones greater than 3 inches in any dimension, or as defined by the pipe or tank manufacturer, whichever is smaller.
 - d. Unstable material consists of material too wet to properly support the pipe or tank.
 - e. Select granular material consists of well-graded sand, gravel, crushed gravel, crushed stone, or crushed gravel, crushed stone, or crushed slag composed of hard, tough, and durable particles, and shall contain not more than 10 percent by weight of material passing a No. 200 mesh sieve, and no less than 95 percent by weight passing the 1 inch sieve. The maximum allowable aggregate size shall be 3 inches, or the maximum size recommended by the pipe or tank manufacturer, whichever is smaller.
 2. Excavation, trenching, and backfilling for site utility piping systems as specified in DIVISION 31 - SITEWORK.
- H. Placing of Equipment:
1. Coordinate setting of equipment with the requirements of other trades so as to avoid conflicts and to insure compatibility. Equipment shall not block access for installation of other equipment.
 2. Set base mounted equipment on permanent and finished supports. Temporary support, if any, shall be removed prior to making final pipe, duct, or electrical connections to equipment.
 3. Adjust suspended equipment to final elevation prior to making pipe, duct or electrical connections.
 4. Exercise caution during equipment placing operations to insure that structure is not overloaded.
 5. Do not move heavy equipment across floor or roof of insufficient load bearing capacity to support such equipment. Provide bracing or shoring as required or use crane to place equipment directly on permanent and finished support.
 6. Secure all roof mounted equipment to the structure adequately to resist overturning, uplift and sliding forces for basic wind speeds indicated for this location in Figure 1609 of the Florida Building Code, Latest Edition.

7. Guards shall be provided where appliances, equipment, fans or other components that require service are located within 10 feet of a roof edge or open side of a walking surface and such edge or open side is located more than 30 inches above the floor, roof or grade below. The guard shall extend not less than 30 inches beyond each end of such appliance, equipment, fan or component and the top of the guard shall be located not less than 42 inches above the elevated surface adjacent to the guard. The guard shall be constructed so as to prevent the passage of a 21-inch-diameter sphere and shall comply with the loading requirements for guards specified in the Florida Building Code.

END OF SECTION

SECTION 23 05 00
COMMON WORK RESULTS FOR HVAC SYSTEMS

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.
- B. Comply with Sections 01 33 00 – Submittal Procedures and 01 60 00 – Material Equipment and Approved Equals.

1.2 ARTICLES INCLUDED

- A. Definitions.
- B. Permits, Fees and Notices.
- C. Applicable Publications.
- D. Code Compliance.
- E. Scope of Work.
- F. Record Drawings.
- G. Intent of Drawings and Specifications.
- H. Quality Assurance.
- I. Submittals.
- J. Product Requirements, Equals, and Substitutions.
- K. Manufacturers Instructions.
- L. Transportation and Handling.
- M. Storage and Protection.
- N. Cutting, Patching and Demolition.
- O. Cleaning Up/Removal of Debris.
- P. Operating and Maintenance Manuals.
- Q. Training of Owners Operators.
- R. Guarantee of Work.
- S. System Testing.

1.3 ARTICLES

- A. Definitions:
 - 1. The term "As indicated" means as shown on drawings by notes, graphics or schedules, or written into other portions of contract documents. Terms such as "shown", "noted", "scheduled" and "specified" have same meaning as "indicated", and are used to assist the reader in locating particular information.
 - 2. The term "Provide", means furnish and install as part of the work covered in Division 23.
 - 3. The term "Furnish" means furnish only, for installation, as part of this contract, by other Divisions.
 - 4. The term "Install only" means to install under the work of Division 23 equipment furnished by other Divisions, or by the Owner.
 - 5. The term "Owner's Representative" when referenced herein shall be the Architect or the Engineer acting as his designated representative unless otherwise noted.

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6. The term "design" as it pertains to the work of this division shall describe the basic intent, component sizing, component relationships and overall architecture of the Plumbing system. The design is generally schematic in nature and will require specific detailing after the accepted products are determined.
 7. The term "detail" as it pertains to the work of this division shall describe the work required by the contractor to assure a fully coordinated installation of the material and equipment supplied. When requested, the contractor shall produce detailed shop drawings or sketches indicating the actual placement of the equipment or material supplied; also including how the equipment or material interfaces with work of other sections or divisions within the contract documents.
 8. The term "workman-like manner" as it pertains to the work of this division shall describe a neat well organized high quality installation system (piping, etc.). Routing shall be well thought out providing adequate service clearance and maximum use of space. Equipment placement shall exhibit proper clearances for service. All lines (piping, etc.) shall be run straight and true, parallel, or perpendicular to building structure neatly supported.
 9. For additional definitions refer to the General Conditions.
- B. Permits, Fees and Notices: Comply with the General Conditions.
- C. Applicable Publications:
1. Publications listed in each Section form a part of that Section to the extent referenced.
 2. When a standard is specified by reference, comply with requirements of that standard, except when requirements are modified by the Contract Documents, or applicable codes establish stricter standards.
 3. The Publication or Standard is the publication in effect as of the bid date, except when a specific date is listed.
- D. Code Compliance:
1. Life Safety Code - NFPA 101
 2. Florida Building Code 2017
 3. Florida Accessibility Code, 2017
 4. National Electric Code 2014
 5. Florida Mechanical Code 2017)
 6. State Requirements for Educational Facilities (SREF), 2014
 7. NFPA Standards, Latest Edition.
- E. Scope of Work: The work to be performed under this Division consists of the satisfactory completion of all HVAC as indicated in the Contract Documents.
- F. Record Drawings: Comply with the General Conditions.
- G. Intent of Drawings and Specifications:
1. The intent of the drawings and specifications is to establish minimum acceptable quality standards for materials, equipment, and workmanship, and to provide operable HVAC systems complete in every respect.
 2. Existing conditions, dimensions, etcetera, depicted on the drawings are taken from the "as-built" drawings of the original construction supplemented by field observation. The contractor is cautioned to field verify all existing conditions, dimensions, etcetera, notifying the Owner's Representative of any discrepancies other than those minor in nature, for direction, prior to ordering or fabricating equipment or materials. Anything mentioned in the specifications and not shown on the drawings or shown on the drawings and not mentioned in the specifications, shall be of like effect as if shown or mentioned in both. In case of difference between drawing and specifications, the more stringent shall govern, unless the discrepancy conflicts with applicable codes, wherein the code shall govern.

3. The drawings are diagrammatic, intending to show general arrangement, capacity, and location of system components, and are not intended to be rigid in detail. Final placement of equipment, other system components, and coordination of all related trades shall be the contractor's responsibility.
 4. Due to the small scale of the drawings, and to unforeseen job conditions, all required offsets and fittings may not be shown but shall be provided at no additional change in contract cost.
 5. In the event of a conflict, the Owner's Representative will render an interpretation in accordance with the General Conditions.
- H. Quality Assurance:
1. All equipment furnished under this Division shall be listed and labeled by U.L., ETL or a nationally recognized testing laboratory (NRTL).
 2. Material furnished under this Division shall be standard catalogued products of recognized manufacturers regularly engaged in the production of such material and shall be the latest design.
 3. Materials shall be the best of their respective kinds. Materials shall be new except where the specifications permit reuse of certain existing materials.
 4. Work provided for in these specifications shall be constructed and finished in every part in a workmanlike manner.
 5. All items necessary for the completion of the work and the successful operation of a product shall be provided even though not fully specified or indicated on the drawings.
 6. All work to be performed by qualified and experienced personnel specifically trained in their respective field.
 7. All work of this division shall be carefully interfaced with the work of other divisions to assure a complete, functioning system or systems.
- I. Submittals:
1. In addition to all other submittal requirements elsewhere in the contract documents, the contractor shall comply with the following.
 2. Submittal for acceptance is required only on those items specifically requested in the specification section that applies.
 3. For products and equipment that do not require a submittal for acceptance, submit a separate letter for each specification section certifying that all products and equipment will be provided in compliance with the contract documents.
 4. Provide submittal data in accordance with the General Conditions and/or as listed below.
 5. Designate in the construction schedule, or in a separate coordinated schedule, the dates for submission and the dates that the submittals will be needed in order to meet construction schedule. This schedule shall be submitted prior to or in conjunction with the first submittal. Processing of submittals may be delayed pending the receipt of this schedule at the reviewer's discretion.
 6. Submittal data shall be presented in a clear and thorough manner and referenced to the specification section.
 - a. Where applicable, data shall be identified by reference to sheet and detail, schedule or room numbers, equipment or unit number as shown on Contract Drawings.
 7. Prepare performance and product data as follows:
 - a. Clearly mark each copy to identify pertinent products or models, delete non-pertinent data.
 - b. Show performance characteristic and capacities.
 - c. Show dimensions and clearances required.
 - d. Show wiring or piping diagrams and controls.

- e. Clearly list any deviation in the submittals from the requirements of the contract documents.
- f. Include installation requirements.
8. Manufacturer's standard schematic drawings and diagrams:
 - a. Modify drawings and diagrams to delete information not applicable to the work of this project.
 - b. Supplement standard information to provide information specifically applicable to the work of this project.
9. Prohibition of Asbestos and PCB:
 - a. The use of any process involving asbestos or PCB, and the installation of any product, insulation, compound of material containing or incorporating asbestos or PCB, is prohibited. The requirements of this specification for complete and operating mechanical systems shall be met without the use of asbestos or PCB.
 - b. Prior to the Final Review field visit the Contractor shall certify in writing that the equipment and materials installed in this Project under this Division 22 contain no asbestos or PCB. Additionally, all manufacturers shall provide a statement with their submittal that indicates that their product contains no asbestos or PCB. This statement shall be signed by a duly authorized agent of the manufacturer.
10. Letter of Certification: Where a submittal is not required, provide letter certifying that the work will be completed in strict accordance of the specified requirements. In the event the contractor wishes to alter the requirements of the specification for whatever reason, this should be clearly explained in this letter noting that this alteration may require additional submittal requirements.
11. Schedules: Where schedules are called for, submit schedule indicating which products will be used and to what extent by system, location, size, etc.
12. Where samples are requested, samples shall be of sufficient size and quantity to clearly illustrate:
 - a. Functional characteristics of the product, with integral related parts and attachment devices.
 - b. Full range of color, texture, and pattern.
 - c. Where a mock-up is specified, erect at the Project site, in a location acceptable to the Owner's Representative. Size or area shall be that specified or as agreed upon during pre-construction or other job site meetings.
 - d. Where mock-up is not a permanent part of the installation, remove mock-ups at conclusion of work or when acceptable to the Owner's Representative.
13. The Contractor shall:
 - a. Review Shop Drawings, Product Data and Samples prior to submission.
 - b. Determine and verify:
 - 1) Field measurements.
 - 2) Field construction criteria.
 - 3) Catalog numbers and similar data.
 - 4) Conformance with specifications.
 - 5) All submittals have been properly interfaced with the requirements of this and other divisions of work so as to assure a complete, functioning system in accordance with the contract documents.
 - 6) Provide ¼" drawings of ALL mechanical rooms, with dimensions clearly indicating equipment maintenance clearances and electrical NEC required clearances. NO mechanical room walls shall be built until the engineer and the owner have approved the shop drawings for the mechanical equipment and clearances.

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- c. Coordinate each submittal with requirements of the work and of the Contract Documents.
 - d. Clearly identify any deviations in the submittals from requirements of the Contract Documents. Any deviations not specifically disclosed in the submittal shall be solely at the risk of the Contractor and shall be subject to discovery at any time. Any undisclosed deviations shall be corrected by the Contractor to comply with the requirements of the Contract Documents at no cost to the Owner regardless of the action code accorded the submittal by the Owner's Representative.
 - e. Do not release equipment for shipment, begin fabrication or work on any items requiring submittals for acceptance until all submittals are returned with the Owner's Representative acceptance.
 - f. Make submittals promptly, and in such sequence as to cause no delay in the work or in the work of any other contractor.
14. Number of Submittals: Comply with the Division 1, Specification Section 01 33 00 – Submittal Procedures.
15. Submittals shall contain:
- a. The date of submission and the dates of any previous submissions.
 - b. The Project title and number.
 - c. Contract identification.
 - d. The names and phone numbers including personal contact of:
 - 1) Contractor.
 - 2) Supplier.
 - 3) Manufacturer.
 - e. Identification of the product, with the specification section number and contract document description clearly indicated.
 - f. Field dimensions, clearly identified as such.
 - g. Relation to adjacent or critical features of the work or materials.
 - h. Applicable standards.
 - i. Identification of deviations from Contract Documents.
 - j. Identification of revisions on re-submittals.
 - k. Contractor's stamp, initialed or signed, certifying to review of submittal, verification of products, field measurements and field construction criteria, and coordination of the information within the submittal with requirements of the work and of Contract Documents.
 - l. Each submittal shall be limited to a single specification section. Submittals shall not be grouped with other sections in common binders or under common control sheets except as defined in paragraph m. below. Each submittal shall have a cover/control sheet containing the information listed above (a thru k) and have a minimum of 8" x 3" clear space for the general contractors, engineers, and architects review stamp.
 - m. The first group of submittals shall be sent in a minimum of one (or if required) two hard cover view type 3-ring binder(s) White, sized to hold 8-1/2" x 11" sheets:
 - 1) Binder is to be adequately sized to comfortably hold required submittals. Minimum spline size to be 1", maximum spline size to be 3" (provide additional binders if 3" size is not sufficient to properly hold submittals).
 - 2) Binder cover and spline to have outer clear vinyl pockets. Provide correct designation of project in each pocket. Description sheets are to be white with black letters, minimum of 11" high and full width of pocket. Description is to describe project and match project drawing/project manual description.
 - n. Submittals not complying with these requirements may be returned with no action taken at the reviewer's discretion.

16. Re-submittals shall contain:
 - a. The date of re-submission and the dates of all previous submissions.
 - b. A copy of the Engineer's comments from the previous submittal.
 - c. An itemized response to each of the Engineer's comments specifically outlining the changes or corrections being made. As an example; this could be either noting the page(s) of the previous submission that are affected and what changes have been made or noting specific additional information being provided.
 - d. Submittals not complying with these requirements may be returned with no action taken at the reviewer's discretion.
 - e. Turnaround time and copies as indicated in Section 01 33 00 – Submittal Procedures.
17. The Owner's Representative will (if they so desire):
 - a. Review submittals promptly and where special attention is requested, review in accordance with the schedule required.
 - b. Review the submittal for general compliance with the contract documents. The contractor is responsible for quantities, dimensions, placement of the product, coordination with all other trades occupying the space, maintain service clearance, function and compliance with the written installation instructions.
 - c. Turnaround time will be per Division 1.
 - d. Review comments will be per Division 1.
18. Resubmission requirements for "as specified" products.
 - a. Make any corrections or changes in the submittals required by the Owner's Representative and resubmit until accepted.
 - b. A submittal shall only be reviewed a maximum of 3 times. If upon the second resubmission an accepted action cannot be rendered (No Exceptions Noted or Make Corrections as Noted), the contractor shall supply the basis of design product and bear all costs incurred by the Owner's Representative during the review process until an accepted submittal is achieved.
19. The Contractor shall maintain one copy of all accepted submittal data including letters of compliance in a job site file.
- J. Product Requirements, Equals and Substitutions: *Comply with the General Conditions, but the following are in addition to:*
 1. In addition to all other requirements for submittals, equals and substitutions elsewhere in the contract documents, the contractor shall comply with the following.
 2. Product Requirements:
 - a. The specifications sections under Article 2.1 "ACCEPTABLE MANUFACTURER", lists suppliers found acceptable for this project. The names listed are manufacturers who meet the minimum acceptable standards that this project dictates. The list is furnished as a guide. Even though a manufacturer is named, he must still provide the type and quality of equipment specified as well as equipment that will fit within the allotted space and within the design weight allowance, etc. Being named does not imply permission for that manufacturer to provide an alternative product or design. Other manufacturers not named will be considered to be equal providing they furnish a product of the type and quality specified.

- b. In certain cases, foundations and/or structural supports or electrical requirements for equipment specified in this Division are provided under other divisions of the specifications. Where an alternate acceptable manufacturer's product is provided, this contractor shall coordinate the revised requirements and include an allowance for any cost differential.
 - c. If the list, under Article 2.1 "ACCEPTABLE MANUFACTURERS" names only one manufacturer followed by "No Substitutions" that product shall be supplied.
3. Substitutions: *Comply with the General Conditions, but the following are in addition to:*
- a. A substitution is defined as any product not meeting the requirements as outlined in PART 2 - PRODUCTS. A different design accomplishing the same result will be considered a substitution. The same design requiring a larger motor, or more space or a structural change to accommodate larger weight, etc., will be considered a substitution. If a manufacturer who is not listed as an "ACCEPTABLE MANUFACTURER" wants to have his product considered as an equal or as a substitution, he shall submit details to the Engineer 10 days in advance of bid date and a decision will be rendered. If necessary, a clarification will be issued in the form of an Addendum. No substitution requests shall be considered after the Bid.
 - b. Submit a separate request for each product, supported with complete data, with drawings and samples as appropriate, including.
 - 1) Comparison of the qualities of the proposed substitution with that specified in tabulated format.
 - 2) Changes required in other elements of the work because of the substitution.
 - 3) Effect on the construction schedule.
 - 4) Cost, extra credit or statement of no change in contract price.
 - 5) Any required license fees or royalties.
 - 6) Availability of maintenance service, and source of replacement materials.
 - c. The Engineer shall be the judge of the acceptability of the proposed substitution.
 - d. A request for a substitution constitutes that the Contractor:
 - 1) Has investigated the proposed product and determined that it is equal to or superior in all respects to that specified.
 - 2) Will provide the same warranties for the substitution as for the product specified.
 - 3) Will coordinate the installation of the substitution into the work and make such other changes as may be required to make the work complete in all respects.
 - 4) Waives all claims for additional costs, under his responsibility, which may subsequently become apparent.
 - 5) Will absorb all costs incurred by the substitution when affecting other trades including but not limited to electrical, structural, architectural, etc.
 - 6) Will absorb any cost incurred by the Engineer in review of the substituted product if the acceptance of the substituted item creates the need for system modification and/or redesign, or if the substituting contractor exhibits negligence in his substituting procedure thus submitting inferior, misapplied or miss-sized equipment. In the event of additional engineering costs the billing structure shall be agreed upon prior to review by all involved parties.
 - 7) Will provide drawing to prove substituted manufacturer meets all accessibility requirements.
4. Engineer will review requests for substitutions with reasonable promptness, and will issue an addendum or notify Contractor, in writing, of the decision to accept or reject the requested substitution.

5. Substitutions will not be considered when they are indicated or implied on shop drawing or product data submittals, without separate written request, or if acceptance requires revision to the contract documents.
 6. The engineer will review substitution submittals for compliance a maximum of two times. If the submittal or substituted product does not comply with the contract documents on the second submittal, the submittal and product will be rejected and the specified product will be required.
 7. The contractor may request further review of the substitution after the second submittal rejection if the contractor agrees in writing to accept responsibility for the cost of additional review time and expenses by the Engineer.
 8. In the event a substitution is rejected, supply the products which constituted the basis of design at no change in the contract price.
 9. Installation of substitutions without the Owners approval shall be cause of immediate rejection and removal without extra cost to the Owner.
- K. Manufacturer's Instructions:
1. Installation of work shall comply with manufacturer's printed instructions.
 2. Should job conditions or specified requirements conflict with manufacturer's instructions, consult with Engineer for clarification. Do not proceed with work without clear instructions.
- L. Transportation and Handling: Comply with General Conditions.
- M. Storage and Protection:
1. Store products in accord with manufacturer's instructions, with seals and labels intact and legible.
 2. Store products to prevent damage by the elements. Space temperature shall be controlled as required to prevent condensation and metal corrosion or damage to electrical or electronic parts are the result of condensation.
 3. Arrange storage in a manner to provide easy access for inspection. Make periodic inspections of stored products to assure that products are maintained under specified conditions, and free from damage or deterioration.
 4. Provide protection as necessary to prevent damage after installation.
 5. Products which suffer damage due to improper storage shall not be installed and if found in place, shall be removed and replaced at the contractors expense.
- N. Cutting and Patching: Comply with the General Conditions.
- O. Cleaning Up/Removal of Debris:
1. Comply with the General Conditions.
 2. Maintain a clean work area. Construction debris shall be immediately removed from all newly erected work.
- P. Operating and Maintenance Manuals: *Comply with the General Conditions, but the following are in addition to:*
1. Quantity: Comply with the General Conditions.
 2. Format: Adequately sized for contents, minimum 1" and maximum 3" spline size, hard cover, view type, 8-1/2" x 11 loose leaf binders. Binder covers to have outer clear vinyl pocket on front cover and spline. Provide correct project designation and contents description in each pocket. Use as many as required. Do not overload binders.
 3. Content:
 - a. Cover sheet.
 - b. Table of contents (as follows):
 - 1) Description of systems.
 - 2) Design parameters.

- c. Point by Point System Check-out: Provide tabulated results indicating compliance with contract document requirements.
4. Detailed Preparation Requirements:
 - a. The cover sheet shall list: project name, location, architect, structure engineer, mechanical engineer and electrical engineering firm name with address, telephone number and project manager's name for this project.
 - b. Each major heading in the table of contents shall have a large distinctive, clearly marked, non-erasable, plastic encased tab.
 - c. The description of systems will be provided by the design engineer for insertion at the time of review and turn-over to owner. This description of systems will be an updated version of the narrative included in this Section and will be an overview of the entire system. It will be the basis for the starting of the owner's instruction program.
 - d. Each section shall have the following sub-tabs. Sub-tabs shall be similar to the main tabs but of a different color.
 - 1) Specifications: The specification shall be copied and inserted complete with all addenda.
 - 2) Submittal: This section shall include all accepted submittal data. If submittal was not required, include technical data as specified.
 - 3) Installation Instructions: If the product, such as pipe, etc., does not have any written installation instructions, include a statement "Manufacturer's Written Installation Instructions not Available - Product Installed in Accordance with Specifications and Good Practice".
 - 4) Operation and Maintenance Instructions: These shall be the written manufacturer's data edited to omit reference to products or data not applicable to this installation.
 - 5) Parts List: These shall be edited to omit reference to items not applying to this installation.
 - 6) Equipment Supplier: This section shall include the name, address and telephone number of the manufacturer's agent and/or service agency supplying or installing and starting up of the equipment.
 - 7) System Description: This section shall include that portion of the overall description included in the beginning of the manual as it applies to each sub-section. In sections such as pipe, valves and fittings, a statement shall be included "Not Applicable to this Section." Data for this section will be added by the design engineer when the manuals are submitted for review and forwarded to the owner.
- Q. Training of Owners Operators:
 1. The manufacturer shall provide a comprehensive training outline for the Owner & Engineer to review within 90 days of final completion.
 2. The manufacturer & contractor shall provide 24 hours of training on the plumbing system, plumbing fixtures, and all water heating systems.
 3. The owners shall be given comprehensive training in the understanding of the systems and the operation and maintenance of each major piece of equipment.
 4. The contractor shall be responsible for scheduling the training which shall start with classroom sessions followed by hands on training on each piece of equipment. Hands on training shall include start-up, operation in all modes possible, shut-down and any emergency procedures.
 5. The manufacturer's representative shall provide the instructions on each major piece of equipment. These sessions shall use the printed installation, operation and maintenance instruction material included in the O&M manuals and shall emphasize safe and proper operating requirements and preventative maintenance.
- R. Guarantee of Work:

1. Comply with the General Conditions.
 2. Where applicable, furnish manufacturer's written warranty for materials and equipment.
 3. Insert warranties in appropriate locations in operating and maintenance manuals.
 4. Materials and equipment having seasonal operation limitations, shall be guaranteed for a minimum of one year from date of seasonally appropriate test, and acceptance in writing by the Owner, unless specific Division 23 specifications specify a longer period.
- S. System Testing:
1. Provide all necessary labor, materials, and equipment to successfully complete all system testing necessary for building occupancy and owner acceptance.
 2. Provide all necessary labor, materials, and equipment to assist contractors of other division to complete system testing necessary for building occupancy and owner acceptance, wherever an inter-relationship between Division 23 and the work of other divisions exists.
 3. Tests shall be repeated as necessary until all occupancy and operation permits are granted and the owner accepts the project.
 4. Testing schedule requirements per the Table below:

Training Schedule							
Div.	Training Description	Subcontractor	Demo . Date	Time	Hours	Comments	Personnel to attend training
	Energy Management System				16 hours	On the job owner training conducted by a technician fully qualified to conduct such training.	
	HVAC Systems				80 hours	Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain units. See specifications for complete list of training requirements.	

PART 2 – PRODUCTS (Not Applicable)

PART 3 – EXECUTION (Not Applicable)

END OF SECTION

SECTION 23 05 93
TESTING, ADJUSTING, BALANCING OF HVAC SYSTEMS

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Specification Sections, apply to this Section.

1.2 WORK INCLUDED

- A. Checking each piece of equipment for proper installation and operation.
- B. Balancing air and water distribution systems to provide design fluid quantities.
- C. Measuring and recording of fluid quantities.
- D. Electrical measurement.
- E. Verification of performance of all equipment and sequence of operation of automatic controls.
- F. Checking sound levels and vibration isolators for proper function and measurement and correction where a problem or question of acceptability exists.
- G. Recording and reporting results on sub-contractors standard report forms and on commissioning data sheets where these have been provided.
- H. Provide testing of all smoke detectors that are installed in the HVAC system.
- I. The HVAC system shall be tested and balanced twice: once in the summer cooling mode and once in the winter heating mode.

1.3 REFERENCES

- A. Air Diffusion Council (ADC) 1062R3 Equipment Test Code
- B. Associated Air Balance Council (AABC)
National Standards for Field Measurements and Instrumentation, Total Balance System Balance, Air Distribution - Hydronic Systems, Volume 1.

1.4 SUBMITTALS

- A. Submit complete description of procedures, instrument calibration and qualifications of personnel actually doing testing and balancing on this project prior to beginning of any balancing.
- B. Submit schedules of test data readings in organized, schematic, tabulated format. Include schematic drawing showing location of all readings.
- C. Submit as-built drawings showing locations of all readings.

1.5 QUALITY ASSURANCE

- A. Adjusting, balancing, and testing procedures and compilation of test data shall be performed by a Certified Test and Balance Engineer or by personnel trained and supervised by a Certified Test and Balance Engineer.
- B. Test and balance personnel shall be qualified to perform testing and balancing in accordance with AABC or NEBB procedures.

1.6 TOLERANCES

- A. Balance final air and water flow to within plus or minus 5 percent of specified quantities. Caution is urged on systems where diversity has been taken and the total flow exceeds the equipment capacity. In this case, the system must be sectioned as necessary to get proper terminal flow.

1.7 GENERAL COMMENTS

- A. Water Balance: Readings from venturi flow meters, or automatic pressure independent flow control devices will be given highest priority as to accuracy. Where neither is specified pump curves and chiller or boiler pressure drops are to be correlated to establish flow. Pressure drop across coils or chillers is to be used to proportion flow. Volt and ampere readings will be used as checks. Temperature data will be used only as a performance check and not for balancing.
- B. Air Balance: Readings from a pitot tube traverse will be given highest priority as to accuracy. Terminal flow shall be as taken from the terminal DDC flow readings. Outlet flow as established by flow hood will be used to pro-rate air flow. Pressure readings as well as voltage and ampere readings will be used for check purposes only. Temperature readings will be used as a check against performance.
- C. All readings shall be cross-checked for accuracy. These cross-checks shall be tabulated within the report.

PART 2 – PRODUCTS (Not Applicable)

PART 3 – EXECUTION

3.1 INTENT OF DRAWINGS AND SPECIFICATIONS

- A. Review drawings and specifications with regard to adjusting and balancing.
- B. Additional balancing devices which, in the opinion of the TAB sub-contractor, would aid in the adjusting and balancing of the systems shall be brought to the attention of the contractor prior to bid time so that the contractor may make allowances to cover the provision of these additional devices in the original bid.
- C. Minor modifications in system design, which in the opinion of the Contractor, would aid in the adjusting and balancing of the systems may be provided subject to approval of the Owner's Representative at no additional cost to the Owner. Design modifications shall not lessen the operating efficiency of the systems.

3.2 WATER BALANCE

- A. Ascertain that piping systems have been cleaned, flushed, drained and properly refilled and that all strainer baskets have been removed, cleaned, and properly reinstalled prior to beginning water balancing procedure.
- B. In the event that TAB work is started prior to the completion of the water treatment portion of work, the TAB contractor shall make a random recheck as directed by the Owner's Representative. The results of this re-check shall be included in the final report.
- C. Variable flow pumping systems having two-way control valves and using automatic pressure independent system of flow control for secondary hot water heating and chilled water systems.

1. With one pump running and all manual and automatic control valves open, record GPM stamped on each automatic flow control device and read and record the pressure drop across those which have dual pressure taps, as well as across each coil and applicable equipment.
 2. With pump running as described above and all manual and automatic control valves open read and record pressure drop across each pump. Also read and record pressure drop at shut off. Plot these points on the submitted pump curves using the sum of the flow control device GPM as the total system flow.
 3. Record the pump speed required to get the pressure drop across the flow control valve having the highest pressure drop to 6 PSI. If this is 85% or greater, no pump impeller change will be required. If less than 85%, the pump impeller will have to be trimmed. Advise the Owners Representative before proceeding.
 4. Operate lag pump to be sure performance is the same at each step.
 5. Manually set pump speed to 20% (minimum speed) and record flow and pressure difference.
- D. For constant flow systems without automatic flow control devices, using manual valves with memory stop. Before balancing the system, the following procedures shall be executed. Where multiple cooling towers and chillers are shown, all systems shall be in operation.
1. With all balancing devices and all manual and automatic control valves wide open, read and record pressure drop across each chiller.
 2. With all balancing devices and all manual and automatic control valves wide open, read and record pressure drop across each pump. Also read and record pressure drop across pump at shut off. Plot point on submitted pump curve.
 3. If pressure drop exceeds the design and the pump pressure readings indicated a flow in excess of design, the pump impeller may have to be trimmed. Submit this data to the Owners Representative for early review, before proceeding with balancing to determine if an impeller trim is warranted.
 4. In multiple unit systems, balance with all units in operation. Then record readings with each possible combination in use, i.e., in a three chiller installation, balance with all three in operation, then record each combination of two and finally each individual unit operating alone.

3.3 AIR BALANCE

- A. Check system visually and audibly for leakage and proceed with balancing as outlined by AABC or NEBB.
- B. Balance for full flow shall be based on dirty friction loss across the filters. Artificially blank-off sections on a uniform pattern as required to simulate this condition.
- C. Variable Volume Systems:
 1. With supply fan running at 100% speed and all terminals calling for full airflow, read and record flow and fan suction and discharge static pressure readings. Pressure readings shall be obtained using procedures outlined in AMCA Publication 203-90 Field Performance Measurement of Fan Systems. Plot on submitted fan curve.
 2. Set flow at each terminal for maximum values as indicated in terminal schedule using hand held operators terminal (HHOT) furnished with the terminal controls. Provide actual measured outlet flow to temperature controls sub-contractor for setting calibration constants in DDC controls. Normally diversity is taken in the fan selection. Close other terminals as required to get full flow as required for balancing. Pro-rate terminal flow to diffusers.
 3. Set minimum flow to values as indicated in terminal schedule.
 4. Where applicable, adjust return fan for specified differential flow. Record fan signal fan speed and other data at full flow and at minimum flow.

5. Record all data on terminals and supply and return fan including voltage and amperage on primary air fans and return fans at full flow.
- D. Constant Volume Systems:
1. Adjust each fan to deliver the specified quantity of air at the specified temperatures to all areas of the building served by the air system. Where the installed drive can not be adjusted to obtain the required flow, advise the contractor so that the necessary drive change can be made. Adjust speed, in direct proportion to actual vs. required cfm. Exercise caution because amps vary with the cube of speed.
 2. Determine air volume in ducts by use of pitot tube, and inclined manometer. Plug all holes in duct.
 3. Determine air quantity through air grilles or diffusers by use of flow hood with direct readout meter calibrated in CFM. If use of flow hood is not possible, use velometer nozzle as recommended by air device manufacturer. Calculate air quantity based on air device area factors provided by the air device manufacturer.
 4. Compare duct traverse to accumulated airflow at diffusers. If the two do not reconcile, examine system for leaks and, report to contractor so that he can repair and repeat.

3.4 AIR HANDLING UNIT PERFORMANCE TESTING

- A. Recognizing that it will be unlikely that the performance testing will be done on a design day, cooling and heating coil performance shall be recorded as follows.
1. With fan delivering design air flow and control valves open to deliver design water flow, read and record entering and leaving drybulb and wetbulb temperatures, air and waterside flow, pressure loss values and water temperatures.
 2. Through the contractor, request performance data from the equipment supplier based on the measured air flow and entering air temperatures and measured water flow and entering water temperature. Submit this data with test data for review.

3.6 CONTROLS ADJUSTMENT

- A. Check the automatic temperature controls to ascertain that the specified sequence of operation is occurring. Record thermostat set point and room conditions in each space. This includes checking each terminal box to ensure that supply air goes to minimum position before heat comes on.
- B. Compare temperature of space (taken with test instrument) to temperature read by thermostat or temperature sensor. Tabulate results.

3.7 TEST DATA SCHEDULES

- A. Submit typewritten schedules of test data readings.
- B. Schedules shall record the specified reading, the first reading taken and the final balanced reading for the following items.
- C. Where Commissioning Forms are provided, equipment data shall be recorded on these forms for comparison with submitted design data.
- D. In the case of off season performance testing of air handling equipment and refrigeration equipment, include manufacturer's projected performance for comparison.
- E. Pumps (Provide all parameters in the normal and ice making modes):
1. Mark number
 2. Manufacturer and model number
 3. gpm flow - specified and actual

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4. Shut-off head
 5. Pump heat and full load amperage - specified and actual
 6. Motor hp - specified and actual
 7. Voltage, phase, and cycles - specified and actual
- F. Fans:
1. Mark number
 2. Manufacturer and model number
 3. Total cfm supply and rpm - specified and actual
 4. Static pressure (discharge static - suction static)
 5. Full load amperage - specified and actual
 6. Voltage, phase, and cycles - specified and actual
- G. Air Devices (Grilles, Registers, Diffusers, and Louvers):
1. Mark number
 2. Room number
 3. cfm - specified and actual
 4. Size
 5. Effective area
 6. Velocity FPM - specified and actual
- H. Chiller (Provide all parameters in the normal and ice making modes):
1. Mark number
 2. Unit manufacturer and model number
 3. Total chilled water and condenser water gpm - specified and actual
 4. Chilled water entering and leaving temperature - specified and actual - one hour log
 5. Cooler and condenser pressure drop - specified and actual
 6. Compressors full load amperage - specified and actual
 7. Voltage, phase, and cycle - specified and actual
 8. Ambient temperature, DB/WB, time of day, and weather conditions at time of test
 9. Cooler tons, condenser tons, and operating kW compared to specified conditions
- I. Variable Volume Boxes:
1. Mark number
 2. Unit manufacturer and model number
 3. Location and room number
 4. Air handler number
 5. Maximum / minimum and heating supply cfm - specified and actual
 6. For DDC controls: measure and record computer readout and calibration factor at design conditions.
 7. Electric heat, KW – specified and actual
 8. Voltage, phase, and cycles – specified and actual
- J. Air Monitor:
1. Mark number
 2. Unit manufacturer and model number
 3. Duct size/monitor size factor
 4. Cfm - specified and actual.
 5. Velocity or velocity pressure
- K. Direct Expansion Cooling Coil:
1. Designation.
 2. Nameplate data.
 3. Entering air DB (F).
 4. Entering air WB (F).
 5. Leaving air DB (F).

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6. Leaving air WB (F).
 7. Evaporative pressure (PSIG).
 8. Air flow (CFM).
 9. Load calculation (tons).
- L. Heat Exchangers:
1. Designation.
 2. Nameplate data.
 3. Pressure, entering and leaving ice water.
 4. Calculated/measured flow (GPM) ice water.
 5. Temperature, entering and leaving chilled water.
 6. Pressure, entering and leaving chilled water.
 7. Calculated/measured flow (GPM) chilled water.
 8. Temperature, entering and leaving chilled water.
 9. Heat balance: ice water tons vs. chilled water tons.
- M. Kitchen Exhaust Hoods:
1. Designation.
 2. Nameplate data.
 3. Exhaust air CFM, from pilot tube traverse.
 4. CFM and velocity in capture area.
 5. All final readings used to determine cfm.
- N. Motors:
1. Designation.
 2. Nameplate HP, voltage, and full load amperes.
 3. RPM.
 4. Motor amperes and voltage under operating conditions.
 5. For belt drive applications, motor amperes and voltage under no load condition.
- O. Fans:
1. Designation.
 2. Nameplate data.
 3. RPM.
 4. Static pressure, inlet and discharge.
 5. CFM from pitot tube traverse of discharge duct.
 6. Final pitot tube traverse sheets showing all readings.
- P. Main and Sub-main Ducts:
1. Designation and location.
 2. CFM from pitot tube traverse.
 3. Final pitot tube traverse sheets showing all readings.
- Q. Air Handlers:
1. Mark number
 2. Unit manufacturers and model number
 3. Total supply air cfm and rpm - specified and actual
 4. Return air cfm - specified and actual
 5. Outside air cfm - specified and actual
 6. Unit static pressure profile, including total fan static
 7. Specified total and external static pressure
 8. Water gpm flow, coil pressure drop, and entering and leaving temps - specified and actual
 9. Coil - entering and leaving air DB/◆F and WB/◆F - specified and actual
 10. Outside air DBF and WBF at time of test
 11. Voltage, phase, and cycle specified load conditions

12. Hand calculations of the BTUh at test conditions of Total cooling, Latent cooling and Sensible cooling.
13. Btu per hour when converted to specified load conditions gpm by means of heat transfer test.

3.8 OPERATING TESTS

- A. Operate systems to demonstrate that systems have been properly adjusted and balanced, and to demonstrate that the systems' performance conforms with the intent of the specifications and drawings.
- B. The balancing contractor shall make available to the Owner's operating personnel a Certified Test and Balance Engineer for a minimum of 16 hours, two working days, not necessarily consecutive, with all necessary equipment to demonstrate that all systems operate as intended and that the balancing reports are accurate.
- C. This demonstration will occur after the balancing contractor has submitted his reports to confirm that all systems or portions of the systems that coincide with the building's occupancy schedule, are adjusted and balanced.
- D. Conduct tests with natural building heating and/or cooling loads for a minimum 4 hours duration.

END OF SECTION

SECTION 23 07 00
HVAC INSULATION

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.
- B. Refer to Division 1 for all requirements pertaining to General Provisions.

1.2 WORK INCLUDED

- A. Duct Systems Insulation.
- B. Piping Systems Insulation.
- C. Equipment Insulation.
- D. Underground Pipe Insulation.
- E. Cold Pipe Hanger Support Blocks.
- F. Accessories.

1.3 QUALITY ASSURANCE

- A. All products within the conditioned air stream or active plenums shall comply with the NFPA 90A Flame/Smoke rating of 25/50 and comply with UL 181 erosion limitations. Fire hazard ratings shall be as determined by NFPA-255, "Method of Test of Surface Burning Characteristics of Building Materials" - ASTM E84 or UL 723.
- B. All adhesives, cements, finishes, jackets, etc., shall be UL listed or labeled for use as applied to insulation and designed specifically for use in the installation.
- C. All insulation shall be installed in accordance with National Commercial & Industrial Insulation Standards (NCIA).
- D. Kitchen hood exhaust duct fireproofing system shall have specific acceptance by ICBO, and SBCCI. Material shall be non-hazardous and contain no asbestos or toxic materials. Suitable for 2 hour fire rating.

1.4 SUBMITTALS

- A. Submit schedule indicating type of insulation, thickness, vapor barrier or coating by system and size.
- B. Product data, along with installation operation and maintenance instructions, shall be included in the operation and maintenance manuals.
- C. Submit details of insulated removable covers using the actual equipment dimensions, concrete base sizes and piping arrangements.
- D. Submit in accordance with Division 1 requirements.

1.5 GENERAL REQUIREMENTS

- A. Factory-applied insulation is specified under the applicable equipment Section of these specifications. It is listed here for reference only.
- B. Acoustical duct liner is specified under Section 23 31 01 - Shop Fabricated Ductwork. It is listed here for reference only.

- C. Packages and standard containers of materials shall be delivered unopened to job site and shall have the manufacturer's label attached giving a complete description of the material.

1.6 DEFINITIONS

- A. The term "exposed" means exposed to view in finished spaces, in equipment rooms, in fan rooms, in closets, in utility corridors, in tunnels, on roof, in storage rooms, and in other spaces as indicated.
- B. The term "concealed" means concealed from view, and includes all spaces not defined as exposed.
- C. The term "unconditioned" space shall mean all places where the temperature surrounding the pipe or duct has not been conditioned consistent with conditioned spaces, and shall include mechanical equipment rooms, non-active ceiling plenums, and non-accessible chases. This term shall also include conditioned spaces where the humidity levels are allowed to rise above 65% RH.

PART 2 – PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

- A. Fiberglass Insulation:
 - 1. Owens-Corning Fiberglas
 - 2. Knauf Fiberglass
 - 3. CertainTeed
 - 4. Johns Manville
- B. Closed Cell Elastomeric Insulation:
 - 1. Armacell LLC
 - 2. Johns Manville
 - 3. Rubatex
- C. Foamglass Insulation:
 - 1. Pittsburgh Corning
 - 2. Cell-U-Foam Corp.

2.2 DUCT INSULATION AND FIREPROOFING REQUIREMENTS

- A. Refer to the drawings for insulation size and type requirements. Please contact the engineer prior to bid with any questions regarding the insulation requirements.

2.3 PIPE INSULATION REQUIREMENTS

- A. Refer to Section 23 02 00 for PVC jacket color specifications requirements on all piping exposed or concealed.

2.4 MATERIALS

- A. Duct Insulation: Blanket Fiberglass: Flexible fibrous glass, flame retardant factory laminated foil-skrim-kraft (FSK) vapor barrier, 2" stapling flange, maximum vapor permeance of .02 perm/in., minimum density of 1.5 lb/cf, maximum conductivity per 1" thickness of .28 at 75°F mean temperature. Based on Knauf Duct Wrap.

B. Pipe Insulation (to 450°F):

1. Rigid Fiberglass: Resin bonded fibrous glass, flame retardant, factory applied all service jacket vapor barrier with self sealing pressure sensitive lap joints, molded to accommodate pipe, maximum vapor permeance of .02 perm/in. and a puncture resistance of 50 units, minimum density 4.0 lb/cf, maximum conductivity per 1" thickness of .23 at 75°F, .29 at 200°F and .43 at 400°F mean temperature. Based on Knauf Pipe Insulation.
2. Closed Cell Elastomeric (Small Pipe Sizes up to 5 Inches): Flexible, elastomeric, closed cellular, tubular molded to accommodate piping, smooth outer surface suitable for painting with vinyl lacquer type coating, water resistant, non absorbent, ozone resistant, minimum density of 4 lb/cf, maximum conductivity per 1" thickness of .27 at 75°F mean temperature. Based on Armacell LLC AP Armaflex and Self-seal Armaflex 2000.
3. Closed Cell Elastomeric (Large Pipe Sizes, 6" and Larger): Sheet type, flexible, elastomeric, closed cellular, smooth outer surface suitable for painting with vinyl lacquer type coating, water resistant, non absorbent, ozone resistant, minimum density of 4 lb/cf, maximum conductivity per 1" thickness of 2.7 at 75°F mean temperature. Based on Armacell LLC Armaflex II.
4. Foamglas: Rigid, preformed sections of 100% rigid cellular glass dimensionally complying with ASTM C585 standards, non-absorptive of moisture after immersion, water vapor permeability 0.00 perm/in. impervious to common acids (except hydrofluoric), non-combustible, 100 PSI compressive strength when capped with hot asphalt, 8.5 #/cu.ft. density, thermal conductivity 0.33 BTU-In./Hr./Sq.Ft./F @ 50°F. Based on Pittsburgh Corning Foamglas.

C. Equipment Insulation:

1. Closed Cell Elastomeric Sheet type, flexible, elastomeric, closed cellular, smooth outer surface suitable for painting with vinyl lacquer type coating, water resistant, non absorbent, ozone resistant, minimum density of 6 lb/cf, maximum conductivity per 1" thickness of .27 at 75°F mean temperature. Based on Armacell LLC Armaflex II.
2. Foamglas: Sections of 100% rigid cellular glass, non-absorptive of moisture after immersion, water vapor permeability 0.00 perm/in., impervious to common acids (except hydrofluoric), non-combustible, 100 PSI compressive strength when capped with hot asphalt, 8.5 #/cu.ft. density, thermal conductivity 0.32 BTU-In./Hr./Sq.Ft./F @ 50°F. Based on Pittsburgh Corning Foamglas.

D. Insulation Accessories: Aluminum Pipe Jacket and Fitting Covers: Jacket shall be 0.016" thick (26 gauge) embossed aluminum, sized to provide a 2" (min.) lap joint both longitudinally and circumferentially, with 3/4" min. wide x 0.015" min. (30 gauge) thick draw bands. Fitting covers shall be aluminum, 0.025" (22 gauge), min., thickness.

E. Cold Pipe Hanger Support Blocks: Lightweight, rigid, closed cell material having 100 lb/sq.in. compressive strength when capped with hot asphalt according to ASTM C240. Based on Pittsburgh Corning Foamglas.

F. Accessories:

1. Aluminum Pipe Jacket and Fitting Covers: Jacket .016" thick (28 ga.) embossed aluminum sized to provide a minimum 2" lap joint both longitudinal and circumferentially, minimum 3/4 inch x .015 inch thick (30 ga) draw bands. Covers .024 inch thick.
2. PVC pipe jacket and fitting covers used with insulation for pipe, elbows, tees, couplings, 25/50 flame/smoke ratings, suitable for temperatures to 500°F.
3. Glass Cloth Pipe, Duct and Equipment Jacket: Glass lagging cloth, 8 oz/sy treated weight. Secure with elastomeric insulating adhesive on elastomeric insulation, for fiberglass insulation use appropriate mastic finish as recommended by the insulation manufacturer with the perm rating of the mastic equal to or less than that of the insulation it is sealing.

4. Corner angles shall be minimum 28 gauge, 1 inch by 1 inch aluminum adhered to 2 inch by 2 inch heavy kraft paper.
5. Glass tape shall be a minimum density of 1.6 ounces per square yard, 4 inch wide with a 10 x 10 thread count per inch of width. Glass cloth shall be untreated.
6. Staples shall be outward clinching type, Type 304 or 316 stainless steel in accord with ASTM A 167 or Monel® coated.
7. Wire shall be soft annealed galvanized, or copper, 16 gauge, or nickel copper alloy.
8. Closed cell elastomeric insulated finish shall be a white water based flexible, acrylic latex enamel equal to WB Armaflex finish.
9. Insulation Tape: Closed cell elastomeric insulation: 2" wide x 1/8" thick.
10. Elastomeric Insulation Adhesive: Air drying contact adhesive for securing sheets to flat or curved metal surfaces and joining seams and butt joints of elastomeric insulation. Suitable for temperatures to 180°F, dried film not to exceed 25 for flame spread and 50 for smoke development when tested per ASTM E 84-84A method.
11. Vapor Barrier Mastic: Air drying flexible water based mastic used for applying a vapor barrier joint with glass cloth at insulation joints. Suitable for temperatures to 180°F, wet and dried film not to exceed 25 for flame spread and 50 for smoke development when tested per ASTM E 84-84A method. Maximum Perm rating of 0.08. , Childers Products Company, Inc. CP-35 Chil Therm® WB, Foster Products Corp. Product Data 30-80 Foster Vapor Safe® Coating, Marathon Industries, Inc. 590 LO-PERM, Richard's Paint Manufacturing CO., Inc. VBM-4, Vimasco Corp. 749 Vapor-Blok, or equal.
12. Acrylic Latex Finish and Sealers:
 - a. Elastomeric Insulations: Air drying flexible water based finish used for finishing flexible elastomeric insulation. Suitable for temperatures to 180°F, wet and dried film not to exceed 25 for flame spread and 50 for smoke development when tested per ASTM E 84-84A method. Armacell LLC WB Armaflex finish.
 - b. Foamglass Insulation: Air drying flexible water based sealer used for applying a vapor barrier seal over microscopic cracks that develop in the insulation. Suitable for temperatures to 180°F, wet and dried film not to exceed 25 for flame spread and 50 for smoke development when tested per ASTM E 84-84A method. Maximum Perm rating of 0.08. , Childers Products Company, Inc. CP-35 Chil Therm® WB, Foster Products Corp. Product Data 30-80 Foster Vapor Safe® Coating, Marathon Industries, Inc. 590 LO-PERM, Richard's Paint Manufacturing CO., Inc. VBM-4, Vimasco Corp. 749 Vapor-Blok, or equal.

PART 3 – EXECUTION

3.1 GENERAL REQUIREMENTS

- A. Install all insulation in strict accordance with the manufacturers written installation instructions.
- B. Provide a PVC jacket on all exposed rain leader piping, including but not limited to the Gym.
- C. All insulation work shall be performed by skilled mechanics regularly engaged in the insulation trade.
- D. Properly coordinate the insulation work with the other trades so that installation is performed with a minimum of conflict.
- E. Insulation shall not be applied on any piping or duct system requiring testing until testing is completed and approved by Engineer.
- F. Insulation shall not be applied until all systems are clean, dry, free of dirt, dust, or grease.

- G. The finished installation shall present a neat and acceptable appearance which includes but is not limited to: all jackets smooth, all vapor barriers sealed properly, no evidence of "ballooning" of the jackets, or sagging insulation, all valves, dampers, gauges, unions, etc. accessible. The Engineer shall be the final judge of acceptance of workmanship.
- H. All equipment nameplates on hot equipment shall be left uncovered. All equipment nameplates on cold equipment shall have a removable section sized to expose the nameplate. This section shall be clearly marked "NAMEPLATE".
- I. If proper maintenance procedures require access to the insulated equipment removable panels, sections or covers shall be provided to accomplish this. These access devices shall be constructed in a manner to assure easy access and sturdy construction. The contractor shall assume the responsibility to coordinate all equipment requiring insulation to be either factory or field insulated.
- J. Insulation and accessories shall be applied only at suitable application temperature and conditions as recommended by the manufacturer. Do not apply insulation to any surface while it is wet.
- K. Insulation shall be protected from moisture and weather during storage and installation.
- L. Insulation which has sustained moisture damage, torn jackets, or other damage due to improper storage or other reasons shall not be used. If evidence of this is sighted the Owner's representative reserves the right to require the insulating contractor to remove any and/or all insulation until the Engineer is satisfied that there is no longer any inferior insulation installed on this project.
- M. Insulation, fabric, and jacketing shall be protected from damage during construction. Damage by the insulator shall be repaired without cost to the Owner. Damage by others shall be reported in writing to the contractor.
- N. The insulation subcontractor is responsible for proper material storage at the work site.
- O. Work performed prior to receipt of approved documents or submittals, which later proves to be incorrect or inappropriate, shall be promptly replaced by the contractor without cost to the purchaser.
- P. Insulation shall not be installed until adequate access and clearances at control mechanisms, dampers, sleeves, columns, and walls have been provided.
- Q. All insulation at handholes, access doors or other openings, and adjacent to flanges and valves shall be neatly finished where exposed to view.
- R. All materials, accessories and methods of installation and fabrication are subject to the Owner's Representatives inspection and approval during any phase of the work.
- S. The insulation subcontractor shall prevent the accumulation of insulation debris in the buildings and on the premises of the Owner.
- T. The insulation subcontractor shall be responsible for his own safety program at the work site and shall provide instruction on safe practices for his workers assigned to the project. All employees are subject to the work rules at the job site.
- U. The insulation subcontractor shall familiarize himself with the progress and execution of the job and notify the proper parties of interferences and any problems with the proper installation of his materials.

3.2 INSTALLATION

- A. Duct Insulation:
 - 1. General:
 - a. Insulate or internally line all flexible duct connectors equal to or greater than adjacent insulation thickness.

- b. The tops of all diffusers shall be insulated same as connecting ductwork to prevent condensation.
 - c. Duct insulation at fire dampers shall be extended over supporting angle iron and sealed to wall.
2. Blanket Fiberglass Insulation:
- a. Insulation shall be tightly wrapped on the ductwork with all circumferential joints butted and longitudinal joints lapped 2 inches and stapled. Joints shall be finished with two coats of an approved vapor barrier mastic, reinforced with glass cloth extending 2 inches onto adjacent insulation. One coat of mastic shall be applied to the insulation prior to the application of the glass cloth, which shall be embedded in the mastic to ensure complete adhesion of the cloth. Additionally secure insulation to bottom of rectangular ducts over 24 inches wide with weld pins at no more than 18 inches on center.
 - b. Insulation shall be butted with facing overlapping all joints shall be finished with two coats of an approved vapor barrier mastic, reinforced with glass cloth extending 2 inches onto adjacent insulation. One coat of mastic shall be applied to the insulation prior to the application of the glass cloth, which shall be embedded in the mastic to ensure complete adhesion of the cloth. Breaks, punctures, pin penetrations in facing shall be sealed with vapor barrier tape and vapor barrier adhesive.
3. Rigid Fiberglass Insulation:
- a. Use boards in largest possible size to minimize seams. Do not use "scraps".
 - b. Shall be installed in all non-public exposed areas up to 10'-0" above finished floor.
 - c. Provide corner angles where insulation is subject to harm.
 - d. All fasteners shall be non corroding.
 - e. The insulation shall be applied by use of cup head weld pins. Such fasteners shall be spaced in accordance with NCIA recommendations, where NCIA standards do not address exact dimensions, cup head weld pins shall be spaced on 12" centers. Pin caps shall be covered with a round vapor seal patch that matches the jacket on the ASJ board. On cold ducts, these shall be coated so as to not cause condensation.
 - f. Ducts having sharp bends shall have the insulation scored as required to conform to the curved surfaces to provide a neat and acceptable appearance when finished.
 - g. Insulation edges and joints shall be finished with two coats of an approved vapor barrier mastic, reinforced with glass cloth extending 2 inches onto adjacent insulation. One coat of mastic shall be applied to the insulation prior to the application of the glass cloth, which shall be embedded in the mastic to ensure complete adhesion of the cloth.
 - h. Generally, rigid fiberglass material will only be used in finished or exposed areas, and it is intended that the finish present a neat and uniform appearance as to color and workmanship.
 - i. In finished areas, molded glass fiber insulation shall be used to insulate round ducts where commercially available sizes can be used.
 - j. Fittings on round ducts in finished areas shall be covered with premolded fiberglass fitting insulators equal to Insul-Coustic where sizes are available. For sizes where premolded fittings are not available use miter-cut segments of molded pipe insulation, wired in place, with all joints sealed with adhesive and smoothed out with a coat of insulating cement.

- k. On cold ducts, the fittings shall be finished with two coats of an approved vapor barrier mastic, reinforced with glass cloth extending 2 inches onto adjacent insulation. One coat of mastic shall be applied to the insulation prior to the application of the glass cloth, which shall be embedded in the mastic to ensure complete adhesion of the cloth. Hot ducts shall be finished in a similar manner, except the mastic need not be of the vapor barrier type.
- B. Pipe Insulation:
- 1. General:
 - a. All locations where the insulated surface is supported by hangers, the insulation shall be protected by shields or saddles properly skimmed to maintain a smooth outer surface, and proper insulation thickness. Chilled water piping, 3" and over shall have a section of foamglas insulation installed between the pipe and shield. 3 and 4" to be 12" long, 5" and 6" to be 18" long and 8" and over, 24" long. If the possibility exists that the hanger may conduct the temperature of the conveyed medium and thus cause condensation or personal injury due to high temperature, the hanger shall also be insulated. Joints between foamglas and pipe insulation shall be properly sealed.
 - b. All devices connected to or in line with the piping system shall be insulated greater than or equal to the connecting piping. This includes but is not limited to valves, air separators, expansion tanks, control valves, control devices, gauge connections, thermometer stems, chemical feed equipment, piping flexible connectors, etc. This is particularly important on ice water and refrigerant lines.
 - c. The insulation at threaded unions in steam and hot water piping shall be tapered and terminated with cement and glass lagging cloth and lagging adhesives.
 - d. Insulate exterior surfaces of all anchors and guides for chilled water and dual temperature piping systems.
 - e. A complete moisture and vapor barrier shall be installed wherever insulation is penetrated by hangers or other projections through insulation and in contact with cold surfaces for which a vapor seal is specified.
 - f. Cover fittings, flanges, unions, valves, anchors, and accessories with premolded or segmented insulation of the same thickness and material as the adjoining pipe insulation. Where nesting size insulation is used overlap pipe insulation 2 inches or one pipe diameter. Fill voids with insulating cement and trowel smooth. Elbows shall have not less than 3 segments per elbow. Secure insulation with wire or tape until finish is applied. Blanket inserts in lieu of premolded or segmented insulation is not allowed. Cover fittings with preformed PVC fitting covers.
 - g. Wrap all pressure gauge taps, thermometer wells and all other penetrations through insulation with closed cell insulation tape so as to prevent condensation.
 - h. Seal all raw edges of insulation.
 - i. For piping supported by hangers outdoors, apply a rainshield to prevent water entry.
 - 2. Rigid Fiberglass:
 - a. Provide PVC fitting covers for all fittings.
 - b. Align all jacket seams.
 - c. Assure all vapor barriers are properly sealed.
 - d. Provide PVC jacket over all exposed insulation in the equipment room.
 - e. All corner angles below 6'-10" shall have padded insulation and be marked with yellow stripes.
 - 3. Closed Cell Elastomeric:
 - a. All joints shall be sealed with adhesives.
 - b. Where the thickness is to be obtained by use of two layers of insulation, install with staggered joints.

- c. Finish:
 - 1) Concealed Indoors: No additional finish.
 - 2) Exposed Indoors: Provide PVC jacket over all insulation.
 - 3) Concealed Indoors: Provide PVC jacket over fittings fabricated from insulation sections or sheet.
 - 4) Outdoors: Provide aluminum pipe jacket.
- 4. Foamglas:
 - a. All joints, both longitudinal and circumferential shall be sealed with a vapor barrier mastic.
 - b. Thickness shown for refrigeration pipe to be obtained by use of two layers of insulation with staggered joints.
 - c. Finish:
 - 1) Exposed Indoors: Provide PVC jacket over all insulation that shall be sealed with an acrylic latex finish.
 - 2) Concealed: Provide PVC jacket over fittings fabricated from insulation sections or sheet. Provide ASJ over all other.
 - 3) Exposed Outdoors: Provide acrylic latex finish and aluminum pipe jacket.
- C. Equipment Insulation:
 - 1. Vessel and Large Pipe Insulation:
 - a. Insulation shall be of the same material as the piping which serves it and it shall be layered to obtain the required thickness. Maximum of 1-1/2" thick per layer.
 - b. All joints shall be staggered to avoid thermal gaps.
 - c. Sheet size shall be as large as possible to minimize seams. Do not use "scraps".
 - d. Securing shall be by welded studs and/or non-corrosive banding wire. Do not weld brackets, clips, or other devices to ASME coded pressure vessels or piping. Insulation pins or studs shall be as specified and installed in accordance with NCIA standards.
 - e. Finish shall be with PVC jacket or galvanized steel mesh wire and a finish coat of insulating cement minimum of 1/4" thick. After cement has cured apply glass lagging cloth and proper coating as directed by manufacturer. All corners shall have metal corner beads and provide acrylic latex finish.
 - 2. Removable Covers:
 - a. Equipment specified to have removable covers shall have insulation as specified in Paragraph 2.4, fastened to the inside surfaces of a 20 gauge galvanized sheet metal equipment cover.
 - b. The covers shall be of a sectionalized design and shall be custom-fitted around each piece of equipment. For ease of removal, joints between sections shall coincide with the splits or joints in the equipment. Joints between sections of the cover shall be held together with quick-connect trunk latches, and shall be gasketed to form a vapor-tite seal cover (for the passage of pipes, etc.) shall be provided with closed cell elastomeric collars to ensure a tight fit.
 - c. The box shall be fitted around each piece of equipment and split for removal to coincide with the split in the casing. The sections of the box shall be held together with quick disconnect trunk latches. Joints between box sections shall be gasketed to form a vapor seal. Void spaces in the box shall be packed with flexible fiberglass insulation. Openings around pump casing shall be provided with closed cell elastomeric collar to ensure tight fit.
 - d. Provide acrylic latex finish.

- e. Coordinate the piping of the drain, vent, gauge, and control lines to exit through the base or back section of the removable cover. The insulation of these pipes shall be totally independent of the removable cover.
3. Chilled Water Compression Tank and Filtering Systems: Surfaces shall be insulated with 1 inch thick closed cell elastomeric insulation board or pipe insulation, as applicable. Finish as specified for vessel and large pipe insulation.
- D. Cold Pipe Hanger Support Blocks:
 1. Provide on all chilled fluid systems pipe hangers and supports.
 2. Apply Pittcote 404 acrylic latex mastic filler over insulation and on ends.
 3. Apply Pittseal 444 butyl joint and penetration sealant at joint between foamglas and adjacent insulation.
 4. Provide vapor barrier system to match the vapor barrier on the adjacent system.
 5. Provide 20 gauge (min.) galvanized shield between the insulation and the hanger or support.
- E. PVC Jacket:
 1. Provide PVC sheet jacket over all exposed, indoor piping or insulation.
 2. Provide PVC pipe jacket over all exposed, indoor foamglas or elastomeric pipe insulation.
 3. Provide PVC fitting covers over all fittings fabricated from insulation sections or sheet material.
 4. PVC pipe jacket shall be applied with special attention given to achieving positive seal at all longitudinal and circumferential joints using a welding solvent on the longitudinal joint as recommended by the manufacturer. Slip joints to have 4" minimum lap and no welding solvent.
- F. Glass Cloth Jacket:
 1. Provide where specified.
 2. Provide acrylic latex finish.
- G. Flexible Acrylic Latex:
 1. Apply two coats to glass cloth jacket, concealed foamglas and closed cell elastomeric insulation.
 2. Refer to Division 9 for color to be used. If no instructions are given, provide a white finish.

3.3 MISCELLANEOUS ITEMS

- A. General: Provide insulation of any portion of a system or piece of equipment not previously discussed where ambient operating conditions will allow condensation to occur or whose surface temperature exceeds 115°F. Insulation materials and method shall be as directed by the Designer.
- B. Final Inspection: At final inspection, the finished surfaces of all exposed insulation shall be clean and without stains or blemishes. Repair and clean the insulation surfaces and, if necessary, to obtain a new appearance, shall coat discolored surfaces with off-white latex water-base semi-gloss paint or lagging adhesive, without a change in the contract price.

END OF SECTION

SECTION 23 31 00
HVAC DUCTS AND CASINGS

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.
- B. Refer to Division 1 for all requirements pertaining to General Provisions.

1.2 WORK INCLUDED

- A. Single Wall Round Ductwork and Fittings.
- B. Single Wall Round Snaplock Seam Galvanized Steel Ductwork and Fittings.
- C. Double Wall Round Ductwork and Fittings.
- D. Round Stainless Steel Ductwork and Fittings.
- E. Single Wall Round Flexible Ductwork.
- F. Insulated Round Flexible Ductwork.

1.3 QUALITY ASSURANCE

- A. All ductwork shall be fabricated within the guidelines established by the Sheet Metal and Air Conditioning Contractors National Association, Inc. (SMACNA) HVAC Duct Construction Standards - Metal and Flexible, latest edition.
- B. All ductwork shall be fabricated to withstand the pressure and velocity required on this project.
- C. All components, fasteners, sealants, adhesives, etc. in the conditioned air stream or exposed in active or non- active plenums shall conform to the NFPA 90A Standard for the Installation of Air Conditioning and Ventilating Systems and Standard for Flame/Smoke/Fire Contribution of 25/50/0.
- D. All ductwork shall conform to UL standard UL 181 Factory Made Air Duct Materials and Duct Connectors, latest edition. Applicable sections shall apply to shop fabricated ductwork.
- E. After fabrication and installation of all shop fabricated ductwork the fabricator and installer, if not the same, shall certify in writing to the Owner's representative that all shop fabricated ductwork and installation of same meets or exceeds the quality standards established by SMACNA.

1.4 SUBMITTALS

- A. Submission for acceptance is required.
- B. Product data, along with installation operation and maintenance instructions, shall be included in the operation and maintenance manuals.
- C. Submit in accordance with Division 1 requirements.

1.5 SHOP DRAWINGS

- A. Shop Drawings: Provide shop drawings of ductwork as follows:
 - 1. Draw to a scale of not less than 1/4 inch to one foot on the same size sheets as the contract drawings.
 - 2. Show duct sizes.

3. Show fitting details.
4. Show lighting and ceiling diffusers.

PART 2 – PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

- A. Single Wall Round Ductwork and Fittings:
 1. Autoduct, Inc.
 2. Eastern Sheetmetal
 3. Hamlin Sheetmetal, Inc.
 4. Impulse Air.
 5. Lindab
 6. Semco Manufacturing, Inc.
 7. United McGill
- B. Single Wall Round Snaplock Seam Galvanized Steel Ductwork and Fittings:
 1. Alco Manufacturing Company.
 2. Crown Products Company.
 3. Hughes.
- C. Double Wall Round Ductwork and Fittings:
 1. Autoduct, Inc.
 2. Eastern Sheetmetal
 3. Hamlin Sheetmetal, Inc.
 4. Impulse Air.
 5. Lindab
 6. Semco Manufacturing, Inc.
 7. United McGill
- D. Round Stainless Steel Ductwork and Fittings:
 1. Autoduct, Inc.
 2. Eastern Sheetmetal
 3. Hamlin Sheetmetal, Inc.
 4. Impulse Air.
 5. Lindab
 6. Semco Manufacturing, Inc.
 7. United McGill
- E. Single Wall Round Flexible Ductwork:
 1. ATCO Rubber Products, Inc.
 2. Flexmaster USA, Inc.
 3. Flexible Technologies - Thermaflex®
- F. Insulated Round Flexible Ductwork:
 1. ATCO Rubber Products, Inc.
 2. Flexmaster USA, Inc.
 3. Flexible Technologies - Thermaflex®

2.2 FABRICATION

- A. Single Wall Round Ductwork and Fittings:
 1. Materials: Hot rolled, continuously annealed, hot dipped galvanized steel minimum of G-90, 0.90 oz/sf coating, conforms to ASTM A653.

2. Metal Gauges: Conform to the Sheet Metal and Air Conditioning Contractor's National Association, Inc. (SMACNA) HVAC Duct Construction Standards - Metal and Flexible, latest edition. The following table shall establish a minimum guideline unless the manufacturer has U.L. Standard 181 test results that show that lighter gages (thinner wall thickness) with intermediate corrugations (ribs) allow the gage reduction:

Pipe Diameter	Positive Internal Static Pressure in W.G.					
	0" - 2.0"		2.1" - 4.0"		4.1" - 10.0"	
	Spiral Pipe	Fittings	Spiral Pipe	Fittings	Spiral Pipe	Fittings
6" - 10"	28	26	28	24	28	24
12"	28	26	28	24	26	24
14"	28	26	26	24	26	24
16"	26	24	26	22	24	22
18" - 26"	26	24	24	22	24	22
27" - 36"	24	22	22	20	22	20
37" - 50"	22	20	20	20	20	20
51" - 60"	20	18	18	18	18	18
61" - 84"	18	16	18	16	18	16

3. Duct Construction: Spiral wound, lockseam construction, slip joint or flanged connections as noted below under couplings.
4. Fitting Construction:
- 90 Deg. and 45 Deg. Ells: Solid - welded seam construction for dust collector use, Solid - welded seam or spot welded and bonded for general use. Radiused ells to be full radiused unless otherwise noted, mitered ells to have single thickness, turning vanes, slip joint or flanged connections.
 - Tees or Crosses: Solid - welded seam construction for dust collector use, Solid - welded seam or spot welded and bonded for general use. Tangential, unless otherwise noted or detailed, conical take off or reduction, slip joint or coupled ends. 180 Deg. or 45 Deg. as indicated.
 - Bellmouth: Solid - welded seam construction for dust collector use, Solid - welded seam or spot welded and bonded for general use. Spun metal, smooth converging bellmouth, round, gauge equal or greater than connecting duct.
 - Access Section:
 - 7" Diameter and Less: Minimum 12" long flanged section, minimum four bolts per flange.
 - 8" Diameter and Larger: Round or rectangular access cover, on welded raised section, pressure sensitive release suitable for manual release or emergency vacuum release, chain retainer, (see Para. 3.5: Schedules for Sizes).
 - Couplings:
 - Joints 36" or less shall have 2" slip coupling.
 - 38" or over shall be spiral mate.
 - Based on United McGill
- B. Single Wall Round Snaplock Seam Galvanized Steel Ductwork and Fittings:
- Materials: Hot rolled, continuously annealed, hot dipped galvanized steel minimum of G-90, 0.90 oz/sf coating, conforms to ASTM A653.

2. Metal Gauges: Minimum of 26 gauge, with remaining sizes conforming to the Sheet Metal and Air Conditioning Contractor's National Association, Inc. (SMACNA) HVAC Duct Construction Standards Metal and Flexible, latest edition. The following table shall establish a minimum guideline:

Round Ducts:

Duct Diameter	Spiral Pipe	Fittings and Longitudinal Seam Pipe
3" thru 14"	26	24
15" thru 26"	24	22
27" thru 30"	22	20

3. Duct Construction: Snaplock seam construction, slip joint or flanged connections.
 4. Fitting Construction:
 a. 90 Deg. and 45 Deg. Ells: Adjustable ells to be full radiused unless otherwise noted, slip joint or flanged connections.
 b. Tees or Crosses: Adjustable, unless otherwise noted or detailed, conical take off or reduction, slip joint or coupled ends. 180 Deg. or 45 Deg. as indicated.

C. Double Wall Round Ductwork and Fittings:

1. Materials:

- a. Outer Duct: Hot rolled, continuously annealed hot dipped galvanized steel, minimum G- 90, 0.90 oz/sf (.001 inch thick/side) coating, conforms to ASTM 653.
 b. Liner: 1" thickness flexible fibrous glass minimum density 1.5 lb/cf, maximum conductivity per 1" thickness of .27 at 75°F mean temperature with a mylar coating.
 c. Inner Duct: Hot rolled continuously annealed, perforated hot dipped, galvanized steel, minimum G-90, 0.90 oz/sf (.001 inch thick/side) coating, conforms to ASTM 653.

2. Metal Gauges:

- a. Outer Duct: Conform to the Sheet Metal and Air Conditioning Contractor's National Association, Inc. (SMACNA) Duct Construction Standards, Metal and Flexible, latest edition. The following table shall establish a minimum guideline unless the manufacturer has U.L. Standard 181 test results that show that lighter gages (thinner wall thickness) with intermediate corrugations (ribs) allow the gage reduction:

Round Ducts:

Spiral Pipe Inside Dia.	Shell	Perf. Liner	Fittings and Seam Pipe	
			Longitudinal Shell	Perf. Liner
3" thru 8"	24	26 Non-Ribbed	24	24
9" thru 12"	24	28 Ribbed	24	24
13" thru 24"	22	28 Ribbed	22	24
25" thru 34"	20	28 Ribbed	20	24
35" thru 48"	20	28 Ribbed	20	22
49" thru 52"	18	28 Ribbed	18	22
53" thru 58"	18	26 Ribbed	18	22
59" thru 62"	16	26 Ribbed	16	22
63" thru 82"	16	22 Non-Ribbed	16	22

3. Duct Construction:

- a. Outer Duct: Spiral wound, lockseam construction, slip joint or flanged connections as noted below under couplings.
 b. Inner Duct: Spiral wound, lockseam construction, slip joint connections, mechanically bound to outer duct for vertical installation.

4. Fitting Construction:
 - a. 90 Deg. and 45 Deg. Ells: Die formed or welded segmented construction, radiused ell to be full radiused unless otherwise noted, mitered ell to have single thickness turning vanes, liner, and inner duct continuous.
 - b. Tees or Crosses: Tangential unless otherwise noted, conical take off or reduction coupled ends, 180 Deg. or 45 Deg. as indicated.
 - c. Bellmouth: Spun metal smooth converging bellmouth, round, single wall gauge equal to or greater than connecting duct.
 - d. Access Section:
 - 1) 7" Diameter and Less: Flanged section, minimum four bolts per flange. Double wall section.
 - 2) 8" Diameter and Larger: Round or rectangular access cover, on welded raised sections, pressure sensitive release suitable for manual release or emergency vacuum release, chain retainer, (see Para. 3.5 - Schedules for Sizes).
 - e. Couplings:
 - 1) Joints 36" or less shall have 2" slip coupling.
 - 2) 38" or over shall be spiral mate.
 - f. Based on United McGill.

D. Round Stainless Steel Ductwork and Fittings:

1. Materials: Exhaust duct shall be constructed of 304 or 316 stainless steel as scheduled with a 2B mill finish.
2. Metal Gauges: Conform to the Sheet Metal and Air Conditioning Contractor's National Association, Inc. (SMACNA) Duct Construction Standards, Metal and Flexible, latest edition. The following table shall establish a minimum guideline unless the manufacturer has U.L. Standard 181 test results that show that lighter gages (thinner wall thickness) with intermediate corrugations (ribs) allow the gage reduction:

Pipe Diameter	Negative Internal Static Pressure in W.G.					
	0" - 2.0"		2.1" - 6.0"		6.1" - 10.0"	
	Pipe	Fittings	Pipe	Fittings	Pipe	Fittings
9" - 15"	26	24	24	22	24	22
16" - 26"	24	22	22	20	20	18
28" - 36"	22	20	20	18	18	16
38" - 50"	20	18	18	16	18**	16
52" - 60"	18	16	16	14	18**	16*

* Companion angle rings required.

** Girth rings required 60" O.C.

3. Duct Construction: Round and oval ducts shall be of the spiral lockseam or all welded construction.
4. Fitting Construction: Fittings shall be factory fabricated with all seams continuously welded.
5. Fitting Type: Refer to Section 2.2.A.4.
6. Joints:
 - a. Joints 36" or less shall have 2" slip coupling.
 - b. 38" or over shall be spiral mate.

- E. Uninsulated Round Flexible Ductwork:
1. High Pressure Application: Factory fabricated assembly of a trilaminate of aluminum foil, fiberglass, and polyester with a perm rating of .02 high tear strength and properties to resist temperature change, mildew, and age hardening. It shall be mechanically locked, without adhesives, into a formed aluminum helix on the ducts outside surface and be U.L. listed 181 Class 1 and comply with NFPA 90A and 90B. The material shall have a pressure rating of 12" w.g. positive pressure and -5" w.g. negative pressure through a temperature range of -20°F to +250°F. Based on Type NI-35 as manufactured by Flexmaster U.S.A., Inc., ATCO Rubber Products UPC #7 or Flexible Technologies – Thermaflex S-LP-10.
- F. Insulated Round Flexible Ductwork:
1. High Pressure Application:
 - a. Factory fabricated assembly of a trilaminate of aluminum foil, fiberglass, and polyester with a perm rating of .02, high tear strength and properties to resist temperature change, mildew, and age hardening. It shall be mechanically locked, without adhesives, into a formed aluminum helix on the ducts outside surface and be U.L. listed 181 Class 1 and comply with NFPA 90A and 90B. The material shall have a pressure rating of 12" w.g. positive pressure and -5" w.g. negative pressure through a temperature range of -20°F to +250°F.
 - b. The duct material shall be factory wrapped in a blanket of fiberglass insulation with a C factor of .23 or less. The insulation shall be encased in a fire retardant reinforced aluminum material vapor barrier with a perm rating of not over .05 grains per square ft. per hour per inch of mercury.
 - c. Based on Type 3M as manufactured by Flexmaster U.S.A., Inc., ATCO Rubber Products UPC #036 or Omni Air 1200, or Flexible Technologies – Thermaflex M-KF.
 2. Low Pressure Application:
 - a. Factory fabricated assembly of a tri-laminate of aluminum foil, fiberglass, and polyester with a perm rating of .02, high tear strength and properties to resist temperature change, mildew, and age hardening. It shall be mechanically locked, without adhesives, into a formed aluminum helix on the ducts outside surface. It shall be U.L. listed 181 Class 1 and comply with NFPA 90A and 90B. The material shall have a pressure rating not less than 6" w.g. positive pressure and -3" w.g. negative pressure through a temperature range of -20°F to +250°F.
 - b. The duct material shall be factory wrapped in a blanket of fiberglass insulation with a C factor of .23 or less. The insulation shall be encased in a fire retardant reinforced aluminum material vapor barrier with a perm rating of not over .05 grains per square ft. per hour per inch of mercury.
 - c. Based on Type 5M as manufactured by Flexmaster U.S.A., Inc., ATCO Rubber Products UPC #036 or Omni Air 1200, or Flexible Technologies – Thermaflex M-KF.
- G. Ductwork, General: Each duct section shall have both ends covered with polyethylene or other suitable material to protect against the entrance of dirt, debris or water during shipment and storage prior to installation.
- H. DUCT SEALANT: Water-Based Joint and Seam Sealant: Flexible, adhesive sealant, used indoors or outdoors. Foster 32-19 Duct Fas, Childers CP-146 Chil Flex or Duro Dyne SAS.

PART 3 – EXECUTION

3.1 GENERAL REQUIREMENTS:

- A. Install in strict accordance with the manufacturer's written installation instructions.
- B. The drawings, due to their small scale, are diagrammatic in nature and are not necessarily complete in all details. For this reason not all necessary offsets, rises or falls are shown. Coordinate the installation of the ductwork with all other trades and to provide all necessary offsets, etc. as required for completion of this project without any additional cost to the Owner, Architect or Engineer.
- C. All ductwork shall be run parallel or perpendicular to building structure and seams or spirals shall be aligned whenever possible.
- D. All sizes indicated on the drawings are inside clear dimensions.
- E. All ductwork shall be properly sealed in a neat clean manner with all excess sealer wiped clean.
- F. Coordinate the location of, provide the necessary access and install all devices provided in other specification sections within Division 23, including but not limited to fire, smoke and/or balancing dampers, access and mounting for control devices, air flow measuring stations, etc., as apply to this project.
- G. All ducts passing through partitions or walls shall be properly and neatly sealed. If partition or wall carries a fire rating (fire damper indicated or if architectural plans indicate a rated wall) the duct shall be sleeved with the space between the sleeve and duct properly sealed with firestopping material (Refer to Division 7 for firestopping material). The sleeve shall be permanently affixed to the wall.
- H. Coordinate the proper duct pressure classification with the system served and to provide the proper ductwork to withstand these pressures. (See Para. 3.5 Schedules: System Pressure Classification and Duct Material Schedule.)

3.2 CLEANING AND PROTECTION

- A. During construction, ductwork shall be cleaned of dirt and debris internally section by section as it is installed. At end of each day, ductwork not finally connected to equipment shall be provided with a temporary closure of polyethylene film or other covering material that will prevent entrance of dust, debris, or water. Clean exterior surfaces of any material which might cause corrosion or if the duct is to be painted, it shall be cleaned suitable for painting. After substantial completion of the ductwork system the system shall be operated with filters in place to blow-out any remaining dust from the system. Protect all equipment and property from damage or fouling during this cleaning. All prefilters used during cleaning shall be replaced prior to turning the system over to the Owner.

3.3 LEAK TESTING

- A. Duct Leakage Report: The Contractor shall make all the supply, return, outside air, and exhaust duct systems (limited to 1,500 cfm and greater) operationally air-tight, with no more than 2% leakage for duct systems rated at 2" w.c. pressure class, and 1% leakage for systems exceeding 2" w.c. pressure class. Leakage test to be performed by Contractor with all air device openings and fan connections sealed airtight. Test the systems prior to applying any insulation or concealing in soffits or chases. Use a portable fan capable of producing a static pressure equal or greater than the duct test pressure. This fan to have a flow measuring assembly consisting of a straight section of duct with an orifice plate, pressure taps, and a calibrated performance curve for determining leakage rates.

1. Test each section equal to the external static pressure indicated for that fan or air handler with the portable fan assembly. After the fan achieves that steady state design pressure, record the air flow quantity across the orifice and the percent of design air flow. If the test fails, the Contractor shall reseal and retest at no additional cost to the Owner.
2. Repair all duct leaks that can be heard or felt, even if the system has passed the leakage test.
3. Submit duct leakage reports to the Balancer and the Engineer for their review and approval.
4. Refer to specification section 23 05 93 for more information.

3.4 INSTALLATION

A. General:

1. Install generally as indicated.
2. Conceal ductwork in finished spaces unless indicated otherwise.
3. Do not install ductwork in or allow to enter or pass through electrical rooms, elevator machine room, or spaces housing switchboards, panelboards, or distribution boards, except ductwork that serves electrical rooms, elevator machine rooms or spaces.
4. Exercise special care to provide tight fitting well fabricated, well braced ductwork systems.
5. Field assemble rectangular, round, or flat oval ductwork as follows:
 - a. Use slip joints, couplings, etc. sealed with adhesive pre-applied to couplings or duct mate spiralmate or oval mate on duct sizes 1" and larger.
 - b. Isolate dissimilar metals with elastomeric sealant tape or fiber gaskets and gaskets and washers for bolts.
6. In high pressure ductwork (above 2" w.g.), do not use 2 piece mitered 90 degree elbows with or without vanes unless approved by engineer.
7. Make duct connections from hoods, openings, fans, and other devices.

B. Double Wall Round Ductwork and Fittings:

1. Coordinate the liner and/or exterior insulation requirements to assure a continuous vapor barrier and uniform thermal resistance. See Para. 3.5 Schedules for liner/insulation thickness requirements.
2. In unconditioned, non-accessible areas such as chases and dry wall ceiling the lined ducts shall also have an additional layer of duct wrap (See Section 23 07 00 – HVAC Insulation) at all joints to assure condensation control, wrap will extend a minimum of 6" on either side of joint.

C. Uninsulated Round Flexible Ductwork:

1. Provide where indicated or required on return air duct connections only.
2. Maximum length shall be 5'-0".
3. Maximum turn or bend shall be no more than 90 Deg. Provide rigid elbows where 90 Deg. turns are indicated on the drawings.
4. Flexible ductwork shall be cut to the proper length. Coiling or unnecessary offsets will not be permitted.
5. Secure inner liner to terminal collar or duct coupling with duct sealer and sheet metal screws. Wrap with three wraps of duct tape following helix path.
6. Rigid round ductwork may be substituted in lieu of flex unless the flex duct is used for vibration isolation or otherwise detailed.

D. Insulated Round Flexible Ductwork:

1. Provide where indicated or required on supply air ducts.
2. Coordinate the insulation requirements as to assure a continuous and consistent thermal resistance and vapor barrier.
3. Maximum length shall be 5'-0".

4. Maximum turn or bend shall be no more than 90 Deg. Provide rigid elbows where 90 Deg. turns are indicated on the drawings or more than one 90 Deg. turn is required.
5. Flexible ductwork shall be cut to the proper length. Coiling or unnecessary offsets will not be permitted.
6. Secure inner liner to terminal collar or duct coupling with duct sealer and sheet metal screws. Provide Stainless steel draw band to seal inner liner tight to connecting duct. Pull insulation over inner liner and fold vapor barrier over end of insulation. Secure with two coats of an approved vapor barrier mastic, reinforced with glass cloth extending 2 inches onto adjacent insulation. One coat of mastic shall be applied to the insulation prior to the application of the glass cloth, which shall be embedded in the mastic to ensure complete adhesion of the cloth.
7. High pressure flexible duct to be provided upstream of all terminal boxes. Low pressure flexible duct may be used downstream of terminal box.
8. Rigid round ductwork may be substituted in lieu of flex unless the flex duct is used for vibration isolation or otherwise detailed. If omitted, external insulation must be provided per Section 23 07 00 – HVAC Insulation.

3.5 SCHEDULES

A. System Pressure Classification and Duct Material Schedule:

<u>System I.D. No.</u>	<u>System</u>	<u>Section</u>	<u>Maximum Pressure</u>	<u>Duct Material</u>
1.	Supply	AHU to Terminal	4" pos.	A
2.	Supply	Terminal to Diffuser	2" pos.	A
3.	Return	Terminal to AHU	2" neg.	A
4.	Emergency Exhaust	Exhaust Fan		

Schedule Legend:

Duct Material

- A Galvanized Steel
- B PVC Coated Galvanized Steel
- C 304 Stainless Steel
- D. Access Door Schedule:

1. Round Duct:

<u>Duct Size</u>	<u>Access Door Size</u>
a. up to 7" dia.	12" long removable section
b. 8" to 12" dia.	8" x 12"
c. 13" to 18" dia.	12" x 12"
d. 19" dia. and up	14" x 20"

END OF SECTION

SECTION 23 31 01
SHOP FABRICATED DUCTWORK

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.
- B. Refer to Division 1 for all requirements pertaining to General Provisions.
- C. Refer to Division 7 for all requirements pertaining to firestopping materials.

1.2 WORK INCLUDED

- A. Galvanized Steel Rectangular Ductwork.
- B. Aluminum Ductwork.
- C. Stainless Steel Ductwork.
- D. Duct Liner.

1.3 QUALITY ASSURANCE

- A. All ductwork shall be fabricated within the guidelines established by the Sheet Metal and Air Conditioning Contractors National Association, Inc. (SMACNA) HVAC Duct Construction Standards - Metal and Flexible, latest edition.
- B. All ductwork shall be fabricated to withstand the pressure and velocity required on this project.
- C. All components, fasteners, sealants, adhesives, etc. in the conditioned air stream or exposed in active or non- active plenums shall conform to the NFPA 90A Standard for the Installation of Air Conditioning and Ventilating Systems and Standard for Flame/Smoke/Fire Contribution of 25/50/0.
- D. All ductwork shall conform to UL standard UL 181 Factory Made Air Duct Materials and Duct Connectors, latest edition. Applicable sections shall apply to shop fabricated ductwork.
- E. After fabrication and installation of all shop fabricated ductwork the fabricator and installer, if not the same, shall certify in writing to the Owner's representative that all shop fabricated ductwork and installation of same meets or exceeds the quality standards established by SMACNA.

1.4 SUBMITTALS

- A. Submission for acceptance is required.
- B. Product data, along with installation operation and maintenance instructions, shall be included in the operation and maintenance manuals.
- C. Submit in accordance with Division 1 requirements.

1.5 SHOP DRAWINGS

- A. Shop Drawings: Provide shop drawings of sheet metal ductwork as follows:
 - 1. Draw to a scale of not less than 1/4 inch to one foot on the same size sheets as the contract drawings.
 - 2. Show duct sizes.
 - 3. Show fitting details.

4. Show lighting and ceiling diffusers.
- B. Floor Plans: Provide sheet metal floor plans drawn to the same scale as the contract drawings.
 1. Use contract drawing sheet size.
 2. Show on each floor plan the floor penetrations, fire dampers and access doors, ducts with sized and bottom elevations, terminal types, and air quantities.

PART 2 – PRODUCTS

2.1 MATERIALS

- A. Galvanized Steel Ductwork:
 1. Interior, exposed, or concealed: Hot rolled steel continuously annealed and hot dipped galvanized sheet or coil, minimum G-90, 0.90 oz/sf coating suitable for forming without flaking or peeling, suitable for welding or soldering. Zinc coating shall not be impaired from double seaming, breaking or roll forming. 14 ga. and lighter conforming to ASTM A653. 13 ga and heavier conforming to ASTM A653.
 2. Exterior or Areas Requiring Painting: Hot rolled steel continuously annealed and hot dipped galvanized sheet or coil, minimum G-90, 0.90 oz/sf (.001 inch thick/side) coating with a mill applied phosphate film suitable for insulating the paint from the drying action of the zinc, capable of forming without flaking or peeling, suitable for welding or soldering. Zinc coating shall not be impaired from double seaming, breaking or roll forming. 14 ga. and lighter conforming to ASTM A653. 13 ga. and heavier conforming to ASTM A653.
 3. Double Wall Galvanized Steel Ductwork:
 - a. Outer Duct: Hot rolled, continuously annealed hot dipped galvanized steel, minimum G-90, 0.90 oz/sf (.001 inch thick/side) coating, conforms to ASTM 653.
 - b. Liner: 1" thickness flexible fibrous glass minimum density 1.5 lb/cf, maximum conductivity per 1" thickness of .27 at 75°F mean temperature with a mylar coating.
 - c. Inner Duct: Hot rolled continuously annealed, perforated hot dipped, galvanized steel, minimum G-90, 0.90 oz/sf (.001 inch thick/side) coating, conforms to ASTM 653.
- B. Aluminum Ductwork: Interior or Exterior: Non heat treatable (common) alloy 1100, commercially pure (99.00% minimum). Corrosion resistant, suitable for welding, shows no signs of cracking when seaming, braking or roll forming, tensile strength range: 14,000 to 24,000 psi tensile strength, conforming to Federal Specification QQ-A-250/1.
- C. Stainless Steel Ductwork:
 1. Interior Concealed or Exterior: Type 304, finish No. 2D conforming to ASTM A 240 and Federal Specification QQ-S-766.
 2. Interior Exposed: Type 304, finish No. 4, conforming to ASTM A 240 and Federal Specification QQ-S-766.

2.2 FABRICATION

- A. Galvanized Steel Ductwork:
 1. Fabricate ductwork as indicated on the drawings. Sizes given are inside clear dimensions. Allowances must be made for duct liner if indicated. Unless otherwise indicated on the drawings, the metal gauge shall be in accordance with SMACNA-HVAC Duct Construction Standards - Metal and Flexible, Latest Edition.
 2. Elbow Fabrication:
 - a. 90 deg. elbows 12" or less in width shall be radiused whenever possible.
 - b. All radiused elbows shall be full radiused (R=1.5).

- c. All mitered 90 deg. elbows shall have turning vanes. Ducts with a width/depth ratio of 1 or more shall have double thickness turning vanes; single thickness is permissible for less than 1.
 3. Tee or Take-off Fabrication:
 - a. Take-off to round run-outs shall be conical or bell mouth. Where conical or bellmouth fittings can not be used due to take-off size to main, provide factory fabricated side takeoff fitting equal to Flexmaster U.S.A., Inc. Type "STO". Provide with handle extension for insulated ducts to clear the insulation thickness specified.
 - b. Take-off to square or rectangular shall be 45 deg. clinch collar or proportional divisions.
 - c. A volume damper shall be located downstream of each take off on square and rectangular take-offs, and integral to round run-outs.
 4. Transitions:
 - a. Concentric Transition: Maximum angle 45 deg. diverging, 60 deg. converging (SMACNA Fig. 2-7).
 - b. Eccentric Transition: Maximum angle 30 deg. diverging or converging (SMACNA Fig. 2-7).
 5. At the Contractor's option, ductwork may be joined at the transverse joints with prefabricated galvanized Ductmate Industries, Inc. ("25" or "35") or Ward Industries, Inc. sections, or with fabricated TDF or TDC T-24 type flanged transverse joints with bolted corners, gaskets, and sealants, constructed in accordance with the SMACNA HVAC Duct Construction Standards - Metal and Flexible, latest edition, Table 1-12. Ductmate "25" may be used only on ductwork with a pressure classification of 2" w.g. or less on the discharge side of air handling units or fan power terminal units. Plastic joint clips are not acceptable. Flanged and prefabricated joints by different manufacturers shall not be jointed. Formed on flanges shall not be used.
- B. Aluminum Ductwork:
 1. Fabricate ductwork as indicated on the drawings. Sizes given are inside clear dimensions. Allowances must be made for duct liner if indicated. Unless otherwise indicated on the drawings, the metal gauge shall be in accordance with SMACNA-HVAC Duct Construction Standards - Metal and Flexible, Latest Edition.
 2. Elbow Fabrication:
 - a. 90 deg. Elbows 12" or less in width shall be radiused whenever possible.
 - b. All radiused elbows shall be full radiused (R=1.5).
 - c. All mitered 90 deg. Elbows shall have single thickness turning vanes.
 3. Tee or Take Off Fabrication:
 - a. Take off to round run-outs shall be conical or bell mouth.
 - b. Take off to square or rectangular shall be 45 deg. clinch collar or proportional divisions.
 - c. A volume damper is to be located downstream of each take off.
 4. Transitions:
 - a. Concentric Transition: Maximum angle 45 deg. diverging, 60 deg. converging (SMACNA Fig. 2-7).
 - b. Eccentric Transition: Maximum angle 30 deg. diverging or converging (SMACNA Fig. 2-7).
 5. All seams shall be welded or sealed to provide watertight construction and all joints to be flanged and gasketed.
 6. All attachment of turning vane, balancing dampers, etc. shall be welded whenever possible.
 7. Access doors when required, will be installed on the side of the duct, not the bottom.
 8. Provide welded tabs for hanging, spacing as required.

- C. Stainless Steel Duct:
 - 1. Fabricate ductwork as indicated on the drawings. Sizes given are inside clear dimensions. Allowances must be made for duct liner if indicated. Unless otherwise indicated on the drawings, the metal gauge shall be in accordance with SMACNA-HVAC Duct Construction Standards - Metal and Flexible, Latest Edition.
 - 2. Elbow Fabrication:
 - a. All elbows shall be full radiused whenever possible.
 - b. All elbows required to be mitered shall have single thickness turning vanes. Vanes shall be welded in place. No protruding screws will be permitted.
 - 3. All seams shall be welded with interior weld ground smooth and all slag and/or splatter removed.
 - 4. All joints shall be constructed using Ductmate DM35 or equal stainless steel flange connections of the same grade as the duct material. All joints shall be sealed completely (externally or internally) with United Duct Sealer or an approved equal. No duct leakage will be allowed.
 - 5. Unless otherwise noted all material shall be 18 gauge.
 - 6. Provide welded tabs for hanging. Spacing as required.
- D. Ductwork, General: Each duct section shall have both ends covered with polyethylene or other suitable material to protect against the entrance of dirt, debris or water during shipment and storage prior to installation.

PART 3 – EXECUTION

3.1 GENERAL REQUIREMENTS

- A. Install in strict accordance with the Sheet Metal and Air Conditioning Contractor's National Association, Inc.'s (SMACNA) recommendations.
- B. The drawings, due to their small scale, are diagrammatic in nature and are not necessarily complete in all details. For this reason not all necessary offsets, risers or falls are shown. Coordinate the installation of the ductwork with all other trades and to provide all necessary offsets, etc. as required for completion of this project without any additional cost to the Owner, Architect and/or Engineer.
- C. All ductwork shall be run parallel or perpendicular to building structure whenever possible.
- D. All ductwork shall be properly sealed.
- E. Coordinate the location, provide the necessary access, and install all devices provided in other specification sections within Division 23. Including but not limited to fire, smoke and/or balancing dampers, access and mounting for control devices, air flow measuring stations, etc. as apply to this project.
- F. All ducts passing through partitions or walls shall pass through at a 90 degree angle. The duct shall be sleeved with the space between the sleeve and duct properly sealed with firestopping material (Refer to Division 7 for Firestopping materials). The sleeve shall be permanently affixed to the wall (see Section 23 05 29 - Hangers and Supports for HVAC Systems for sleeve specifications).
- G. Coordinate the proper duct pressure classification with the systems served and to construct the ductwork to withstand these pressures. (See 3.6 Schedules; System Pressure Classification and Duct Material Schedules.)
- H. All ducts located outdoors and not of welded construction shall have seams and transverse joints sealed water tight with duct sealer, arranged to shed water and finished with insulating duct coating as specified in Section 23 33 00 – Air Duct Accessories.

3.2 CLEANING AND PROTECTION

- A. During construction, ductwork shall be cleaned of dirt and debris internally section by section as it is installed. At end of each day, ductwork not finally connected to equipment shall be provided with a temporary closure of polyethylene film or other covering material that will prevent entrance of duct, debris, or water. Clean exterior surfaces of any material which might cause corrosion or if the duct is to be painted, it shall be cleaned suitable for painting. After substantial completion of the ductwork system, the system shall be operated with filters in place to blow-out any remaining dust from the system. Protect all equipment and property from damage or fouling during this cleaning. All prefilters used during cleaning shall be replaced prior to turning the system over to the Owner.

3.3 DUCT SEALING REQUIREMENTS

- A. All ducts shall have SMACNA Seal Class A (all transverse joints, longitudinal seams, and duct wall penetrations).

3.4 LEAK TESTING

- A. Ductwork rated at over 3" positive pressure shall be leak tested using a test rig as described in the SMACNA Balancing Manual.
- B. Test ductwork that is rated over 3" positive pressure at 25% above specified operating pressure. Ductwork to be tested in segments and CFM leakage shall be limited to 5% of the system airflow for that section.
- C. Leaks must be located and sealed. All audible leaks, regardless of size, must be sealed.
- D. Duct Leakage Report: The Contractor shall make all the supply, return, outside air, and exhaust duct systems (limited to 1,500 cfm and greater) operationally air-tight, with no more than 2% leakage for duct systems rated at 2" w.c. pressure class, and 1% leakage for systems exceeding 2" w.c. pressure class. Leakage test to be performed by Contractor with all air device openings and fan connections sealed airtight. Test the systems prior to applying any insulation or concealing in soffits or chases. Use a portable fan capable of producing a static pressure equal or greater than the duct test pressure. This fan to have a flow measuring assembly consisting of a straight section of duct with an orifice plate, pressure taps, and a calibrated performance curve for determining leakage rates.
 - 1. Test each section equal to the external static pressure indicated for that fan or air handler with the portable fan assembly. After the fan achieves that steady state design pressure, record the air flow quantity across the orifice and the percent of design air flow. If the test fails, the Contractor shall reseal and retest at no additional cost to the Owner.
 - 2. Repair all duct leaks that can be heard or felt, even if the system has passed the leakage test.
 - 3. Submit duct leakage reports to the Balancer and the Engineer for their review and approval.
 - 4. Refer to specification section 23 05 93 for more information.

3.5 INSTALLATION

- A. Galvanized Steel Ductwork:
 - 1. Install ductwork as indicated on the drawings. If any conflict occurs notify the Owner's Representative prior to any extensive rerouting.
 - 2. Install ductwork to allow clearance for the installation of duct insulation.
 - 3. Provide duct liner as specified and/or detailed. (See 3.6 Schedule for liner requirements.)

- B. Aluminum Ductwork:
 1. Connect to equipment served with a solid duct connection.
 2. Slope horizontal runs to inlets at a minimum of 1/4" -/10 LFT. If not possible, slope away from the inlet and provide a continuous drain at the first rise. Coordinate the trapping and drain piping requirements.
 3. All joints shall be sealed water tight.
 4. Do not use penetrating screws or rivets for hanging. Support duct from welded clips or from flanges.
- C. Stainless Steel Ductwork:
 1. Connect to equipment served with a solid connection.
 2. Slope horizontal runs to inlet at a minimum of 1/4 inch per one (1) linear foot.
 3. All joints shall be sealed air and water tight.
- D. Duct Liner:
 1. Coordinate the proper duct liner thickness with the liner thickness schedule included in Para. 3.6 - Schedules.
 2. The liner shall be applied with fire resistant adhesive and weld pin mechanical fasteners on a maximum of 15" centers for velocities less than 1500 FPM and 12" centers for velocities above 1501 FPM. Adhered or clinched pinched type pins not permitted. When installed, fastener heads shall not compress the insulation more than 1/8" based on the nominal insulation thickness.
 3. The liner shall be butted and sealed at all joints, seams, and exposed edges to ensure continuous thermal resistance, and condensation control. In unconditioned, non-accessible areas such as chases and dry wall ceilings, the lined duct shall also have an additional layer of duct wrap at the joints for a minimum of 6" either side of the joint to assure condensation control.

3.6 SCHEDULES

- A. Ductwork shown to be round or oval is to be provided under Section 23 31 00 - Pre-Fabricated Ductwork.
- B. System Pressure Classification and Duct Material Schedule for Shop Fabricated Ductwork:

	<u>System</u>	<u>Section</u>	<u>Maximum Pressure</u>	<u>Duct Material</u>
1.	Outside Air Plenum	All	2" neg.	A
2.	Outside Air Duct	All	2" neg.	A
3.	Supply	AHU to terminal	3" pos.	A
4.	Supply	Terminal to Diffuser	2" pos.	A
5.	Return	All AHU Return	2" neg.	A
6.	Gen. Exhaust	Inlet to Unit	2" neg.	A
7.	Kit. Hood Exhaust	All	3" neg.	C
8.	Locker/Shower.	All	2" neg.	B
9.	Laundry Rm. Exh.	All	2" neg.	B
10.	Air Transfer Duct	All	2" neg.	A
11.	Laboratory	Inlet Grille	2" neg.	C
	General Exhaust	To Air Valve		

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Schedule Legend:

Duct Material

- A. Galvanized Steel
- B. Aluminum
- C. Stainless Steel - Type 304

END OF SECTION

SECTION 23 33 00
AIR DUCT ACCESSORIES

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.
- B. Refer to Division 1 for all requirements pertaining to General Provisions.

1.2 WORK INCLUDED

- A. Duct access doors.
- B. Fire doors.
- C. Fire dampers.
- D. Smoke dampers.
- E. Smoke/Fire dampers.
- F. Backdraft dampers.
- G. Volume dampers.
- H. Prefabricated casing panels.
- I. Flexible duct connectors.
- J. Roof mounted air outlets and inlets.
- K. Louver (Exhaust).
- L. Louver (Outside Air Intake).
- M. Hardware Cloth.
- N. Aluminum Brick vent.
- O. Install miscellaneous control devices.

1.3 QUALITY ASSURANCE

- A. All products provided for enhancement of Life Safety shall be UL listed and bear the appropriate label stating compliance.
- B. All Products to have a Florida Product Approval Number, as required by the Florida Building Code.
- C. All products located in the conditioned air stream or located in return air plenums shall conform to the NFPA 90A Flame/Smoke/Fuel Contribution of 25/50/0 and all other applicable requirements of NFPA 90A.
- D. Smoke and Smoke/Fire dampers shall be provided with a 60 month from the date of shipment parts only warranty, including freight for all components, including damper operators.
- E. Quality Assurance for Louvers:
 - 1. Source Limitations: Obtain louvers and vents through one source from a single manufacturer where indicated to be of same type, design, or factory-applied color finish.
 - 2. Welding: Qualify procedures and personnel according to the following:
 - a. AWS D1.2, "Structural Welding Code - Aluminum."
 - b. AWS D1.6, "Structural Welding Code - Stainless Steel."
 - 3. SMACNA Standard: Comply with recommendations in SMACNA's "Architectural Sheet Metal Manual" for fabrication, construction details, and installation procedures.

1.4 PERFORMANCE REQUIREMENTS FOR LOUVERS

- A. Structural Performance: Louvers shall withstand the effects of gravity loads and the following loads and stresses within limits and under conditions indicated without permanent deformation of louver components, noise or metal fatigue caused by louver blade rattle or flutter, or permanent damage to fasteners and anchors. Wind pressures shall be considered to act on vertical projection of louvers.
 - 1. Wind Loads: Determine in accordance with Florida Building Code (current edition).

1.5 SUBMITTALS

- A. Submission for acceptance is required.
- B. Product data, along with installation operation and maintenance instructions, shall be included in the operation and maintenance manuals.
- C. Submit in accordance with Division 1 Requirements.
- D. Submittals for Louvers:
 - 1. Product Data: For each type of product indicated.
 - 2. Shop Drawings: For louvers and accessories. Include plans, elevations, sections, details, and attachments to other Work. Show blade profiles, angles, and spacing.
 - a. For installed louvers and vents indicated to comply with design loads, include structural analysis data signed and sealed by the qualified professional engineer responsible for their preparation. Include summary of forces and loads on walls and jambs.
 - 3. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency or by manufacturer and witnessed by a qualified testing agency, for each type of louver.
 - a. Wind-Driven Rain.
 - b. Air-Performance.

1.6 PROJECT CONDITIONS FOR LOUVERS

- A. Field Measurements: Verify louver openings by field measurements before fabrication and indicate measurements on Shop Drawings.
 - 1. Established Dimensions: Where field measurements cannot be made without delaying the Work, establish opening dimensions and proceed with fabricating louvers without field measurements.

PART 2 – PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

- A. Duct Access Doors:
 - 1. Air Balance, Inc.
 - 2. Cesco Products
 - 3. Greenheck, Inc.
 - 4. Nailor Industries, Inc.
 - 5. Nystrom
 - 6. Prefco Products, Inc.

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7. Ruskin Manufacturing, Co.
8. Safe Air Inc.
- B. Fire Doors:
 1. Air Balance, Inc.
 2. Cesco Products
 3. Greenheck, Inc.
 4. Nailor Industries, Inc.
 5. Nystrom
 6. Prefco Products, Inc.
 7. Ruskin Manufacturing, Co.
 8. Safe Air Inc.
- C. Fire Dampers:
 1. Air Balance, Inc.
 2. Cesco Products
 3. Greenheck, Inc.
 4. Nailor Industries, Inc.
 5. Prefco Products, Inc.
 6. Ruskin Manufacturing, Co.
 7. Safe Air Inc.
- D. Smoke Dampers:
 1. Air Balance, Inc.
 2. Cesco Products
 3. Greenheck, Inc.
 4. Nailor Industries, Inc.
 5. Prefco Products, Inc.
 6. Ruskin Manufacturing, Co.
 7. Safe Air Inc./Dowco
- E. Smoke/Fire Dampers:
 1. Air Balance, Inc.
 2. Cesco Products
 3. Greenheck, Inc.
 4. Nailor Industries, Inc.
 5. Prefco Products, Inc.
 6. Ruskin Manufacturing, Co.
 7. Safe Air Inc./Dowco
- F. Backdraft Dampers:
 1. Air Balance, Inc.
 2. Cesco Products
 3. Greenheck, Inc.
 4. Nailor Industries, Inc.
 5. Prefco Products, Inc.
 6. Ruskin Manufacturing, Co.
 7. Safe Air Inc./Dowco
- G. Volume Dampers:
 1. Greenheck, Inc.
 2. Air Balance, Inc.
 3. Arrow United Industries, Inc.
 4. Cesco Products
 5. Nailor Industries, Inc.
 6. Prefco Products, Inc.

7. Ruskin Manufacturing, Co.
8. Safe Air Inc./ Dowco
- H. Prefabricated Casing Panels:
 1. IAC
 2. Ruskin
 3. Semco
 4. United Sheetmetal
 5. Vibro Acoustics
- I. Flexible Duct Connectors:
 1. Ductmate Industries, Inc.
 2. Duro-Dyne
 3. Elgen
 4. Ventfabric
- J. Roof Mounted Air Outlets and Inlets:
 1. Air Balance, Inc.
 2. Cesco Products
 3. Greenheck, Inc.
 4. Leader, Inc.
 5. Loren Cook
 6. Ruskin Manufacturing Company
- K. Louvers (Exhaust) - No Substitutions Accepted:
 1. Greenheck, Inc.
 2. Ruskin Company; Tomkins PLC.
 3. United Enertech
- L. Louvers (Outside Air Intake) - No Substitutions Accepted:
 1. Greenheck, Inc.
 2. Ruskin Company; Tomkins PLC.
 3. United Enertech
- M. Hardware Cloth:
 1. McNichols Co.
 2. or equal.
- N. Aluminum Brick Vent
 1. Greenheck, Inc.
 2. Ruskin Manufacturing Company
 3. United

2.2 FABRICATION

- A. Duct Access Doors:
 1. Low Pressure Ductwork:
 - a. Rating up to 2" wg positive or negative.
 - b. Frame: Minimum 22 gauge galvanized steel or aluminum, minimum 5/8" knock over edge, neoprene gasket between frame and duct and frame and door.
 - c. Door: Minimum 24 gauge galvanized steel or aluminum, continuous hinge and cam latches or minimum 2 cam latches, double wall construction, fiberglass insulated thickness to match ductwork.
 - d. Based on Ruskin Manufacturing Co. ADH24. High Pressure Ductwork:
 - a. Rating: Up to 10" wg positive pressure.
 - b. Frame: Minimum 16 gauge galvanized steel with "Z" shaped reinforced corners, polyurethane gasket between frame and duct and frame and door.

- c. Door: Minimum 16 gauge galvanized steel or aluminum, minimum 2 spring latches, double wall construction, fiberglass insulated with thickness to match ductwork.
 - d. Based on Ruskin Manufacturing Co. ADHP-3.
- B. Fire Doors:
1. Rating: 3 hours (UL approved for installation in Class "A" wall construction).
 2. Minimum 24 gauge galvanized steel frame suitable for connection to ductwork without transition, minimum 24 gauge galvanized steel curtain type blades located out of the airstream, thickness coordinated with wall construction. Where an active smoke control system exists the damper shall be capable of closing in an airstream moving at a minimum of 2000 feet per minute and operating at 4" w.g. pressure (dynamic damper).
 3. Sleeves: UL listed minimum gauge galvanized steel with welded construction corners. Rollformed sleeves will not be acceptable unless contractor guarantees in writing to seal voids in sleeve with UL approved sealer to limit air leakage. Length of sleeve shall be coordinated with the wall or floor.
 4. Operation: Stainless steel constant force closure spring.
 5. Link Setting: 160°F or 165°F
 6. Based on Ruskin Manufacturing Co., IBD23 Style B (Static Systems).
 7. Based on Ruskin Manufacturing Co., DIBD23 Style B (Active smoke control systems only).
- C. Fire Dampers:
1. Rating: 1-1/2 hours (UL approved for installation in 2 hour walls).
 2. Construction: Minimum 24 gauge galvanized steel frame suitable for connection to ductwork without transition, minimum 24 gauge galvanized steel curtain type blades located out of the airstream, thickness coordinated with wall construction. Where an active smoke control system exists the damper shall be capable of closing in an airstream moving at a minimum of 2000 feet per minute and operating at 4" w.g. pressure (dynamic damper).
 3. Sleeves: UL listed minimum gauge galvanized steel with welded construction corners. Rollformed sleeves will not be acceptable unless contractor guarantees in writing to seal voids in sleeve with UL approved sealer to limit air leakage. Length of sleeve shall be coordinated with the wall or floor.
 4. Operation: Stainless steel constant force closure spring.
 5. Link Setting: 160°F or 165°F.
 6. Based on Ruskin Manufacturing Co. IBD2 Style B. (Static Systems).
 7. Based on Ruskin Manufacturing Co., DIBD2 Style B. (Active smoke control systems only).
- D. Smoke Dampers:
1. Low and Medium Pressure Ductwork:
 - a. UL labeled under UL 555S low leakage rated, no more than 10 CFM/SF @ 1" w.g. (UL Class II) after exposure to 1000°F for 1 hour (non-degradable). Classified for both horizontal and vertical mounting.
 - b. Construction:
 - 1) Frame 16 galvanized steel.
 - 2) Damper Blades: 14 gauge true airfoil design constructed of galvanized steel of low leakage non-heat degradable design with friction free silicone rubber edge type for a smoke seal to 450°F incorporated into blade and frame shapes. Blade shall be suitable for installation in systems with a maximum velocity of 4,000 FPM and 8" w.g. pressure at closure.

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- c. Damper operation by means of an electric actuator 120V AC, 24V AC or signal from smoke detector alarm circuit. Electric motor actuator to be UL listed with damper assembly for power open, spring closed operation with a maximum travel time of 15 seconds. Motor furnished with all connecting linkage and mounting hardware.
 - d. Damper and actuator shall be provided with a 60 month warranty as described in Paragraph 1.3.C.
 - e. Based on Ruskin Manufacturing Co., SD60-II.
- E. Smoke/Fire Dampers:
- 1. Low and Medium Pressure Ductwork:
 - a. UL labeled under the following standards:
 - 1) UL 555 - 1-1/2 hr. fire endurance.
 - 2) UL 555S - Low leakage rated, no more than 10 CFM/SF @ 1" w.g. (UL Class II) after exposure to 1000°F for 1 hour (non-degradable).
 - 3) Classified for both horizontal and vertical mounting.
 - b. Construction: Single damper designed and rated for combination smoke/fire duty.
 - 1) Frame: 16 ga. galvanized steel.
 - 2) Damper Blades: 14 gauge true airfoil design constructed of galvanized steel of low leakage non-heat degradable design with friction free inflatable silicone coated fiberglass material to maintain smoke leakage rating to a minimum of 450°F and galvanized steel for flame seal to 1900°F. Blade shall be suitable for installation in systems with a maximum velocity of 2,000 FPM and 4" w.g. pressure at closure.
 - 3) Duct sleeve provided by others.
 - c. Operation:
 - 1) Smoke/fire damper operation by means of an integral resettable and re-useable UL listed electric-ambient temperature link, UL listed releasing device and mechanical lock assembly. Link activated by either electric, 120V AC or 24V AC signal from smoke detector alarm circuit or 350°F duct ambient temperature. Damper shall be capable of being reopened by remote signal when the duct temperature drops to 150°F. Electric motor actuator shall be UL listed with the damper assembly for power open/spring closed operation. Motor actuator shall be factory furnished with all connecting linkage and mounting hardware and shall be factory tested for proper operation.
 - 2) Damper and actuator shall be provided with a 60 month warranty as described in Paragraph 1.3.C.
 - d. Based on Ruskin Manufacturing, Co., FSD60-2.
- F. Backdraft Dampers:
- 1. Low Pressure Ductwork:
 - a. Rating: Up to 1" wg positive or negative.
 - b. Frame: Minimum 16 gauge (.064") galvanized steel or extruded aluminum.
 - c. Blades: Minimum 16 gauge (.064") galvanized steel or extruded aluminum parallel blade action, brass bearing, non-ferrous or de-iron pivot pins, gasketed blades.
 - d. Accessories: Counterbalance and weights suitable for assisting or retarding as indicated on the drawings.
 - e. Based on Ruskin Manufacturing, Co. CBD4.
- G. Volume Dampers:
- 1. Provide volume dampers where indicated, in all branch ductwork and construct as follows:
 - a. Provide single blades to a maximum of 10 inch blade width.

- b. Provide inside end synthetic bearings and locking quadrants with wing nuts.
- c. Friction locks are not permitted.
- d. Break damper blades on both edges for stiffness.
- e. Provide multi-blades on dampers 12 inches and larger with inside pins and molded synthetic bearings, and 2 inches wide by 1/8 inch thick structural galvanized channel frame.
- f. Provide galvanized connecting bar with molded synthetic bearings on multi-blade dampers.
- g. Provide stand off bracket for installation in externally insulated duct.
- h. Based on Ruskin Manufacturing, Co. MD35 for rectangular ducts (MDSR25 for round ducts) with velocities up to 1500 feet per minute.
- i. Based on Ruskin Manufacturing, Co. CD30AF1 for rectangular ducts (CDR82 for round ducts) with velocities over 1501 feet per minute.

H. Prefabricated Casing Panels:

1. Panel sections shall consist of an outer sheet of 18 gauge and an inner sheet of 22 gauge galvanized steel. Inside panel surfaces shall have 3/32 inch diameter perforations on 3/16 inch centers.
2. Panels shall be completely metal enclosed; shall be minimum (2) (4) inches thick; and the space between inner and outer surfaces shall be filled with acoustic material which will not settle, shed, or dust.
3. Housing shall be factory fabricated and field assembled with joining members serving to provide structural rigidity to 10 inches water pressure differential, either positive or negative. Structure shall be tested and rated for known structural deflection.
4. The joining members shall be fabricated from galvanized sheet steel, minimum 20 gauge, and shall be arranged to provide a pressure tight air seal against 10 inches pressure differential, either positive or negative. Use Sealing Mastic when joining parallel panels, roof to wall panels, joints, and corner joints. Housing shall be fabricated to withstand floor and roof loads of 40 pounds per square foot plus any concentrated loads.
5. Assembly shall be secured against the separation forces of air pressure with cadmium plated metal fasteners.
6. The panel shall have minimum airborne sound transmission loss when tested according to ASTM E90-70.

Transmission Loss in DB

Octave

Band HZ	63	125	250	500	1K	2K	4K
Loss	30	16	24	35	45	52	58

7. The thermal conductivity of the panel shall not exceed 0.07 Btu/hr-square foot-degrees F.
8. Insulated access doors shall be provided. Doors shall be constructed of 20 gauge galvanized steel, adequately hinged. Doors shall open against the pressure force and be equipped with safety features such as latches operable from both sides of door and wire glass double pane windows not less than 6 inches x 6 inches square. Doors shall seat against neoprene gaskets. Doors shall have Ventfabrics No. 260 "Ventlok" latches.
9. All openings in the casing for ductwork connections shall be cut and framed at the factory by the panel manufacturer. All openings shall be sealed to prevent air leakage and condensation in accordance with the manufacturer's instructions.
10. All joints, corners, etc., in the panels and floor shall be so designed that no direct path for sound or air leakage can occur.
11. The casing manufacturer shall guarantee that the casings, doors, and housings shall meet the acoustical, thermal and air pressure performance specified, when installed in accordance with the manufacturer's recommendations and as noted herein.

- I. Flexible Duct Connectors (Required on all duct transitions from AHU to ductwork):
1. Indoor Applications:
 - a. Material: Heavy glass fabric double - Coated with neoprene, Minimum of 30 oz/sy, Resistant to abrasion and damage due to repeated flexing, waterproof and air tight, minimum 26 gauge galvanized steel or .032" aluminum edge a minimum of 2-1/2" wide each side. Coordinate the flex width with the schedule in 3.3 - Schedule.
 - b. Rating:
 - 1) Temperature: -10°F to 200°F
 - 2) Pressure: 10" positive
10" negative
 - c. Based on Ventfabric and Ventglass
 2. Outdoor Applications:
 - a. Heavy glass fabric double - Coated with neoprene, Minimum of 30 oz/sy, resistant to abrasion and damage due to repeated flexing, water proof, airtight and resistant to damage from direct sunlight, minimum 26 gauge galvanized steel or .032" aluminum edge at minimum of 2-1/2" wide each side. Coordinate the flex width with the schedule in 3.3 - Schedule.
 - b. Rating:
 - 1) Temperature: -10°F to 250°F
 - 2) Pressure: 10" positive
10" negative
 - c. Based on Ventfabrics Ventlon.
- J. Louvers (Exhaust):
1. Subject to compliance with requirements, provide either of the following unless a specific orientation is indicated:
 2. Horizontal Storm-Resistant Louver.
 3. Frame and Blade Nominal Thickness: As required to comply with structural performance requirements, but not less than 0.080 inch (2.0 mm).
 4. Performance Requirements:
 - a. Wind-Driven Rain Performance: Not less than 99 percent effectiveness when subjected to a rainfall rate of 3 inches (75 mm) per hour and a wind speed of 29 mph (13 m/s) at a core-area intake velocity of 700-fpm (3.6-m/s).
 - b. Air Performance: Not more than 0.10-inch wg (25-Pa) static pressure drop at 600-fpm (3.0-m/s) free-area intake velocity.
 - c. Free Area: Not less than 7.0 sq.ft. (0.65 sq.m) for 48-inch-(1220-mm-) wide by 48-inch-(1220-mm-) high louver.
 5. AMCA Seal: Mark units with AMCA Certified Ratings Seal.
 6. Acceptable Products – Horizontal:
 - a. Greenheck EHH-501-X.
 - b. Ruskin EME-520-MD.
 - c. UEC SED-5.
Must be Miami Dade NOA approved and also have a Florida Product Approval Number.
 7. EHPA Acceptable Products – Vertical:
 - a. Based on Ruskin Manufacturing, Co. EME6325D /CD-50 Miami Dade/Hurricane Tested & Missile Impact Tested and approved. (Vertical Blade).
This louver shall be used on ALL EHPA Buildings as specified on the Architectural Drawings.
- K. Louvers (Outside Air Intake):

1. Subject to compliance with requirements, provide either of the following unless a specific orientation is indicated:
 - a. Horizontal Storm-Resistant Louver.
2. Frame and Blade Nominal Thickness: As required to comply with structural performance requirements, but not less than 0.080 inch (2.0 mm).
3. Performance Requirements:
 - a. Wind-Driven Rain Performance: Not less than 99 percent effectiveness when subjected to a rainfall rate of 3 inches (75 mm) per hour and a wind speed of 29 mph (13 m/s) at a core-area intake velocity of 700-fpm (3.6-m/s).
 - b. Air Performance: Not more than 0.10-inch wg (25-Pa) static pressure drop at 600-fpm (3.0-m/s) free-area intake velocity.
 - c. Free Area: Not less than 7.0 sq.ft. (0.65 sq.m) for 48-inch-(1220-mm-) wide by 48-inch-(1220-mm-) high louver.
4. AMCA Seal: Mark units with AMCA Certified Ratings Seal.
5. Acceptable Products – Horizontal:
 - a. Greenheck EHH-501-X.
 - b. Ruskin EME-520-MD.
 - c. UEC SED-5.
Must be Miami Dade NOA approved and also have a Florida Product Approval Number.
6. EHPA Acceptable Products – Vertical:
 - a. Based on Ruskin Manufacturing, Co. EME6325D /CD-50 Miami Dade/Hurricane Tested & Missile Impact Tested and approved. (Vertical Blade).
This louver shall be used on ALL EHPA Buildings as specified on the Architectural Drawings.
- L. Hardware Cloth: 4 mesh galvanized steel, plain weave with .035 wire.
- M. Aluminum Brick Vent
 1. Extruded aluminum, 0.100” minimum wall thickness for frame and blades. Frame depth 4”.
 2. 8-1/8”W x 7-3/4”H with 1-1/2 flanged frame and aluminum mesh screen.
 3. Finish to be “Kynar 500” fluoropolymer coating having dry thickness of approximately 1.2 mils when baked at 450°F. Color to be selected by Architect.
 4. Minimum free area shall be 39% of nominal size.
 5. Based on Ruskin Manufacturing, Co. BV100 or Greenheck Model BVF.

2.3 MATERIALS FOR LOUVERS

- A. Aluminum Extrusions: ASTM B 221 (ASTM B 221M), alloy 6063-T5 or T-52.
- B. Aluminum Sheet: ASTM B 209 (ASTM B 209M), alloy 3003 or 5005 with temper as required for forming, or as otherwise recommended by metal producer for required finish.
- C. Aluminum Castings: ASTM B 26/B 26M, alloy 319.
- D. Stainless-Steel Sheet: ASTM A 666, Type 304, with No. 4 finish.
- E. Fasteners: Of same basic metal and alloy as fastened metal or 300 Series stainless steel, unless otherwise indicated. Do not use metals that are incompatible with joined materials.
 1. Use types and sizes to suit unit installation conditions.
 2. Use Phillips flat-head, hex-head, or Phillips pan-head screws for exposed fasteners, unless otherwise indicated.

- F. Postinstalled Fasteners for Concrete and Masonry: Torque-controlled expansion anchors, made from stainless-steel components, with capability to sustain, without failure, a load equal to 4 times the loads imposed, for concrete, or 6 times the load imposed, for masonry, as determined by testing per ASTM E 488, conducted by a qualified independent testing agency.
- G. Bituminous Paint: Cold-applied asphalt emulsion complying with ASTM D 1187.

2.4 FABRICATION, GENERAL FOR LOUVERS

- A. Assemble louvers in factory to minimize field splicing and assembly. Disassemble units as necessary for shipping and handling limitations. Clearly mark units for reassembly and coordinated installation.
- B. Vertical Assemblies: Where height of louver units exceeds fabrication and handling limitations, fabricate units to permit field-bolted assembly with close-fitting joints in jambs and mullions, reinforced with splice plates.
- C. Continuous Vertical Assemblies: Fabricate units without interrupting blade-spacing pattern.
- D. Maintain equal louver blade spacing to produce uniform appearance.
- E. Fabricate frames, including integral sills, to fit in openings of sizes indicated, with allowances made for fabrication and installation tolerances, adjoining material tolerances, and perimeter sealant joints.
- F. Frame Type: As indicated.
- G. Include supports, anchorages, and accessories required for complete assembly.
- H. Provide vertical mullions of type and at spacings indicated, but not more than recommended by manufacturer, or 72 inches (1830 mm) o.c., whichever is less.
- I. Provide subsills or extended sills made of same material as louvers where indicated or required for drainage to exterior and to prevent water penetrating to interior.
- J. Provide with optional wire mesh filter rack and filters.
- K. Join frame members to each other and to fixed louver blades with fillet welds, threaded fasteners, or both, as standard with louver manufacturer, concealed from view, unless otherwise indicated or size of louver assembly makes bolted connections between frame members necessary.

2.5 LOUVER SCREENS

- A. General: Provide screen at each exterior louver.
 - 1. Screen Location for Fixed Louvers: Interior face.
 - 2. Screening Type: Insect screening, unless otherwise indicated; bird screening where indicated.
- B. Secure screens to louver frames with stainless-steel machine screws, spaced a maximum of 6 inches (150 mm) from each corner and at 12 inches (300 mm) o.c.
- C. Louver Screen Frames: Fabricate with mitered corners to louver sizes indicated.
 - 1. Metal: Same kind and form of metal as indicated for louver to which screens are attached. Reinforce extruded-aluminum screen frames at corners with clips.
 - 2. Finish: Same finish as louver frames to which louver screens are attached.
 - 3. Type: Rewirable frames with a driven spline or insert for securing screen mesh.
- D. Louver Screening for Aluminum Louvers:
 - 1. Insect Screening: Aluminum, 18-by-16 (1.4-by-1.6-mm) mesh, 0.012-inch (0.30-mm) wire.
 - 2. Bird Screening: Aluminum, 1/2-inch- (12.7-mm-) square mesh, 0.063-inch (1.6-mm) wire.

2.6 CLOSURE ANGLES AND CLOSURE PLATES FOR LOUVERS

- A. Fabricate from minimum 0.074-inch (2 mm) thick stainless steel or aluminum.
- B. Provide continuous closure angles and closure plates on inside head, jambs, and sill of exterior wall louvers.
- C. Secure angles and plates to louver frames with screws, and to masonry or concrete with fasteners as specified.
- D. Provide minimum 0.032-inch (0.8 mm) thick stainless steel or aluminum sleeves in cavity walls and elsewhere as shown.

2.7 BLANK-OFF PANELS

- A. Uninsulated, Blank-Off Panels:
 - 1. Aluminum sheet for aluminum louvers, not less than 0.050-inch (1.2-mm) nominal thickness, unless otherwise indicated.
 - 2. Panel Finish: Same finish applied to louvers.
 - 3. Attach blank-off panels to back of louver frames with clips or stainless-steel, sheet metal screws.
- B. Insulated, Bland-off Panels: Laminated metal-faced panels consisting of insulating core surfaced on back and front with Metal sheets:
 - 1. Thickness: 2 Inch (50 mm).
 - 2. Metal Facing Sheets: Aluminum sheet, not less than 0.032-inch (0.8-mm) nominal thickness.
 - 3. Insulating Core: Foamed-plastic rigid insulation board.
 - 4. Edge Treatment: Trim perimeter edges of blank-off panels with louver manufacturers standard extruded-aluminum-channel frames, not less than 0.080-inch (2.0-mm) nominal thickness, with corners mitered and with same finish as panels.
 - 5. Seal perimeter joints between panel faces and louver frames with 1/8-by-1-inch (3.2-by-25-mm) PVC compression gaskets.
 - 6. Panel Finish: Same finish applied to louvers.
 - 7. Attach blank-off panels to back of louver frames with clips or stainless steel, sheet metal screws.

2.8 ALUMINUM FINISHES

- A. Finish louvers after assembly.
- B. High-Performance Organic Finish: 2-coat fluoropolymer finish complying with AAMA 2605 and containing not less than 70 percent PVDF resin by weight in color coat. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers written instructions.
 - 1. Color and Gloss: As selected by School Board from manufacturers full range if not indicated as part of the Design Build Package.

PART 3 – EXECUTION

3.1 GENERAL REQUIREMENTS

- A. Install all products in strict accordance with the manufacturer's written installation instructions.
- B. Coordinate the installation of products provided within other sections of Division 23 including but not limited to control dampers, airflow measuring stations, etc.

3.2 INSTALLATION

- A. Duct Access Doors:
 - 1. Coordinate the proper class access door with the system requirements.
 - 2. Duct access doors shall be mounted so as to allow maximum access and/or door swing while also providing easy access from the floor or other personal accessible structures.
 - 3. Duct access doors shall be provided wherever required for proper maintenance of equipment, access to duct mounted control devices, or visual inspection and setting of dampers, etc. All doors, due to the small scale of the drawings, may not be shown, it is the contractor's responsibility to coordinate with all trades concerned to provide the necessary quantity and properly locate all doors.
- B. Fire Doors:
 - 1. Fire doors shall be provided where indicated.
 - 2. Review the architectural drawings to determine the wall construction rating so as to provide the proper rated damper.
 - 3. All fire doors shall be mounted within a 16 gauge steel sleeve permanently affixed to the wall by means of perimeter retaining angles.
 - 4. The fire door shall be permanently attached to the sleeve. All voids around the sleeve and damper and sleeve and wall shall be properly firestopped under Division 07 Section "Firestopping."
 - 5. Ductwork shall be attached to the fire door by means of a UL approved break away connection.
 - 6. Access doors or access sections shall be provided at all fire door locations.
- C. Fire Dampers:
 - 1. Fire dampers shall be provided where indicated.
 - 2. Review the architectural drawings to determine the wall construction rating so as to provide the proper rated damper.
 - 3. All fire dampers shall be mounted within a UL approved thickness galvanized steel sleeve permanently affixed to the wall by means of perimeter retaining angles.
 - 4. The fire damper shall be permanently attached to the sleeve. All voids around the sleeve and damper and sleeve and wall shall be properly firestopped under Division 07 Section "Firestopping."
 - 5. Ductwork shall be attached to the fire damper by means of a UL approved break away connection.
 - 6. Access doors or access sections shall be provided at all fire damper locations.
- D. Smoke Dampers:
 - 1. Provided where indicated. See combination smoke/fire damper for assemblies in fire rated barriers.
 - 2. Review the architectural drawings to determine the wall construction rating so as to provide the proper rated damper.
 - 3. Provide access doors or access sections at all damper locations.
 - 4. Coordinate the provision of the smoke damper actuator with the automatic temperature control and fire alarm system and ensure adequate space for the mounting of the actuator during installation of the damper and ductwork.
- E. Smoke/Fire Damper:
 - 1. Provided where indicated. All smoke dampers in fire rated barriers to be combination type.
 - 2. Review the architectural drawings to determine the wall construction rating so as to provide the proper rated damper.

3. All smoke/fire dampers shall be mounted within a UL approved thickness galvanized steel sleeve permanently affixed to the wall by means of perimeter retaining angles.
 4. The smoke/fire damper shall be permanently attached to the sleeve. All voids around the sleeve and damper and sleeve and wall shall be properly firestopped under Division 07 Section "Firestopping."
 5. Ductwork shall be attached to the smoke/fire damper by means of a UL approved break away connection.
 6. Access doors or access sections shall be provided at all smoke/fire damper locations.
 7. Coordinate the provision of the smoke damper actuator with the Building Control System and assure adequate space for the mounting of the actuator during installation of the smoke/fire damper and ductwork.
- F. Backdraft Damper:
1. Securely attach backdraft damper to wall with a suitable sleeve and retaining angles and seal all voids between damper and wall.
 2. Adjust damper to open or close under the design conditions.
- G. Volume Dampers: Install at all branch take-offs.
- H. Prefabricated Casing Panels:
1. Casing shall be constructed as detailed on drawings. All necessary structural steel bracing required but not shown shall be provided.
 2. Casing shall be sealed air tight both positive and negative to ± 10 in. w.g.
 3. Install in accordance with SMACNA duct construction standards for the pressure indicated.
 4. Set access doors minimum 6 inches above floor as detailed on drawings. Arrange door swings so that fan static pressure holds door in closed position.
 5. In casing sections subject to collection of water, where deep seal traps are shown, coordinate with other trades to be certain that traps are properly located.
 6. All openings in casing shall be framed. All pipes shall be sleeved and area between pipe and sleeve sealed.
- I. Flexible Duct Connectors:
1. Flexible duct connectors shall not be omitted where air handling units are provided with internally isolated fans and internal isolation.
 2. Provide flexible duct connectors immediately adjacent to all in-line or ductwork connected fans and/or fan equipped units with or without internal vibration isolation.
 3. Flexible duct connectors shall be properly selected and installed to ensure against collapsing under negative pressure and unacceptable ballooning under positive pressure. Leakage is not permissible. See width schedule in 3.3 - Schedules.
- J. Roof Mounted Air Outlets and Inlets:
1. Install in accordance with manufacturers written installation instructions.
 2. Coordinate installation requirements with roofing sub-contractor.
- K. Hardware Cloth: Install over all open ended ducts. Provide sheet metal pocket over raw edges and secure with sheet metal screws through the metal edge cover.
- L. Aluminum Brick Vent: Receive an unload louvers and deliver to general contractor at jobsite for storage and installation by general contractor.
- M. Install Miscellaneous Control Devices:
1. Install dampers. Provide necessary blank off sections where dampers are installed in factory fabricated mixing box openings.
 2. Install air flow measuring stations. Coordinate size and location with proper access before approving release of units for fabrication and shipment.
 3. Install duct smoke detectors provided under Division 26.

3.3 INSTALLATION FOR LOUVERS

- A. Locate and place louvers level, plumb, and at indicated alignment with adjacent work and in accordance with manufacturer's recommendations to meet requirements of article titled "Performance Requirements".
- B. Use concealed anchorages where possible. Provide brass or lead washers fitted to screws where required to protect metal surfaces and to make a weather-tight connection.
- C. Form closely fitted joints with exposed connections accurately located and secured.
- D. Install closure angles and closure plates.
- E. Provide perimeter reveals and openings of uniform width for sealants and joint fillers, as indicated.
- F. Repair finishes damaged by cutting, welding, soldering, and grinding. Restore finishes so no evidence remains of corrective work. Return items that cannot be refinished in the field to the factory, make required alterations, and refinish entire unit or provide new units.
- G. Protect galvanized and nonferrous-metal surfaces from corrosion or galvanic action by applying a heavy coating of bituminous paint on surfaces that will be in contact with concrete, masonry, or dissimilar metals.
- H. Install concealed gaskets, flashings, joint fillers, and insulation as louver installation progresses, where weather-tight louver joints are required. Comply with Division 7 Section "Joint Sealants" for sealants applied during louver installation.

3.4 ADJUSTING AND CLEANING FOR LOUVERS

- A. Clean exposed surfaces of louvers and vents that are not protected by temporary covering, to remove fingerprints and soil during construction period. Do not let soil accumulate until final cleaning.
- B. Before final inspection, clean exposed surfaces with water and a mild soap or detergent not harmful to finishes. Thoroughly rinse surfaces and dry.
- C. Restore louvers and vents damaged during installation and construction so no evidence remains of corrective work. If results of restoration are unsuccessful, as determined by Architect, remove damaged units and replace with new units.

3.5 SCHEDULES

- A. Access Door Schedule: Square or Rectangular Duct work: Access Door Mounting

	<u>Surface Max. Dim.</u>	<u>Access Door Size</u>
1.	6"	12" long Remov. Section
2.	7" to 8"	6" x 6"
3.	9" to 12"	8" x 8"
4.	13" to 18"	12" x 12"
5.	19" and up	16" x 16"
6.	Special Situations	See Plans

B. Flexible Duct Connector Schedule: Indoor and Outdoor Material Width Schedule

	<u>Duct Size</u> <u>(Max. Dim.)</u>	<u>Pressure</u> <u>(Max.)</u>	<u>Width</u>
1.	12" and less	positive	3"
2.	13" and up	positive	6"
3.	12" and less	negative	3"
4.	13" and up	negative	3"

END OF SECTION

SECTION 23 37 13
GRILLES, REGISTERS AND DIFFUSERS

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.
- B. Refer to Division 1 for all requirements pertaining to General Provisions.

1.2 WORK INCLUDED

- A. Grilles.
- B. Registers.
- C. Diffusers.

1.3 QUALITY ASSURANCE

- A. Manufacturer shall certify cataloged performance and ensure correct application of all air outlet types.
- B. All components within the conditioned air stream or exposed in active or non-active plenums shall conform to the NFPA 90A standard for Flame/Smoke/Fire Contribution of 25/50/0.
- C. Manufacturers shall fully comply with LEED IEQ Prerequisite 3 minimum acoustical performance.

1.4 SUBMITTALS

- A. Submit schedule and product data for acceptance. Coordinate submittal by "G" number and include construction details, capacity ratings including airside pressure drops and NC levels.
- B. Product data, along with installation operation and maintenance instructions, shall be included in the operation and maintenance manuals.
- C. Submit in accordance with Division 1 requirements.

PART 2 – PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

- A. Grilles:
 - 1. Titus
 - 2. Anemostat
 - 3. Krueger
 - 4. Metal Aire Division of Metal Industries, Inc.
 - 5. Nailor
 - 6. Price
 - 7. Trox
- B. Registers:
 - 1. Air Concepts
 - 2. Anemostat
 - 3. Krueger

4. Metal* Aire Division of Metal Industries, Inc.
 5. Nailor
 6. Price
 7. Titus
 8. Trox
- C. Diffusers:
1. Anemostat
 2. Krueger
 3. Metal* Aire Division of Metal Industries, Inc.
 4. Nailor
 5. Price
 6. Titus
 7. Trox.

2.2 FABRICATION

- A. Grilles:
1. Sidewall or Ceiling Mounted Return/Exhaust Grille:
 - a. Construction: Heavy gauge aluminum border. Size as indicated.
 - b. Baked enamel finish.
 - c. Based on Titus Model 272FL.
 2. Sidewall Double Deflection Supply Grille:
 - a. Construction: Aluminum frame with aluminum shaped blades having long blades on front. Size as indicated.
 - b. Baked enamel finish.
 - c. Based on Titus Model 7DCA-AA.
 3. Ceiling Mounted Return Air Filter Grille:
 - a. Construction: Heavy gauge aluminum border. Concealed hinged core with integral filter frame and start-up plus spare filter. Border suitable for use in ceiling specified in Contract Documents. Size as indicated.
 - b. Baked enamel finish.
 - c. Based on Titus Model 4FL.
- B. Registers:
1. Sidewall or Ceiling Mounted, Return Register (G-5 & G-6):
 - a. Construction: Heavy gauge frame and horizontal bars. Bars set at 45° fixed deflection. Allen key operated opposed blade damper.
 - b. Baked enamel finish.
 - c. Based on Titus Model 350FL (aluminum) with/without Model AG-35AA opposed blade aluminum damper (refer to schedule and drawings for requirements).
- C. Diffusers:
1. Square Ceiling Diffuser (G-1):
 - a. Construction: Surface or lay-in mounted, 3 cone diffuser. Round collar size as indicated. Aluminum construction only.
 - b. Baked enamel finish.
 - c. Based on Titus TMS-AA (aluminum).

PART 3 – EXECUTION

3.1 GENERAL

- A. Install all devices in strict accordance with the manufacturer's written installation instructions.
- B. Coordinate the proper grille style and frame style with the final approved ceiling construction and install grilles, registers, and diffusers in accordance with the requirements of the architectural reflected ceiling plan.
- C. Due to the small scale of the drawings the contractor shall assume the responsibility to coordinate the air outlet and inlet locations with the reflected ceiling plans, lighting plans, sections and or details.
- D. Any unlined or otherwise exposed parts beyond the grille, register or diffuser face exposed to sight shall be painted black.
- E. Coordinate the color requirements for all grilles, registers, and diffusers with the Owner's Representative.
- F. Insulate the back pans of all diffusers per the requirements of Specification Section 23 07 00.
- G. Air distribution devices installed in lay-in ceilings shall have a 24"x24" extended panel.
- H. Devices installed in sheetrock or other hard ceilings shall be surface mount type.

END OF SECTION

26

DIVISION

ELECTRICAL

SECTION 26 00 00
SCOPE OF WORK

PART 1: GENERAL

1.1 DESCRIPTION OF SYSTEMS

- A. The work included consists of all supervision, labor, materials, equipment, facilities and installation required for the complete and approved electrical system installation and modifications as indicated on the Contract Documents and called for in this Specification, or as may be reasonably implied by and for the installation of this project.
- B. All notes on the drawings pertaining to the work of this trade shall be considered as part of this specification and contract.
- C. In general, the Electrical Contractor shall make final line voltage connections to equipment furnished by other trades or by Owner. Miscellaneous equipment is to be provided by the Owner, installed, and utilities connected by the Contractor.
- D. Refer to entire Contract Documents for coordination and demolition. The Contractor shall coordinate phasing and staging of all work with all affected trades. Provide demolition as necessary to completely remove all electrical items within the area of work.
- E. Contractor shall confirm existing utilities are capped or shutdown prior to excavation or demolition.
- F. It is the Contractor's responsibility to visit the job site to inspect and confirm field conditions and systems. Advise Consultant of inconsistencies prior to bidding.
- H. The Contractor shall install complete and operating electrical systems as required for the scope of work, including but not limited to, the following:
 - 1. New power feeds to electrical terminal devices and equipment.
 - 2. Installation/relocation of miscellaneous lighting, power, and systems components as required for the renovation/completion.
 - 3. Where indicated, an empty raceway system for telecommunications. Outlet devices, cabling, and hardware to be provided and installed by the Owner.
 - 4. Where indicated, and fire alarm system, including all raceways, conductors, devices, equipment start-up and testing, as required for the proposed space modifications.
 - 5. Miscellaneous items required for complete and operating systems, but not specifically called for on the drawings or in the specifications, such as fastening devices, supports, scaffolding, welding, drilling, etc.
 - 6. Miscellaneous raceways, junction boxes, and interconnections to medical equipment provided by third party vendors.

PART 2 - PRODUCTS Not Applicable

PART 3 - EXECUTION Not Applicable

END OF SECTION

SECTION 26 00 01
BASIC ELECTRICAL REQUIREMENTS

PART 1 GENERAL

1.1 SECTION INCLUDES:

- A. Basic Electrical Requirements specifically applicable to Division 16 in addition to Division 1 -General requirements.

1.2 QUALITY ASSURANCE

- A. Electrical supervision shall have a current Local County Journeyman Electricians Certificate of Competency, be licensed to do work in the project location, and be present on site while work is being performed.
- B. Coordinate with other trades to provide adequate working clearance about equipment.
- C. Materials, where applicable, shall bear the label of an approved testing agency, such as:
 - 1. E.T.L. (Electrical Testing Laboratories).
 - 2. U.L. (Underwriters Laboratories, Inc.)
 - 3. F.M. (Factory Mutual).
- D. Materials subject to corrosion shall be protected.

1.3 RELATED WORK

- A. Continuity of Service:
Service or circuits shall not be interrupted or changed without authorization from the Architect and the Owner. Written authorization shall be obtained before work is started.
- B. Demolition:
 - 1. Equipment to be removed and turned over to the Owner shall be delivered to the Owner at a place and time mutually agreed upon.
 - 2. Materials to be turned over to the Owner or reused and installed, shall be maintained in the condition equal to that existing before work began. Repair or replace damaged materials or equipment at no additional cost to the Owner.
- C. Outdoor equipment to be secured to wall surface shall be mounted on stainless steel channel or supports.

1.4 TEMPORARY WIRING

- A. New Construction: Install according to National Electrical Code.
- B. Remodel: Remove temporary wiring upon completion of project. Install according to National Electrical Code.
- C. Grounding: Equipment grounding conductors shall be bonded to available electrodes at each building.

1.5 EQUIPMENT

- A. Equipment of a similar nature shall be identical and of the same manufacturer.

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- B. Equipment shall be set level. Where grouped, shall be mounted at the same height, properly aligned, bolted together in sections, and fastened in place. Tighten screws, bolts, nuts, clamps, fittings, or other fastening devices. Install all covers, plates, fittings, and accessories.

PART 2 PRODUCTS

Not Applicable

PART 3 EXECUTION

3.1 COMMISSIONING SUPPORT

Not applicable

END OF SECTION

SECTION 26 01 27
CODES, FEES, AND STANDARDS

PART 1: GENERAL

1.1 CODES AND STANDARDS

- A. Unless specifically noted to the contrary, the Contractor shall furnish all equipment, materials, labor, and install and test in accordance with these specifications.
- B. The Contractor shall comply with the latest applicable editions of the following:
 - Florida State Fire Marshall's Rule Chapter 69A-3.012 FAC and Rule Chapter 69A-60 (FAC)
 - NFPA 101 (2015 Edition)
 - Florida Building Code 6th Edition
 - NFPA-70 - National Electrical Code (2014)
 - NFPA-72 - National Fire Alarm Code (2013)
 - U.L. - Underwriter's Laboratories
 - NEMA - National Electrical Manufacturer's Association
 - ASTM - American Society for Testing and Materials
 - IEEE - Institute of Electrical and Electrical Engineers
 - ANSI - American National Standards Institute
 - ADA - Americans with Disabilities Act
 - NFPA-780 – Lightning Protection (2011)
 - Florida Statute Section 633.022
 - Florida Administrative Code 69A – 43.004 and 69A-3.012
- C. Reference to standards shall mean and intend the latest edition of such standards adopted and published at the date of bidding documents.
- D. Materials and installation, as a minimum, shall conform with local and state codes and ordinances.

1.2 FEES, CHARGES, COSTS

- A. It is the contractor's responsibility to contact the appropriate Utility Company and/or Building Department to determine if any fees, charges, or costs will be due to them. This fee, charge or cost shall be included in this contractor's bid price.

END OF SECTION

SECTION 26 05 00
BASIC MATERIALS AND METHODS

PART 1 – GENERAL

1.1 WORK INCLUDES

- A. Contractor shall provide:
 - 1. Work shown on the drawing and specified herein.

1.2 RELATED WORK

- A. Specified Elsewhere
 - 1. Division 1 - Drawings and general provisions of Contract, including, but not limited to, General, Special, and Supplementary Conditions and other Division-1 Specification Sections, apply to the work of this Section.
 - 2. Division 21, & 23 - applicable sections.
 - 3. Division 26, & 28 - applicable sections.

1.3 QUALITY ASSURANCE

- A. All work and materials shall be in accordance with the requirements and codes of the State of Florida, and all other applicable bodies having jurisdiction.
- B. If, in the opinion of the Contractor, any part of the specification or plans do not comply with the laws, codes and regulations, that matter shall be referred in writing to the attention of the Engineer for a decision before proceeding with that part of the work. There shall be no changes in the drawings or specifications made without approval of the Engineer. Where a discrepancy exists between the drawings and this specification, the more stringent shall apply.
- C. This Contractor shall secure and pay for all permits required by local authorities and shall provide the Owner with satisfactory interim and final inspection certificates.
- D. Bidders shall visit the site and familiarize themselves with existing conditions and satisfy themselves as to the nature and scope of the work and the difficulties that attend its execution. The submission of a bid will be construed as evidence that such an examination has been made and that the existing conditions have been allowed for in hid bid.
Before opening any material or doing any work, examine Architectural, Structural, Electrical and Mechanical and Equipment drawings, verify all conditions of project. Any differences which occur between drawings or between them and specifications, or between both of these and actual field measurements shall be reported in writing to Consultant and written instructions for changes obtained before proceeding with work.

1.4 SUBMITTALS

- A. In accord with Division One.
 - 1. Product Data
 - a. Fire Stopping Material
 - b. Conduit seals.
 - 2. Corrections or comments made on the shop drawings during the review do not relieve this Contractor from compliance with requirements of contract documents, plans and specifications. Shop drawings will be checked for general conformance with the design concept of the project and general compliance with information given in the contract documents. Review of the shop drawings shall not relieve the Contractor from

responsibility for details and accuracy, confirming and correlating all quantities and dimensions, selecting fabrication processes, for techniques of assembly and construction, coordinating his work with that of all other trades, and performing his work in a safe and satisfactory manner. Review of shop drawings shall not permit any deviation from plans and specifications.

3. Contractor shall submit point to point wiring diagram for all signal and control systems, control panels, terminal cabinets, etc., for complete systems to be provided under this contract. Shop Drawings shall indicate terminal identification, and barrier strip layout.
- B. Coordination drawings shall be provided showing routing of ALL trades and systems above ceilings and in chases. Objective of coordination drawings is to identify any conflicts and provide resolution, prior to the start of construction. Division 26 subcontractor shall coordinate with the General Contractor for requirements relating to this submittal. This requirement shall not conflict with requirements for coordination drawings as mandated in any other sections of this specification.
- C. In accord with Division One, at the completion of the project, Contractor shall submit operating instructions and maintenance manuals. Submit model number, catalog information, technical data sheets, shop drawings, test reports, wiring diagrams, parts lists, and maintenance instructions where applicable for each of the following items of equipment:
 1. Fire Alarm System
- D. Throughout the progress of construction, keep a complete and detailed record of all deviations in the electrical installation from that indicated on the Drawings, specifications and/or shop drawings. At the completion of the project and prior to final payment this marked set of drawings shall be submitted to Engineer. As-Built shall be legible and clearly indicating depths, dimensions of raceways from unknown points. Provide one mylar set of reproducibles to the Owner, certified and signed, by the Contractor as to their accuracy.
- E. Comply with the following for all work specified in Division 26. As-built information shall be shown to scale, using standard symbols listed in the legend. As a minimum show the following:
 1. Location of stub-outs, dimensioned from permanent building lines.
 2. All routing of raceways, dimensions from building, depths.
 3. Corrected panelboard and equipment schedules.
 4. Corrected circuit numbers as they appear on panelboard directories.
 5. Number, size, type of insulation and number of wires in each conduit or multi-conductor cable whether in conduit or exposed.
 6. Location of junction boxes and splices.
 7. Location of access panels.

1.5 GUARANTEE

- A. Guarantee all materials and workmanship for a period of one year in accord with the General Conditions.

1.6 DELIVERY, STORAGE AND HANDLING

- A. Materials shall be suitably packaged by manufacturer to prevent damage during shipment. Damaged materials will not be acceptable for use.
- B. Store materials on site in clean, dry storage area; when outside, elevated above grade and enclosed with durable watertight wrapping.
- C. Handle all materials carefully to prevent damage. Minor scratches, marks or blemishes to finish shall be repaired by Contractor.

PART 2 – PRODUCTS

2.1 MATERIALS

A. General

1. All equipment and material for permanent installation shall be new unless specifically indicated otherwise. In addition, material shall:
 - a. Be without blemish or defect.
 - b. Not be used for temporary power or lighting without prior written authorization from the Owner.
 - c. Be in accordance with NEMA Standards.
 - d. Bear Underwriter's Label where subject to U.L. label service.
 - e. U.L. listed for its intended service and application.
2. Equipment and materials of the same type of classification and used for the same purposes, shall be products of the same manufacturer.
3. Materials and equipment shall conform in all respects to the requirements set forth in these specifications and the accompanying drawings. However, wherever a product is identified by name, equal products which meet the Consultants written approval may be used (per contract document procedures).
4. Except as otherwise specified, materials and equipment shall be new and bear the approval label of Underwriter's Laboratories, Inc., where applicable.
5. Where equipment and materials are specified or designated on drawings by trade names and catalog numbers, the intent is to establish a standard of quality, appearance, performance and dimension. Material and equipment of other manufacturers will be considered, provided they are equal in all respects to that specified. However, it will be the Contractor's responsibility to demonstrate equality of substituting with materials or equipment specified by the Consultant. Compensations for "as-built" drawings or contract documents requiring additional engineering services due to Contractor substitutions shall be paid directly by the Contractor to the Consultant. The Consultant shall be compensated by the Contractor for multiple reviews (more than two) of any shop drawing submission.

B. Fire Stopping Material

1. Fire stopping materials shall consist of commercially manufactured products capable of passing ASTM E-814 (UL 1479) Standard Method of Fire Test for Through Penetration Fire Stops.
2. Fire stopping materials shall maintain the rating of the wall, partition or floor opening that penetration is made.
3. Fire stopping materials shall be U.L. classified.
4. Acceptable Products
 - a. 3M - Fire Barrier
 - b. Thomas & Betts - Flame Safe
 - c. Nelson Electric - Flameseal

C. Water Seal

1. Seal penetrations of perimeter walls or floors below grade to prevent entry of water. Use materials compatible with wall or floor construction.
2. Seal penetrations of roof, with flashings compatible with roof design.

D. Nameplates

1. General: Furnish and install nameplates wherever indicated as "required" in these specifications. Wording shall be submitted to the Engineer for review prior to purchase of nameplates.
2. Material: Refer to Section 26 05 53 for requirements.

PART 3 – EXECUTION

3.1 INSTALLATION

- A. All equipment and materials shall be installed and completed in a first-class workmanlike manner. The right is reserved to direct the removal and replacement of any item, which in the opinion of the Owner's Representative and/or Engineer does not present an orderly and reasonably neat or workmanlike appearance, provided such items can be properly installed in an orderly way by usual methods in such work.
- B. Electrical drawings are diagrammatic but shall be followed as closely as actual construction of the building and the work of other trades will permit. Do not scale drawings. Consult Architectural drawings and details for exact location of fixtures and equipment and building element dimensions. Because of the small scale of drawings, it is not possible to indicate all of the offsets, fittings and accessories required. This Subcontractor shall investigate the structural and finish conditions affecting his work and shall arrange such work accordingly, providing fittings, bends, junction boxes, pull boxes, access panels and accessories required to meet such conditions.
- C. No deviations for the plans and specifications shall be made without the full knowledge and consent of the Consultant. Should the Contractor find at any time during the progress of the work that, in his judgment, a modification of the requirements of any particular item is needed, he shall report such item promptly to the Consultant for his decision and instruction.
- D. Discrepancies in Electrical and Mechanical Drawings - it is recognized that locations of piping, ductwork, etc., shown on Mechanical and Electrical drawings are diagrammatic, except for figured dimensions, and that field conditions may arise that will prevent their being installed as noted on drawings, such as runs of pipe crossovers, risers, panelboards, electric outlets, machinery, etc. within limits established by figures on Architectural Drawing. It is the duty of each and all subcontractors to consult with each other, verifying existing conditions and in each case where there is any questions or doubt as to space conditions or location of outlets, etc., to submit a workable solution to the Consultant for their approval before installing any work which is questionable.
- E. The Contractor is specifically directed to the mechanical section of the contract documents for coordination.
- F. The Contractor shall refer to the entire set of contract documents for bidding purposes and completeness of proposal. Items not shown on the electrical project documents, but shown on mechanical requiring wiring, components, raceways, etc., must be included in bid proposal to provide a complete working system. Systems and devices shown on one portion of documents shall be included as if they are shown on all portions of the contract documents.
- G. The Contractor shall, prior to rough-ins, confirm location of all devices with Owner Representative and Architect. Coordinate with architectural drawings and interior elevations for exact locations, mounting heights, and dimensions for installation of all items. Coordinate with wall coverings, furniture, etc.
- H. Install all equipment in accord with manufacturer's recommendations.
- I. Provide all necessary anchoring devices and supports.
 - 1. Use structural supports suitable for equipment, or as indicated.
 - 2. Check loadings and dimensions of equipment with shop drawings.
 - 3. Do not cut or weld to building structural members.
- J. Verify that equipment will fit support layouts indicated.
 - 1. Where substitute equipment is used, revise indicated supports to fit.
- K. Arrange for necessary openings to allow for admittance of equipment.
 - 1. Where equipment cannot be installed as structure is being erected, provide and arrange for building-in of boxes, sleeves or other devices to allow later installation.

- L. Make all penetrations through roofs prior to installation of roofing. For penetrations required after installation of roofing:
 - 1. In built-up roofing (BUR), provide all curbs, cants, and base flashings.
 - 2. In elastic sheet roofing (ESR), arrange and pay for base flashing work by authorized roofer.
- M. Install rain hoods and metal counter flashings as indicated and to make all penetrations of electrical work through walls and roof water- and weather-tight.
 - 1. Furnish all clamps, waterproofing material, and labor necessary.
 - 2. Where metal flashings are applied over concrete, paint concrete with 1/8 IN of mastic cement first.
 - 3. Set flashing in mastic cement, watertight.
- N. Repair and replace roof construction, damaged by this work, in manner which will not nullify roof guarantee.
- O. Provide equipment guards at all belts, couplings, moving machinery and equipment provided under this division in accord with OSHA.
 - 1. Use suitable structural frames with 12 ga, 3/4 inch maximum opening galvanized mesh, or expanded metal mesh.
 - 2. Attach to equipment by removable clips and bolts with wing nuts, or other approved connectors.
- P. Install equipment to permit easy access for normal maintenance.
 - 1. Maintain easy access to switches, motors, drives, pull boxes, receptacles, etc.
 - 2. Relocate items which interfere with access.
- Q. Provide concrete foundations or pads required for electrical equipment, as indicated or as follows:
 - 1. Where drawings do not show special foundations, install 4 IN high concrete pads.
 - 2. Use 3,000 PSI concrete.
 - 3. Reinforce with 6 x 6 x 10 x 10 mesh, with short dowels into floor at 12 IN OC around perimeter.
 - 4. Chamfer top edges 3/4 IN.
 - 5. Rub all faces smooth with carborundum block.
 - 6. Set anchor bolts for equipment.
- R. All connections shall be tightened to the torque values recommended by that device manufacturer's instructions. If these values are not listed, tighten to pound-inch or pound-foot values recommended in UL Standard 486B, a summary of which may be found in Section 110-4 of the National Electric Code Handbook. Record the torque values of all main pieces of equipment and include in the maintenance manuals.

3.2 LOCATION OF EQUIPMENT

- A. The approximate location of all equipment and devices is shown on the Drawings. The Owner's Representative and/or Engineer reserves the right to change the location of all equipment or devices 8 feet in any direction at no additional cost provided such changes are requested before final installation.
- B. Install all equipment with ample space allowed for removal and repair. Provide ready accessibility to removable parts of equipment and to all wiring without moving equipment which is installed or which is already in place. Provide access panels for all devices installed above non-accessible ceilings and/or within walls or partitions.
- C. In mechanical and electrical equipment spaces, expose ceiling outlets and conduit with due consideration to ventilating ducts and mechanical piping. Where numerous ducts occur, install conduits and outlets after the ventilating ducts. Puncturing of duct work or hanging equipment such as light fixtures, ceiling hangers and conduits from duct work is prohibited unless specifically noted otherwise.

- D. Electrical equipment shall be installed to maintain minimum clearances per Article 110 of NEC and ANSI C2 (National Electrical Safety Code and recommendations of manufacturer/vendor).
- E. Dimensions indicated on documents are limiting dimensions. Do not provide equipment exceeding dimensions indicated or equipment arrangements that reduce required clearances or exceed specified maximum dimensions.

3.3 COORDINATION

- A. Provide day-to-day coordination with the work of other contractors engaged in this project. Execute the work in a manner not to interfere with other contractors.
- B. Coordinate with other contractors regarding the location and size of pipes, raceways, ducts, openings, and devices, so that there may be no interferences between installations or of the progress of any contractor.
- C. If conflict arises in the installation of work, the following preference schedules shall be followed:
 - 1. Recessed lighting fixtures.
 - 2. Sanitary drainage.
 - 3. Chilled water piping.
 - 4. Low pressure ductwork.
 - 5. Domestic water, storm, and vent lines.
 - 6. Electric conduits.
- D. This Contractor shall notify all other contractors of any deviations or special conditions necessary for the installation of his work. Interferences between the work of various contractors shall be resolved prior to installation. Work installed not in compliance with the plans and specifications and without properly checking and coordinating as specified above shall, if necessary, be removed and properly reinstalled by this Contractor without additional cost to the Owner. The Consultant or his representative shall be the mediating authority in all deviation and confliction disputes arising on the project.
- E. Insofar as it is possible to determine in advance, this Contractor shall consult with the masonry contractor and others as to leaving the proper chases and openings for his work; and he shall place all of his outlets, anchors, sleeves and supports prior to pouring concrete or masonry work. Should this Contractor neglect doing this, any cutting and/or patching shall be done at this Contractor's expense.
- F. Contractor must notify owner prior to excavation and exercise due caution with regard to disturbance of utilities and services.
- G. Contractor shall be held responsible for any damage and restoration to utilities and services. Restoration shall be made immediately with methods and materials that are approved for the intended use. Provide written report to the Owner detailing occurrence and corrective action.
- H. The locations of existing underground utilities are not shown and have not been independently verified by the Owner or it's representative. The Contractor shall determine the exact location of all existing utilities before commencing work in the vicinity and agree to be fully responsible for any and all damage which might be occasioned by the Contractor's failure to exactly locate and preserve any and all utilities.

3.4 WALL, ROOF AND FLOOR PENETRATIONS AND SLEEVE INSTALLATION

- A. Provide sleeves for all electrical raceways, and wiring passing through walls and floors and roof. Sleeves shall be of sufficient length to extend through the wall, roof, and floors. Wall sleeves shall have ends flush with finished thickness of walls and floor sleeves shall extend 1 inch above finish floor. Interior diameter of sleeves shall provide 1/2 inch clearance all around conduit.

- B. Below grade wall and roof penetration shall be made watertight. Below grade wall penetration shall be sealed with compression type conduit sealing bushings. Roof penetration shall be sealed and flashed per roof manufacturers published recommendations.
- C. Where cutting is required to facilitate construction, this contractor shall patch and repair cut items to the original state. However, structural work shall not be cut without the written approval of the Engineer or his representative.
- D. Holes through concrete and masonry in new and existing structures shall be cut with a diamond core drill or concrete saw. Pneumatic hammer impact, electric hand or manual hammer type drills, shall not be allowed, except where permitted by Engineer as required by limited working space.
- E. CUTTING AND PATCHING
 - 1. Any damage caused by cutting or in any other way caused by this Contractor in the performance of his contract shall be repaired or replaced under the separate heading for the type material required in a manner satisfactory to the Engineer/Owner.
 - 2. Any unnecessary damage caused by this Contractor, due to installation of the electrical work, brought about through carelessness or lack of coordination, shall be corrected under the heading for the type of materials involved, and shall be paid for by this Contractor.
- F. ACCESS PANELS
 - 1. The Contractor's attention is called to access panels. It is a requirement of these specifications that all access panels required in architectural finishes or surfaces to provide access to junction boxes, smoke detectors, strip heaters, ballasts or other devices be provided and installed by this Contractor. Advise Consultant of locations and size of all panels.

3.5 FIRESTOPPING

- A. Where conduits, wireway, bus duct and other electrical raceways pass through fire partitions, fire walls or floors, install a firestop that provides an effective barrier against the spread of fire, smoke, and gases. Fire-stop material shall be packed tight, and completely fill clearances between raceways and openings. Fire-stop material shall conform to the following:
 - 1. Fire-stopping material shall maintain its dimension and integrity while preventing the passage of flame, smoke and gases under conditions of installation and use when exposed to the ASTM #119 time-temperature curve for a time period equivalent to the rating of the assembly penetrated. Cotton waste shall not ignite when placed in contact with the non-fire side during the test. Fire-stopping material shall be non-combustible as defined by ASTM E136, and, in addition, for insulation materials, melt point shall be a minimum of 1700° F for 2-hour protection.
 - 2. Unused, spare sleeves in electrical closets shall be sealed with threaded steel caps on each end.
- B. Fire stopping materials shall be installed in accordance with manufacturers written instructions.

3.6 PROTECTION OF WORK

- A. Protect work from injury by keeping all conduit and boxes capped and plugged or otherwise protected. This includes damage by water and/or stoppage from building materials, sand, dirt, or concrete.
- B. Protect all equipment and fixtures from damages during the project, provide all tarpaulins, drop cloths, barricades, or auxiliary equipment.
- C. All materials or equipment damaged during construction shall be repaired or replaced with new items to the satisfaction of the Engineer.

3.7 IDENTIFICATION

- A. Electrical Identification shall be in accordance with Section 26 05 53.

3.8 PAINTING

- A. Finish painting shall be as specified in Division 9.
- B. Provide touch-up painting of all electrical equipment marred in any way during shipment or installation.

3.9 CONNECTIONS TO EQUIPMENT

- A. Equipment: The Contractor shall make final electrical connections to all items of equipment. All power wiring from power source through starters, disconnects and control panels to equipment shall be provided.

3.10 SAMPLES

- A. Physical samples of material and equipment proposed for installation in this project shall be submitted to the Consultant upon request.
- B. Samples shall be submitted through the General Contractor with all shipping and handling charges prepaid. Any expense incurred in securing, delivery and return of samples, is the responsibility of Contractor. Samples shall be delivered to location designated by Consultant.
- C. Samples shall remain the possession of the Contractor except as follows:
 - 1. Approved samples, without physical damage, may be installed on the project.
 - 2. Samples not called for within 14 days after notification will be disposed of by the Consultant.

3.11 SPARE PARTS AND TOOLS

- A. Furnish to Owner and obtain receipt for same, the following:
 - 1. One spare set of fuses for each size and type installed on project; including overload relays for magnetic starters.
 - 2. One set of special tools required for equipment furnished, spare keys, etc.
 - 3. See other sections for spare parts relative to specific systems.

3.12 FINAL INSPECTION AND TESTS

- A. As precedent to final inspection and acceptance, the Contractor shall have all previously listed defects corrected, complete all work, test all systems and submit results of such tests to the Engineer, install all directories, and labels and post all instructions and comply with applicable paragraphs of this section. Refer to Section 26 05 70 for additional information.

3.13 PERFORMANCE

- A. The Contractor shall employ a competent foreman on the job throughout the entire period of construction to see that his work will not conflict with other trades and that it is properly performed/

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- B. The foreman shall have a thorough knowledge of the work to be installed under this contract, be a skilled mechanic who has had a minimum of four (4) years previous successful experience on projects of comparable sizes and complexity. Foreman shall be present at all times that work under this Division is being installed or affected. Foreman shall be a State of Florida licensed Journeyman and shall have a valid Palm Beach County Electrical Journeyman Certificate of Competency.

END OF SECTION

SECTION 26 05 01
WORK INCLUDED

PART 1 GENERAL

1.1 DESCRIPTION OF SYSTEMS

- A. The work required under this Division shall include all materials, labor and auxiliaries required to install, start up and test a complete and properly operating electrical system. The electrical systems required under this Division consist basically of, but are not limited to, the following:
1. Complete distribution system for power including service entrance, main switchboards and distribution panels, feeders, branch circuits, convenience outlets and connections to motors and other power loads.
 - a. The Contractor shall submit at the shop drawing submittal stage, 2-inch scale, dimensioned drawings of actual electrical equipment layouts in all electrical and mechanical rooms, based on the equipment being provided. Any conflicts shall be resolved between the General Contractor and the respective subcontractors to provide for the equipment location and required working clearances.
 - b. Conduit routing is not shown on the documents. It shall be the Contractors responsibility to field route all raceways and coordinate such routing with all disciplines to resolve any conflicts, as necessary to provide the intended connections. It shall be assumed that the design was based on the shortest possible route. Where conduit or duct routing follows other than direct paths, the conductors and raceways shall be adjusted accordingly to account for voltage drop.
 2. Complete distribution system for lighting including the necessary feeders, branch circuits, lighting fixtures, control switches and receptacles.
 3. Complete system of empty raceways (with pull lines) and cabinets for telephones and data network structured cabling.
 4. Complete fire alarm system.
 5. Complete power distribution system for HVAC equipment including wiring, conduits, and disconnect switches.
 6. Complete system of empty raceways (with pull lines) and terminal cabinets and power requirements for EMCS (Energy Management and Control System), security systems, and cable TV.
 7. Furnishing and installing all necessary access panels.
 8. Concrete work for equipment pads or encased raceways.
 9. Painting (of special equipment).
 10. Temporary power.
 11. Contractor shall check site and existing conditions thoroughly before bidding. Advise Architect of discrepancies or questions note.
 12. Whether indicated on the drawings or not, if a requirement is listed, mentioned, or described in this specification, the cost for its provision and complete installation and connection, shall be included in the Contractor=s bid.

13. The Contractor is cautioned to consult drawings of all disciplines to ascertain electrical requirements for systems that may not be on the electrical plans. Specific attention is directed to special systems such as fire alarm, security, EMCS, etc. The Contractor shall include in his bid, the cost for providing and installing all electrical provisions for a complete, operating system.

END OF SECTION

SECTION 26 05 13
BUILDING WIRE AND CABLE

PART 1: GENERAL

1.1 SECTION INCLUDES

- A. Building wire and cable.
- B. Wiring connectors and connections.

1.2 REFERENCES

- A. ANSI/NFPA 70 - National Electrical Code.

1.3 SUBMITTALS

- A. Submit under provisions of Division One.
- B. Product Data: Provide for each cable assembly type.
- C. Test Reports: Indicate procedures and values obtained.
- D. Manufacturer's Installation Instructions: Indicate application conditions and limitations of use stipulated by product testing agency specified under Regulatory Requirements.

1.4 QUALIFICATIONS

- A. Manufacturer: Company specializing in manufacturing products specified in this Section with minimum three years documented experience.

1.5 REGULATORY REQUIREMENTS

- A. Conform to requirements of ANSI/NFPA 70.
- B. Furnish products listed and classified by Underwriters Laboratories, Inc., as suitable for purpose specified and shown.

1.6 FIELD SAMPLES

Where required, provide as per the following:

- A. Provide under provisions of Division One.
- B. Submit one length, each 18 inches of cable assembly from each reel.
- C. Select each length to include complete set of manufacturer markings.
- D. Attach tag indicating cable size and application information.

1.7 PROJECT CONDITIONS

- A. Verify that field measurements are as shown on Drawings.
- B. Conductor sizes are based on copper.
- C. Wire and cable routing shown on Drawings is approximate unless dimensioned. Route wire and cable as required to meet Project Conditions.
- D. Where wire and cable routing are not shown, and destination only is indicated, determine exact routing and lengths required.

1.8 COORDINATION

- A. Coordinate Work under provisions of Division One.
- B. Determine required separation between cable and other work.
- C. Determine cable routing to avoid interference with other work.

PART 2: PRODUCTS

2.1 BUILDING WIRE AND CABLE

- A. Description: Solid or stranded insulated wire.
- B. Conductor: Copper.
- C. Insulation Voltage Rating: 600 volts.
- D. Insulation: ANSI/NFPA 70, Type THW, THWN.

2.2 WIRING CONNECTORS

- A. Solderless Pressure Connectors:
 - 1. IlSCO Model PDB.
 - 2. Substitutions: Under provisions of Division One.
- B. Spring Wire Connectors:
 - 1. Ideal
 - 2. Scotchloc
 - 3. Holub
 - 4. Substitutions: Under provisions of Division One.
- C. Compression Connectors:
 - 1. Panduit
 - 2. Burndy
 - 3. 3M
 - 4. Substitutions: Under provisions of Division One.
- D. Split-bolt, insulation piercing or push-in type connectors shall not be used.

PART 3: EXECUTION

3.1 EXAMINATION

- A. Verify that mechanical work likely to damage wire and cable has been completed.

3.2 PREPARATION

- A. Completely and thoroughly swab raceway before installing wire.

3.3 INSTALLATION

- A. Install products in accordance with manufacturer's instructions.
- B. All wire shall be installed in conduit unless specifically noted otherwise.
- C. Use stranded conductors for control circuits.

- D. Use conductor not smaller than 12 AWG for power and lighting circuits.
- E. Use conductor not smaller than 12 AWG to supply a single fixture.
- F. Use conductor not smaller than 16 AWG for control circuits.
- G. Conductors of the essential electrical system shall be run in separate raceways and be isolated from conductors of the normal power system.
- H. Use 10 AWG conductors for 20 ampere, 120 volt branch circuits longer than 75 feet.
- I. Pull all conductors into raceway at same time.
- J. Use suitable wire pulling lubricant for installing all building wire.
- K. Protect exposed cable from damage.
- L. Use suitable cable fittings and connectors.
- M. Neatly train and lace wiring inside boxes, equipment, and panelboards.
- N. Clean conductor surfaces before installing lugs and connectors.
- O. Make splices, taps, and terminations to carry full ampacity of conductors with no perceptible temperature rise.
- P. Use antioxidant compound on splices and termination of 2 AWG and larger.
- Q. Use sealed weatherproofing kits for underground splices.
- R. Provide 8 inches of free conductor at outlet, switch, pull and junction boxes.
- S. Use insulated spring wire connectors with plastic caps for copper conductor splices and taps, 8 AWG and smaller.
- T. Use IlSCO or Polaris type bolted lugs with covers for copper conductor taps, and hy-press type sleeves with shrink-sleeve insulation, 6 AWG and larger. Do not splice in underground hand holes.
- U. In new conduit installation, do not install more than five wires in the same conduit unless specifically noted otherwise. Conduits containing control wires or switch legs may contain more than 5 wires to a maximum fill of 40%.
- V. All bushings shall be installed prior to pulling wire. Any wire pulled-in prior to installation of bushings will be required to be removed and replaced at the Contractor's expense.
- W. Each current carrying phase conductor of 120v branch circuits and 277V lighting circuits shall have a dedicated neutral conductor paired with it. Do not "share" neutral conductors among alternate phase conductors.

3.4 INTERFACE WITH OTHER PRODUCTS

- A. Identify wire and cable under provisions of Division One.
- B. Identify each conductor with its circuit number or other designation indicated on Drawings.

3.5 FIELD QUALITY CONTROL

- A. Perform field inspection and testing under provisions of Division One.
- B. Inspect wire and cable for physical damage and proper connection.
- C. Measure tightness of bolted connections and compare torque measurements with manufacturer's recommended values.
- D. Verify continuity of each branch circuit conductor.
- E. Megger all feeders and all branch circuits larger than 200 amp. Coordinate all testing with Section 26 05 70.

END OF SECTION

SECTION 26 05 26
GROUNDING

PART 1 – GENERAL

1.1 WORK INCLUDES

- A. Base Bid:
 - 1. Electrical Contractor provide:
 - a. Grounding for Separately Derived Systems
 - b. Grounding for equipment.

1.2 SYSTEM DESCRIPTION

- A. Ground each separately derived system neutral to structural member of building.
- B. Ground raceways and electrical equipment; use double locknuts at all panels; use bonding jumpers where conduits are installed in concentric knockouts. Ground panels, switches, motor frames, motor starters fixtures, and outlets with separate ground conductor in conduit system.
- C. Bond together system neutrals, service entrance enclosures, exposed non-current carrying metal parts of electrical equipment, metal raceway systems, grounding conductor in raceways and cables, receptacle ground terminals.

1.3 QUALITY ASSURANCE

- A. Regulatory Requirements:
 - 1. Comply with NFPA 70, National Electric Code.
 - 2. UL 467: Grounding and Bonding Equipment.

1.4 SUBMITTALS

- A. In accord with Division One.
- B. Test data in accord with 26 05 70.

PART 2 – PRODUCTS

2.1 MATERIALS

- A. Materials used for grounding conductors shall be in accordance with N.E.C. Article 250-91.
- B. Ground Rods: Steel, copper-encased, 3/4 inch O.D. x 10'-0".
- C. Connections: Exothermic weld type for inaccessible locations, mechanical clamp type for accessible locations.

PART 3 – EXECUTION

3.1 INSTALLATION

- A. Use driven ground rod where shown on drawings.
- B. Bond all grounding systems together.

- C. Separately Derived Systems: Provide connection to building steel bonded to neutral of transformer.
- D. Provide green equipment grounding conductor sized in accordance with Table 250-95 of the N.E.C., in all raceways including conduits, wireways, ducts, and boxes. Bond equipment grounding conductor to each section of ducts and wireways using a continuous conductor and lay-in type grounding lugs bolted to the housing.
- E. The equipment grounding busses of the normal and essential branch - circuit panelboards serving the same patient care areas, shall be bonded together using a No. 10 insulated (green) copper conductor in accordance with Article 517-14, N.E.C.
- F. In all patient rooms, prep/recovery areas, O.R.'s, or other patient care areas, bond outlet boxes of each switch, receptacle, TV outlet, telecom outlet, telemetry outlet, med gas outlet, nurse call outlet, code blue outlet, etc., together using a #10 AWG (min.) green equipment grounding conductor. Bond to med gas faceplates using a tapped cap-screw or similar connection. This requirement is intended to enhance equipotential grounding in these spaces.

3.2 FIELD QUALITY CONTROL

- A. Measure ground resistance in accord with 26 05 70.

END OF SECTION

SECTION 26 05 29
SUPPORTING DEVICES

PART 1: GENERAL

1.1 WORK INCLUDED

- A. Conduit and equipment supports.
- B. Fastening hardware.

1.2 COORDINATION

- A. Coordinate size, shape, and location of concrete pads with Division 3.

1.3 QUALITY ASSURANCE

- A. Support systems shall be adequate for weight of equipment and conduit, including wiring, which they carry.

PART 2: PRODUCTS

2.1 MATERIAL

- A. Support Channel: Galvanized steel.
- B. Hardware: Corrosion resistant.

PART 3: EXECUTION

3.1 INSTALLATION

- A. Fasten hanger rods, conduit clamps, and outlet and junction boxes to building concrete structure using expansion anchors.
- B. Use toggle bolts or hollow wall fasteners in hollow masonry, plaster, or gypsum board partitions and walls; expansion anchors or preset inserts in solid masonry walls; self-drilling anchors or expansion anchor on concrete surfaces; sheet metal screws in sheet metal studs; and wood screws in wood construction.
- C. Do not fasten supports to piping, ductwork, mechanical equipment, or conduit.
- D. Do not use powder-actuated anchors.
- E. Do not drill structural steel members.
- F. Fabricate supports from structural steel or steel channel, rigidly welded or bolted to present a neat appearance. Use hexagon head bolts with spring lock washers under all nuts.
- G. In wet locations install free-standing electrical equipment on concrete pads.
- H. Install surface-mounted cabinets and panelboards with minimum of four anchors. Provide steel channel supports to stand cabinet 3/4 inch off wall.

- I. Bridge studs top and bottom with channels to support flush-mounted cabinets and panelboards in stud walls.

END OF SECTION

SECTION 26 05 33
RACEWAYS

PART 1: GENERAL

1.1 SECTION INCLUDES

- A. Metal conduit.
- B. Flexible metal conduit.
- C. Liquidtight flexible metal conduit.
- D. Electrical metallic tubing.
- E. Fittings and conduit bodies.

1.2 REFERENCES

- A. ANSI C80.1 - Rigid Steel Conduit, Zinc Coated.
- B. ANSI C80.3 - Electrical Metallic Tubing, Zinc Coated.
- C. ANSI/NEMA FB 1 - Fittings, Cast Metal Boxes, and Conduit Bodies for Conduit and Cable Assemblies.
- D. ANSI/NFPA 70 - National Electrical Code.
- E. NECA "Standard of Installation."
- F. NEMA RN 1 - Polyvinyl Chloride (PVC) Externally Coated Galvanized Rigid Steel Conduit.

1.3 DESIGN REQUIREMENTS

- A. Conduit Size: ANSI/NFPA 70.

1.4 SUBMITTALS

- A. Submit under provisions of Division One.

1.5 PROJECT RECORD DOCUMENTS

- A. Submit under provisions of Division One.
- B. Accurately record actual routing of empty conduits, exterior underground.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Deliver, store, protect, and handle Products to site under provisions of Division One.
- B. Accept conduit on site. Inspect for damage.
- C. Protect conduit from corrosion and entrance of debris by storing above grade. Provide appropriate covering.

1.7 PROJECT CONDITIONS

- A. Verify that field measurements are as shown on Drawings.
- B. Verify routing and termination locations of conduit prior to rough-in.
- C. Conduit routing is shown on Drawings in approximate locations unless dimensioned. Route as required to complete wiring system.

PART 2: PRODUCTS

2.1 RIGID METAL CONDUIT

- A. Description: Rigid Galvanized Steel Conduit: ANSI C80.1.
- B. Fittings and Conduit Bodies: ANSI/NEMA FB 1; material to match conduit; all steel fittings.

2.2 NON-METALLIC CONDUIT

- A. Description: Schedule 40 PVC.
- B. Fittings and Conduit Bodies: Same manufacturer as conduit.

2.3 FLEXIBLE METAL CONDUIT

- A. Description: Interlocked steel construction.
- B. Fittings: ANSI/NEMA FB 1. Steel or malleable iron type.

2.4 LIQUIDTIGHT FLEXIBLE METAL CONDUIT

- A. Description: Interlocked steel construction with PVC jacket.
- B. Fittings: ANSI/NEMA FB 1. Steel or malleable iron type.

2.5 ELECTRICAL METALLIC TUBING (EMT)

- A. Description: ANSI C80.3; galvanized tubing.
- B. Fittings and Conduit Bodies: ANSI/NEMA FB 1; steel, set screw or compression type with insulated throat.

PART 3: EXECUTION

3.1 CONDUIT REQUIREMENTS

- A. Minimum Size: 3/4 inch unless otherwise specified.
- B. Underground Installations:
 - 1. Use rigid galvanized steel (RGS) conduit or Schedule 40 PVC outside building footprint. Paint all RGS conduit, to be installed underground, with two coats of bitumastic paint.
 - 2. Minimum Size: 3/4 inch.
 - 3. Install conduits a minimum of 30 inches below finished grade, unless inside the building line.
 - 4. Terminate conduits with bell ends or bushings at manholes.
 - 5. Duct seal all outdoor conduit terminations, and underground conduits entering a building.
 - 6. PVC conduit shall not be used in any patient care areas.
- C. Outdoor Locations, Above Grade: Use rigid steel conduit where exposed to possible physical damage. All other areas, use Schedule 40 PVC.
- D. In Slab Above Grade:
 - 1. Use rigid steel conduit or electrical metallic tubing.

2. Maximum Size Conduit in Slab: 3/4 inch.
- E. Wet Locations: Use rigid steel conduit.
- F. Damp Locations: Rigid steel conduit.
- G. Indoor Locations:
 1. Concealed: Use rigid steel conduit or use electrical metallic tubing.
 2. Exposed: Below 4'-0" AFF, use rigid steel conduit. Above 4'-0" AFF, use electrical metallic tubing.
- H. Subject to Physical Damage: Galvanized rigid steel conduit.
- I. Flexible conduit: 3/8 inch steel (min.), maximum 6 feet long.
- J. Electrical Metallic Tubing: 1/2 inch, not exceeding 10 feet long at the following conditions:
 1. Junction box above ceiling to a single box in furred wall.
 2. All other locations, use 3/4" EMT minimum.
- K. Steel flexible conduit or liquid tight conduit, 1/2 inch (maximum 3 feet long), to connect equipment where subject to vibration or frequent changing.

3.2 INSTALLATION

- A. Install conduit in accordance with NECA "Standard of Installation."
- B. All wiring shall be in conduit unless specifically noted otherwise.
- C. Arrange supports to prevent misalignment during wiring installation.
- D. Secure and/or support conduit using coated steel or malleable iron straps, lay-in adjustable hangers, clevis hangers, and split hangers.
- E. Multiple parallel runs of suspended conduits shall be supported by steel channel and straps.
- F. Group related conduits; support using conduit rack. Construct rack using steel channel; provide space on each for 25 percent additional conduits.
- G. Fasten conduit supports to building structure and surfaces under provisions of Section 26 05 29.
- H. Do not support and/or secure conduit with perforated pipe straps. Remove wire used for temporary supports.
- I. Do not attach conduit to ceiling support wires. Install additional support wires to support conduits. Conduit must be securely fastened in place.
- J. Arrange conduit to maintain headroom and present neat appearance.
- K. Route exposed conduit parallel and perpendicular to walls. Exposed conduit below 10 ft above floor in occupied areas, shall have 2 hole straps spaced a maximum of 5 ft.
- L. Do not route conduits on floors in areas used for access to any equipment.
- M. Route conduit installed above accessible ceilings parallel and perpendicular to walls.
- N. Route conduit in and under slab from point-to-point.
- O. Do not cross conduits in slab.
- P. Maintain adequate clearance between conduit and piping.
- Q. Maintain 12 inch clearance between conduit and surfaces with temperatures exceeding 104 degrees F.
- R. Cut conduit square using saw or pipe cutter; de-burr cut ends.
- S. Bring conduit to shoulder of fittings; fasten securely.
- T. Use conduit hubs or sealing locknuts to fasten conduit to sheet metal boxes in damp and wet locations and to cast boxes.
- U. Install no more than equivalent of four 90-degree bends between boxes. Use conduit bodies to make sharp changes in direction, as around beams. Use factory elbows for bends in metal conduit larger than 2 inch size.

- V. Avoid moisture traps; provide junction box with drain fitting at low points in conduit system.
- W. Provide suitable fittings to accommodate expansion and deflection where conduit crosses expansion joints.
- X. Provide a 200 lb test pull string in each empty conduit except sleeves and nipples.
- Y. Use suitable caps to protect installed conduit against entrance of dirt and moisture immediately after installation.
- Z. Ground and bond conduit under provisions of Section 26 05 26.
- AA. Identify conduit under provisions of Section 26 05 53.
- BB. New Construction: Conduits run in finished areas shall be concealed.
- CC. No conduits shall be installed on roof surface.
- DD. Do not use threadless connector or couplings on rigid conduit installed above grade.
- EE. Do not use "all-thread" conduit nipples.
- FF. Terminate all empty conduits in approved type boxes.
- GG. Disconnect switches, magnetic starters, contactors, control cabinets and panel boards shall not be used as raceways.
- HH. Flexible metal conduit and liquidtight flexible metal conduit shall not exceed 6 feet in length.
- II. Flexible metal conduit and liquid-tight flexible metal conduit shall not penetrate walls or ceilings.
- JJ. All metallic conduits and fittings below grade or in slabs shall be coated with two (2) coats of bitumastic paint prior to installation.
- KK. All conduit terminations shall have insulated throat or appropriate plastic bushing.
- LL. All raceway systems shall be complete, and each system shall be totally separate.
- MM. Non-metallic conduit shall not be used in patient care areas.

3.2 INTERFACE WITH OTHER PRODUCTS

- A. Install conduit to preserve fire resistance rating of partitions and other elements, using materials and methods under the provisions of Division Seven.
- B. Route conduit through roof openings for piping and ductwork or through suitable roof jack with pitch pocket. Coordinate location with roofing installation.

END OF SECTION

SECTION 26 05 34
BOXES

PART 1: GENERAL

1.1 SECTION INCLUDES

- A. Wall and ceiling outlet boxes.
- B. Floor boxes.
- C. Pull and junction boxes.

1.2 REFERENCES

- A. ANSI/NEMA FB 1 - Fittings and Supports for Conduit and Cable Assemblies.
- B. ANSI/NEMA OS 1 - Sheet-steel Outlet Boxes, Device Boxes, Covers, and Box Supports.
- C. ANSI/NFPA 70 - National Electrical Code.
- D. NEMA 250 - Enclosures for Electrical Equipment (1000 Volts Maximum).

1.3 PROJECT RECORD DOCUMENTS

- A. Submit under provisions of Division One.
- B. Accurately record actual locations and mounting heights of outlet, pull, and junction boxes.

1.4 REGULATORY REQUIREMENTS

- A. Conform to requirements of ANSI/NFPA 70.
- B. Furnish products listed and classified by Underwriters Laboratories, Inc., as suitable for purpose specified and shown.

1.5 PROJECT CONDITIONS

- A. Verify field measurements are as shown on Drawings.
- B. Electrical boxes are shown on Drawings in approximate locations unless dimensioned. Install at location required for box to serve intended purpose.

PART 2: PRODUCTS

2.1 OUTLET BOXES

- A. Sheet Metal Outlet Boxes: ANSI/NEMA OS 1, galvanized steel one piece construction, 4 inches x 4 inches x 1.5 inches deep, minimum.
- B. Cast Boxes: NEMA FB 1, Type FD cast ferralloy. Provide gasketed cover by box manufacturer. Provide threaded hubs, 4 inches x 4 inches x 1.5 inches deep, minimum.

2.2 PULL AND JUNCTION BOXES

- A. Sheet Metal Boxes: NEMA OS 1, galvanized steel one piece construction.
 - 1. Minimum Size Box: 4 x 4 x 1-1/2 inches deep.

- B. Surface-Mounted Cast Metal Box: NEMA 250, Type 4; flat-flanged, surface-mounted junction box.
 - 1. Material: Galvanized cast iron.
 - 2. Cover: Furnish with ground flange, neoprene gasket, and stainless steel cover screws.

PART 3: EXECUTION

3.1 INSTALLATION

- A. Install electrical boxes as shown on Drawings, and as required for splices, taps, wire pulling, equipment connections and compliance with regulatory requirements.
- B. Install electrical boxes to maintain a 6'-3" headroom and to present neat mechanical appearance.
- C. Install pull boxes and junction boxes above accessible ceilings and in unfinished areas only.
- D. Inaccessible Ceiling Areas: Install outlet and junction boxes no more than 6 inches from ceiling access panel or from removable recessed luminaire.
- E. Accessible Ceiling Areas: Install outlets and junction boxes no more than 3'-0" above removable ceiling.
- F. Install boxes to preserve fire resistance rating of partitions and other elements, using materials and methods under the provisions of Division One.
- G. Align adjacent wall-mounted outlet boxes for switches, thermostats, and similar devices with each other.
- H. Use flush mounting outlet boxes in finished areas.
- I. Do not install flush mounting boxes back-to-back in walls; provide minimum 6 inch separation. Provide minimum 24 inches separation in acoustic rated and fire rated walls.
- J. Secure flush mounting box to interior wall and partition studs. Accurately position to allow for surface finish thickness.
- K. Use stamped steel bridges to fasten flush mounting outlet box between studs.
- L. Install flush mounting box without damaging wall insulation or reducing its effectiveness.
- M. Do not fasten boxes to ceiling support wires.
- N. Support boxes from building structure or structural member.
- O. Use gang box where more than one device is mounted together. Do not use sectional box.
- P. Use 2-gang box with plaster ring for single device outlets.
- Q. Use cast outlet box in exterior locations exposed to the weather and wet locations.
- R. Use cast floor boxes for installations in slab on grade; formed steel boxes are acceptable for other installations.
- S. Set floor boxes level.
- T. Large Pull Boxes: Boxes larger than 100 cubic inches in volume or 12 inches in any dimension.
 - 1. Interior Dry Locations: Use hinged enclosure.
 - 2. Other Locations: Use surface-mounted cast metal box.
- U. Floor boxes shall not be used for feed through wiring except to another floor box.
- V. Cast boxes at the end of a run shall have one additional conduit into slab for support.
- W. Pull boxes shall be added, as necessary, to eliminate conduit runs from exceeding 200 feet in length.

- X. Box mounting height, unless indicated on drawings:
(All mounting heights shall comply with ADA)
 - 1. Refer to Section 26 27 26, Paragraph 3.4.
- Y. A maximum of one extension ring shall be used on a box.
- Z. System pull and junction boxes shall be color-coded as specified in Section 26 05 53.

3.2 INTERFACE WITH OTHER PRODUCTS

- A. Coordinate locations and sizes of required access doors with Division 8.
- B. Locate flush mounting box in masonry wall to require cutting of masonry unit corner only. Coordinate masonry cutting to achieve neat opening.
- C. Coordinate mounting heights and locations of outlets mounted above counters, benches, and backsplashes.
- D. Position outlet boxes to locate luminaries as shown on reflected ceiling plan.

3.3 ADJUSTING

- A. Adjust floor box flush with finish flooring material.
- B. Adjust flush-mounting outlets to make front flush with finished wall material.
- C. Install knockout closure in unused box opening.

END OF SECTION

SECTION 26 05 53
ELECTRICAL SYSTEMS IDENTIFICATION

PART 1: GENERAL

1.1 WORK INCLUDED

- A. Nameplates.
- B. Wire markers.
- C. Box color coding.
- D. Lighting and power junction boxes.
- E. Panel directories.

1.2 SUBMITTALS

- A. Submit shop drawings under provisions of Division One.
- B. Include schedule for nameplates.

PART 2: PRODUCTS

2.1 MATERIALS

- A. Nameplates: Engraved three-layer laminated plastic, white letters on a black background. Equipment and devices on 'critical branch' (emergency) shall have labels with white letters on red background.
- B. Underground-Type Plastic Line Marker: Manufacturer's standard permanent, bright-colored, continuous-printed plastic tape with mylar backing, intended for direct-burial service; not less than 6 inches wide x 4 mils thick. Provide tape with printing which most accurately indicates the type of the buried conduit.
- C. Wire and Cable Markers: Cloth markers, split sleeve, or tubing type.

PART 3: EXECUTION

3.1 INSTALLATION

- A. Degrease and clean surfaces to receive nameplates.
- B. Install nameplates parallel to equipment lines.
- C. Secure nameplates to equipment fronts using stainless steel screws. Secure nameplate to outside face of recessed panelboard doors in finished locations.
- D. Embossed tape will not be permitted for any application.
- E. Provide underground-type plastic line marker above exterior underground conduits. Bury 6 to 8 inches below finish grade. Provide line markers on each side of trench if wider than 16 inches.

3.2 WIRE IDENTIFICATION

- A. Phase Color Coding:
 - 1. 120/208 volt system, "A" phase - black, "B" phase - red, "C" phase - blue, neutral - white, and ground green.
 - 2. 277/480 volt system, "A" phase - brown, "B" phase - orange, "C" phase - yellow, neutral - gray, and ground - green.
- B. Maintain A, B, C, phase relation left to right or top to bottom when viewed from front. Maintain color coding throughout entire project.
- C. Phase conductors, size #10 and smaller, and neutral and ground conductors, shall have continuous outer finish color as indicated above. Size #8 and larger conductors shall have black insulation and be color coded with a six inch band of colored tape at all junctions and terminators.

3.3 NAMEPLATE ENGRAVING SCHEDULE

- A. Provide nameplates of minimum letter height as scheduled below.
 - 1. Panelboards: 1/2 inch-identify panelboard name. 1/4 inch-identify voltage rating.
 - 2. Individual Circuit Breakers and Switches: 3/8 inch-identify circuit and load served, including location.
 - 3. Safety Switches and Enclosed Switches: 1/2 inch - identify switch name; 1/4-inch - identify load served.
 - 4. Transformers: 3/8 inch-identify transformer name. 1/4 inch-identify primary and secondary voltages.
 - 5. Electrical Cabinets and Enclosures: 3/8 inch- identify equipment name.
 - 6. System Terminal Cabinets: 3/8 inch-identify equipment or system name.
- B. Headwall: 1/8 inch-identify panel and circuit number serving outlet (ex. 'LINA - 2') located above each outlet on headwall.
- C. Provide panelboard and circuit number on engraved trim plate, on each receptacle and switch. Engraving shall be deep enough to be visible and legible from a distance of 5'-0". Fasten nameplate to switch coverplate.

3.4 BOX COLOR CODING SCHEDULE

- A. Paint junction box and cover, and 6" of all conduits entering/leaving, in the following manner:
 - Life-Safety - Yellow
 - Critical - Orange
 - Equipment - Green
 - Fire alarm - Red
 - Nurse Call/Code Blue - blue.
 - Patient Monitor - purple.
 - Telephone system - brown.
 - CATV - white.

3.5 LIGHTING AND POWER JUNCTION BOX IDENTIFICATION

- A. Identify lighting and power junction box covers with circuit and panelboard number on the outside, using permanent marker.

3.6 PANEL DIRECTORY

- A. Shall be typewritten, indicating specific and clear area of control, regardless of the listing in the panel schedules on the drawings. Indicate by room name, equipment, system, etc.
- B. Provide to the Engineer corrected panel directories so the panel schedules on the record drawings can be updated to match the directories in the panels in the field.

END OF SECTION

SECTION 26 05 70
TESTING

PART 1 – GENERAL

1.1 WORK INCLUDES

- A. Testing of electrical components and equipment as herein specified.

1.2 SYSTEM DESCRIPTION

- A. Testing includes:
 1. Resistance tests.
 2. Continuity tests.
 3. Phase relationship verification.
 4. Voltage tests.
 5. Ground fault protection tests.

1.3 QUALITY ASSURANCE

- A. Regulatory Requirement
 1. Comply with National Electrical Code, (NEC).
- B. Reference Publications

1.4 SUBMITTALS

- A. Test Reports: All test reports shall be submitted in triplicate, assembled and bound to Architect/Engineer prior to final acceptance.

PART 2 – PRODUCTS

2.1 MATERIALS

- A. Furnish all test equipment to perform specified testing.

PART 3 – EXECUTION

3.1 TESTS

- A. Conduct such tests and adjustment of equipment as necessary to verify performance requirements.
- B. Test Reports: Typewritten, listing testing equipment used, person or persons performing the tests, date tested, circuits tested, motor or equipment nameplate data, and results of tests.
- C. Insulation resistance tests general:
 1. Perform insulation resistance tests on equipment and cables listed herein.
 2. Test equipment: Furnished by Contractor.
 3. Resistance measured: line-to-ground.
 4. Disconnect, prior to testing, any device that could be damaged by application of voltage.
 5. Insulation resistance tests shall be conducted per following schedule:

Martin County School District
 Citrus Grove Elementary School
 Enhanced Security Project A2

Item Tested	Voltage of Test	Min. Acceptance Resistance in Megohms
Transformers	500v	5
No. 2 and larger cables (600 V)	1000V	50
Panelboards	1000V	25

D. Ground Resistance

1. Measure and record ground resistance from system neutral connection at separately derived system, to convenient ground reference point using suitable ground testing equipment. Minimum acceptable resistance: 10 ohms. When resistance exceeds 10 ohms, modify ground connection and/or increase grounding electrode conductor size and repeat test.
2. Measure equipotential difference and ground resistance between the metallic raceway, and the equipment grounding conductor at each outlet mounted in the walls, of the Operating and Procedure rooms, and prep and recovery areas. Maximum allowable potential difference is 20 millivolts, (.020 volts), and maximum ground resistance shall be 0.1 ohms.
3. Random testing shall be performed at the time of the AHCA Final Survey. Test equipment shall be provided with current calibration data indicating date of calibration, and length of test leads used during calibration. Calibration shall have been within the last twelve (12) months.

E. Continuity Test

1. Test branch circuits and control circuits to determine continuity of wiring and connection. Submit written statement that this has been performed.

F. Voltage test shall be made and recorded at the following listed points. Tests shall be conducted under normal load conditions.

1. Distribution feeders at panelboards.
2. Outlets in the headrail system.

G. Phase Relationship: Check connections to equipment for proper A-B-C phase relationships.

1. Disconnect, prior to check, any device which could be damaged by application of voltage of reversed phase sequence.

3.2 CORRECTIONS OF DEFECTS

- A. If tests disclose any unsatisfactory workmanship or equipment furnished under this contract, Contractor shall repair or replace such defects.
- B. If any wiring or equipment is damaged by tests, Contractor shall repair or replace such wiring or equipment.

END OF SECTION

SECTION 26 24 16
CIRCUIT BREAKER PANELBOARDS

PART 1 – GENERAL

1.1 WORK INCLUDES

- A. Panelboards herein specified and shown on the drawings.

1.2 SUBMITTALS

- A. In accord with Division One:
1. Shop Drawings: Panelboards and Dimensional Data.
2. Product Data: Circuit breakers.

PART 2 – PRODUCTS

2.1 MATERIALS

- A. Panelboards rated 208/120 volt shall have copper bus structure braced for 10,000 RMS amps fault current minimum, and panelboards rated 277/480 volt shall have copper bus braced for 25,000 RMS amps fault current minimum, or as indicated on the drawings, whichever is greater. All copper parts shall be plated to prevent corrosion.
1. All panelboards shall be Dead-Front Safety Type, equipped with thermal-magnetic molded case breakers, and solid neutral bus.
 2. Bus bar connections to the branch circuit breakers shall be the "Distributed Phase" or "Phase Sequence" type. Bussing shall be such that adjacent single pole breakers will be on different phases or polarities, and that two or three pole breakers can be installed at any location.
 3. Panelboard numbering shall be such that starting at the top, odd numbers shall be used in sequence down the left hand side and even numbers shall be used in sequence down the right hand side.
- B. Cabinets shall be fabricated of code gauge galvanized steel with gutters per National Electrical Code. Fronts shall have doors with matching one piece trim, be code gauge and be finished with rust inhibiting primer and baked enamel. Fronts shall have adjustable indicating trim clamps completely concealed when door is closed. Provide a circuit directory frame and card with a clear plastic covering on the inside of the doors. Fronts shall have flush locks and be furnished with two keys per lock.
- C. Provide circuit breakers, quick-make, quick-break, thermal-magnetic, trip indicating, and common trip on all multi-pole breakers. Branch circuit breakers feeding convenience outlets shall have sensitive instantaneous trip settings of not more than 10 times the trip rating of the breaker. Circuit breakers shall have bolt-on connections to the bus. Ratings are shown on the panelboard schedule.
- D. Main circuit breaker: Circuit breaker ampere rating as shown on drawings, voltage as required, 3-pole, single-throw, front connected. Molded case, thermal-magnetic, common trip, quick-make, quick-break, adjustable magnetic trip elements, with RMS interrupting rating as required to meet the panel's integrated rating. Provide where indicated on drawings.
- E. Breakers intended to switch fluorescent lighting loads on a regular basis shall be rated for switching duty.

- F. Provide ground fault circuit interrupter circuit breakers rated to trip at 30 milliamperes for circuits as shown on drawings.
- G. Panelboards shall be furnished with ground bus and separate insulated neutral bus.
- H. Circuit Breaker Panelboards:
 - 1. Acceptable Products:
 - a. Square D (Basis of Design)
 - b. G.E.
 - c. Eaton
 - d. Siemens

PART 3 – EXECUTION

3.1 INSTALLATION

- A. Locate as shown on drawings. Maximum distance from floor to highest breaker: 6 feet - 6 inches.
- B. Provide mounting materials required; make connections specified or shown. Use collars around mounting bolts, or equivalent means to provide 1/4" minimum air space between panel and wall for surface mounted panel.
- C. Provide nameplate for each panel in accord 26 05 53.
- D. Provide typed circuit directory for each panel indicating load served. Leave spare circuit breakers and circuit breaker space blank on directory.
- E. Where double-panels are indicated, provide single common trim or allow for two individual covers when mounting cabinets.

END OF SECTION

SECTION 26 27 16
CABINETS AND ENCLOSURES

PART 1 GENERAL

1.1 SECTION INCLUDES:

- A. Hinged cover enclosures.
- B. Cabinets.
- C. Terminal blocks and accessories.

1.2 REFERENCES

- A. NEMA 250 - Enclosures for Electrical Equipment (1000 Volts Maximum).
- B. ANSI/NEMA ICS 1 - Industrial Control and Systems.
- C. ANSI/NEMA ICS 4 - Terminal Blocks for Industrial Control Equipment and Systems.
- D. ANSI/NEMA ICS 6 - Enclosures for Industrial Control Equipment and Systems.

1.3 SUBMITTALS

- A. Submit product data under provisions of Division 1.
- B. Shop Drawings for Equipment Panels: Include wiring schematic diagram, wiring diagram, outline drawing and construction diagram as described in ANSI/NEMA ICS 1.

PART 2 PRODUCTS

2.1 HINGED COVER ENCLOSURES

- A. Construction: NEMA 250; steel; type as required to meet conditions of installation unless indicated on the Drawings. Where installed outdoors, enclosure shall be NEMA-4X stainless steel.
- B. Finish: Manufacturer's standard enamel finish.
- C. Covers: Continuous hinge, held closed by flush latch operable by key.
- D. Panel for Mounting Terminal Blocks or Electrical Components: 14 gage steel, enamel finish.

2.2 CABINETS

- A. Cabinet Boxes: Galvanized steel with removable end walls. Provide 3/4 inch thick plywood backboard (exterior fir, type A/C, 7 ply) painted gray on all sides, for mounting terminal blocks.
- B. Cabinet Fronts: Screw cover front, concealed hinge, and flush lock keyed to match branch circuit panelboard; finish in baked enamel.

2.3 TERMINAL BLOCKS AND ACCESSORIES

- A. Terminal Blocks: ANSI/NEMA ICS 4; UL listed.
- B. Power Terminals: Unit construction type, closed-back type, with tubular pressure screw connectors, rated 600 volts.

- C. Signal and Control Terminals: Modular construction type, channel mounted; tubular pressure screw connectors, rated 300 volts.

2.4 FABRICATION

- A. Shop assemble enclosures and cabinets housing terminal blocks or electrical components in accordance with ANSI/NEMA ICS 6.
- B. Provide knockouts on enclosures.
- C. Provide protective pocket inside front cover with schematic diagram, connection diagram, and layout drawing of control wiring and components within enclosure.

PART 3 EXECUTION

3.1 INSTALLATION

- A. Install cabinets and enclosures plumb; anchor securely to wall and structural supports at each corner, minimum.
- B. Provide accessory feet for free-standing equipment enclosures.
- C. Install trim plumb.

END OF SECTION

SECTION 26 27 26
WIRING DEVICES

PART 1: GENERAL

1.1 SECTION INCLUDES

- A. Wall switches.
- B. Receptacles.
- C. Device plates and decorative box covers.

1.2 REFERENCES

- A. NEMA WD 1 - General Purpose Wiring Devices.
- B. NEMA WD 6 - Wiring Device Configurations.

1.3 SUBMITTALS

- A. Submit under provisions of Division One.
- B. Product Data: Provide manufacturer's catalog information showing dimensions, colors, and configurations.
- C. Manufacturer's Instructions:
 - 1. Indicate application conditions and limitations of use stipulated by product testing agency specified under regulatory requirements.
 - 2. Include instructions for storage, handling, protection, examination, preparation, operation, and installation of product.

1.4 QUALIFICATIONS

- A. Manufacturer: Company specializing in manufacturing products specified in this Section with minimum three (3) years experience.

PART 2: PRODUCTS

2.1 WALL SWITCHES - Specification Grade - 20A, 125V/277V, grounding type. Switches on the critical branch and life safety branch shall be red.

- A. Single Pole Switch:
 - 1. Legrand
 - 2. Leviton
 - 3. Arrow-Hart
- B. Three-way Switch:
 - 1. Legrand
 - 2. Leviton
 - 3. Arrow-Hart
- C. Four-way Switch:
 - 1. Legrand
 - 2. Leviton
 - 3. Arrow-Hart

2.2 RECEPTACLES - Hospital Grade - 20A, 125V, 3W, Grounding type. Receptacles on the critical and life-safety branch shall be red.

- A. Single Convenience Receptacle:
 - 1. Legrand
 - 2. Leviton.
 - 3. Arrow-Hart
- B. Duplex Convenience Receptacle:
 - 1. Legrand
 - 2. Leviton
 - 3. Arrow-Hart
- C. GFCI Receptacle:
 - 1. Legrand
 - 2. Leviton
 - 3. Arrow-Hart
- D. Surge Protected Receptacle:
 - 1. Legrand
 - 2. Leviton

2.3 WALL PLATES

- A. Decorative Cover Plate: Stainless steel type 302/304 satin finished, non-magnetic.
- B. Weatherproof Cover Plate: Gasketed stainless steel with lockable hinged gasketed device cover, equal to Sierra Model WP-26L.

PART 3: EXECUTION

3.1 EXAMINATION

- A. Verify existing conditions.
- B. Verify outlet boxes are installed at proper height.
- C. Verify wall openings are neatly cut and will be completely covered by wall plates.
- D. Verify branch circuit wiring installation is completed, tested, and ready for connection to wiring devices.

3.2 PREPARATION

- A. Provide extension rings to bring outlet boxes flush with finished surface.
- B. Clean debris from outlet boxes.

3.3 INSTALLATION

- A. Install products in accordance with manufacturer's instructions.
- B. Install devices plumb and level.
- C. Install switches with OFF position down.
- E. Install receptacles with grounding pole on bottom, or to the left when mounted horizontally.
- F. Connect wiring device grounding terminal to branch circuit equipment grounding conductor.

- G. Install decorative plates on switch, receptacle, and blank outlets in finished areas.
- H. Connect wiring devices by wrapping conductor around screw terminal. Do not "back-wire" any devices.
- I. Install galvanized steel plates on outlet boxes and junction boxes in unfinished areas, above accessible ceilings, and on surface mounted outlets.
- J. Any receptacle within six feet of a sink shall be a GFCI type.
- K. Devices on 'emergency' circuits shall be red in color. Devices on normal power circuits shall be the color as specified by the Architect.
- L. When GFCI is specified, use only GFCI receptacles. Do not protect "down stream" receptacles with GFCI receptacles.
- M. Do not use push-in connections on any device.
- N. All devices, receptacles, and switches shall have separate grounding terminal.
- O. Identify each outlet and switch in accordance with Section 26 05 53.

3.4 MOUNTING HEIGHTS

- A. Coordinate locations of outlet boxes provided under Section 26 05 34 to obtain mounting heights specified herein or indicated on Drawings.
- B. Install wall switch 42-inches, to center, above finished floor, or as dimensioned on the drawings.
- C. Install convenience receptacle 18-inches, to center, above finished floor.
- D. Install convenience receptacle 6-inches to center, above backsplash of counter.
- E. Install telecommunications outlet 18-inches, to center, above finished floor, or as dimensioned on the drawings.

3.5 FIELD QUALITY CONTROL

- A. Inspect each wiring device for defects.
- B. Operate each wall switch with circuit energized and verify proper operation.
- C. Verify that each receptacle device is energized.
- D. Test each receptacle device for proper polarity.
- E. Test each GFCI receptacle device for proper operation.

3.6 ADJUSTING

- A. Adjust devices and wall plates to be flush, plumb, and level.

END OF SECTION

SECTION 26 28 13
FUSES (600 VOLT & BELOW)

PART 1 GENERAL

- 1.1 Furnish and install fuses of the types and sizes as indicated on the drawings and/or as specified herein. All fuses furnished and installed under this specification shall be as specified; shall be new, unused fuses; shall be delivered to the job site in manufacturer's original boxes or cartons whether furnished by the Contractor or by the manufacturer of equipment. All fuses shall have a minimum interrupting rating of 200,000 amperes. Should utilization, conversion, or distribution equipment provided under any division of these specifications require fuse classes offering a higher degree of protection or different ampere ratings than fuses specified, such fuse classes and ampere ratings may be used.
- 1.2 Mounting bolts or nuts shall be evenly torqued to ASTM recommendations for type and diameter of mounting bolts or studs provided. The inside of each fuse enclosure shall contain a durable, readily visible label which shall clearly indicate the correct type and size of replacement fuse. Label shall not cover or interfere with equipment manufacturer's instructions.
- 1.3 FUSES SHALL BE MADE BY ONE OF THE FOLLOWING MANUFACTURERS
- A. Reliance Fuses
 - B. Gould Shawmut
 - C. Littlefuse
 - D. Bussmann
 - E. Substitutions: Should the Contractor propose to provide fuses other than those specified, at least six weeks prior to the installation of the fuses, he shall furnish the Engineer complete technical data sufficient for the Engineer to determine whether system function will be adversely affected, whether proposed fuses meet this specification and whether they are equal in quality. Proposal for substitution shall state the dollar cost savings to the Owner and reason for proposed substitution.
- 1.4 To assure selective coordination of protective devices, all fuses shall be of the same manufacturer.

PART 2 PRODUCTS

- 2.1 FUSES FOR SERVICE, SWITCHBOARD MAINS, FEEDERS AND BRANCH CIRCUITS
- A. 0 to 600 amperes. Except as specified fuses 0 to 600 amperes shall be UL listed RK1 dual-element, time-delay fuses with ampere ratings indicated on the drawings except as may be modified by these specifications.

- B. Fuses for motor branch circuits 600 amperes and below, whether individual or grouped (MCC), shall be class RK1 fuses. Fuse ratings for motor branch circuits shall be determined by actual full-load currents of motors provided, not by NEC Table of Standard Motor Full Load Ampere. EXCEPTION: Fuses in motor control centers may be time-delay Class CC fuses if MCC manufacturer's standard designs are for these fuses. Fuse manufacturer's recommendations shall be followed for Class CC fuses.
- C. Fuses for motor branch circuits requiring fuses over 601 amps, whether individual or grouped (MCC), shall be Class L fuses.

2.2 FUSING OF CONTROL CIRCUITS

- A. General: Fuses shall be RK1 or time-delay Class CC fuses installed in Class CC fuse blocks.
- B. Control Power Transformers: Primary circuit of all control power transformers shall be fused. Fuse ratings shall be in accordance with NEC requirements. Fuses shall be RK1 or time-delay UL Class CC fuses installed in Class CC fuse blocks.

2.3 FUSING FOR FLUORESCENT AND H.I.D. LIGHTING FIXTURE BALLASTS

- A. 300 volt and below fluorescent fixture ballasts, where required, shall be individually fused. Fuseholders and fuses shall be GLR fuses or equal.
- B. H.I.D. lighting fixture ballasts shall be individually fused, where required, with fuses rated in accordance with fixture manufacturer's recommendation. Fuseholders shall be UL Class CC fuses.

2.4 FUSES FOR METERING CENTERS, LOAD CENTERS AND FOR BACK-UP PRODUCTION OF CIRCUIT BREAKERS

- A. Fuses for above purposes shall be RK1 or Class L fuses. Fuse ampere ratings shall not exceed maximum recommended by equipment manufacturer.

2.5 INITIAL START-UP

- A. Contractor shall replace all fuses opened during start-up and testing. At contract completion, all fuseholders shall contain serviceable fuses as specified.

PART 3 EXECUTION

3.1 INSTALLATION

- A. All circuits shall be completely de-energized prior to installing any fuses.

END OF SECTION

SECTION 26 28 16
CIRCUIT AND MOTOR DISCONNECTS

PART 1 – GENERAL

1.1 WORK INCLUDES

- A. All disconnect switches for each piece of electrically operated equipment shown on the Drawings or herein specified.

1.2 SUBMITTALS

- A. In accord Division One.
 - 1. Product Data: All disconnect switches.
 - 2. Shop Drawings: Dimensional Data

PART 2 – PRODUCTS

2.1 MATERIALS

- A. Provide switches fusible or non-fusible as indicated, heavy duty, and incorporate a quick-make, quick-break operating mechanism. Cover shall be interlocked with handle and be suitable for padlocking in "OFF" position using up to three padlocks.
- B. Switches shall be furnished in NEMA 1 general purpose enclosures. If located outdoors, they shall be in NEMA 3R Stainless Steel (SS) enclosures. Covers on NEMA 1 enclosures shall be attached with pin type hinges. NEMA 3RSS covers shall be securable in the open position. NEMA 3RSS enclosures for switches thru 200 amperes shall have provisions for interchangeable bolt-on hubs. NEMA 3RSS enclosures shall be manufactured from stainless steel. Enclosures shall have a gray baked enamel finish, electro-deposited on cleaned, phosphatized steel.
- C. Switches shall be horsepower rated for ac and/or dc as indicated by the plans. All fusible switches rated 100 thru 600 amperes at 240 volts and 30 thru 600 amperes at 600 volts shall have a UL approved method of field conversion from standard Class H fuse spacing to Class J fuse spacing. The switch also must accept Class R fuses and have provisions for field installation of a UL listed rejection feature to reject all fuses except Class R. The UL listed short circuit rating of the switches shall be 200,000 rms symmetrical amperes when Class R or Class J fuses are used with the appropriate rejection scheme. The UL listed short circuit rating of the switch, when equipped with Class H fuses, shall be 10,000 rms symmetrical amperes. 800 and 1200 ampere switches shall have provisions for Class L fuses and shall have a UL listed short circuit range of 200,000 rms symmetrical amperes.

2.2 ACCEPTABLE MANUFACTURERS

- A. Square D
- B. General Electric
- C. Eaton
- D. Siemens

PART 3 – EXECUTION

3.1 INSTALLATION

- A. Mount switches 5 feet - 0 inch to top. Provide anchoring point at each mounting hole provided in enclosure.
- B. Provide nameplate in accord with 26 05 00 to indicate equipment served or function of switch.
- C. Mounting Method:
 - 1. Wall Mounting: Use expansion anchors and bolts. Install collars around mounting bolts or mount on channel, to provide air space between wall and device enclosure.
 - 2. Do not mount unit onto air handling units.
 - 3. Floor Mounting: Install on 4" high concrete equipment pad, in plumb and level attitude. Use expansion anchors and bolts as required.
 - 4. Where wall or floor-mounting is not possible, erect framework using steel channel or angle-iron to adequately support unit. Provide bracing to prevent sway.

END OF SECTION

SECTION 26 28 17
OVERCURRENT PROTECTIVE DEVICES

PART 1 – GENERAL

1.1 WORK INCLUDES

- A. Fuses for all fusible equipment installed on the project regardless of which contractor has provided the equipment.
- B. Enclosed circuit breakers as indicated on the drawings and herein specified.
- C. Circuit breakers for existing panelboards for new branch circuit overcurrent protection.

1.2 SUBMITTALS

- A. In accord with Division One.
 - 1. Shop Drawings: All enclosed circuit breakers with dimensional data.
 - 2. Product Data
 - a. Fuses
 - b. Enclosed circuit breakers
 - c. Circuit breakers for installation into existing panelboards.

PART 2 – PRODUCTS

2.1 MATERIALS

- A. Fuses rated 15 to 600 ampere (except for motor branch circuit protection), 600 volt and below, U.L. listed Class RK-1 current limiting type, 200,000 amperes RMS interrupting.
 - 1. Acceptable Products
 - a. Bussman Limitron - Type KTS-R
 - b. Little Fuse - Type KLSR
 - c. Gould Shawmut - Type A2K (250 vac)/A6K (600 vac)
- B. Fuses for motor branch circuit and transformer protection U.L. listed Class RK-5 dual element type, 200,000 amperes RMS interrupting.
 - 1. Acceptable Products
 - a. Bussman Fusetron - Type FRS-R
 - b. Little Fuse - Slo-Blo, Type FLS-R
 - c. Gould Shawmut - Type TR (250 vac)/TRS (600 vac)
- C. Furnish and install individually enclosed circuit breakers as indicated on the plans. All circuit breakers shall meet Federal Specification W-C-375B, and both the circuit breaker and the enclosure shall be UL listed.
- D. Circuit breakers shall have overcenter toggle type mechanisms, providing quick-make, quick-break action. Breakers shall have current and interrupting rating as indicated on the plans. Each circuit breaker shall have trip indication by handle position and shall be trip-free. Two and three pole breakers shall be common trip. Each breaker shall have a permanent trip unit containing individual thermal and magnetic trip elements in each pole.
- E. Enclosures shall be of the NEMA type indicated on the plans.
- F. NEMA 1 enclosures shall be furnished with knockouts where practical and shall be fabricated from sheet steel which conforms to UL 50. The enclosure shall be given an electrodeposited, gray baked enamel finish. Padlocking provisions shall be provided to allow locking the circuit breaker in the "OFF" position. Enclosures shall be UL listed.

- G. NEMA 3RSS enclosures for circuit breakers rated thru the 225 ampere frame size shall be furnished with provisions for interchangeable, bolt-on hubs. Enclosures shall be fabricated from stainless steel and shall be given an electrodeposited, gray baked enamel finish. Enclosure covers shall be securable in the open position. Padlocking provisions shall be provided to allow locking the enclosure cover closed. Enclosures shall be UL listed.

PART 3 – EXECUTION

3.1 INSTALLATION

- A. Distribution system is designed to provide selectivity, coordination, and component protection. To guarantee this system, all fuses or circuit breakers shall be from the same manufacturer. Substitution provisions are specified in Division One.
- B. Place a fuse identification label showing size and type of fuses installed inside the cover of each switch.
- C. Furnish Owner at completion of project, one spare set (3) of each size of fuse rated over 100 amperes. Obtain a written receipt for same from the Owner.
- D. Provide a nameplate for each enclosed circuit breaker in accordance with Section 26 05 53.

END OF SECTION

SECTION 26 29 10
ELECTRIC CONTROLS AND RELAYS

PART 1 GENERAL

1.1 SECTION INCLUDES:

- A. Pushbutton and selector switches.
- B. Control stations.
- C. Relays.
- D. Time-delay relays.
- E. Control power transformers.
- F. Control panels.

1.2 REFERENCES

- A. NEMA ICS 1 - General Standards for Industrial Control Systems.
- B. NEMA ICS 2 - Standards for Industrial Control Devices, Controllers and Assemblies.
- C. NEMA ICS 6 - Enclosures for Industrial Controls and Systems.
- D. NEMA ST 1 - Standard for Specialty Transformers (Except General Purpose Type).

1.3 SUBMITTALS

- A. Submit shop drawings under provisions of Division 1.
- B. Submit shop drawings to NEMA ICS 1 indicating control panel layouts, wiring connections and diagrams, dimensions, support points.
- C. Submit product data under provisions of Division 1.
- D. Submit product data for each component specified.

1.4 PROJECT RECORD DOCUMENTS

- A. Submit record documents under provisions of Division 1.
- B. Accurately record actual locations of control equipment. Revise diagrams included in Drawings to reflect actual control device connections.

1.5 OPERATION AND MAINTENANCE DATA

- A. Submit operation data under provisions of Division 1.
- B. Include instructions for adjusting and resetting time-delay relays, timers, and counters.
- C. Submit maintenance data under provisions of Division 1.
- D. Include recommended preventive maintenance procedures and materials.

1.6 QUALIFICATIONS

- A. Manufacturer: Company specializing in manufacturing the products specified in this Section with minimum three years documented experience.

PART 2 PRODUCTS

2.1 CONTROL SWITCHES AND STATIONS

- A. Contacts: NEMA ICS 2; Form C.
- B. Contact Ratings: NEMA ICS 2; as scheduled.
- C. Pushbutton Operator: NEMA ICS 2; as scheduled.
- D. Control Stations: NEMA ICS 2; as scheduled.

2.2 CONTROL RELAYS

- A. Contacts: NEMA ICS 2; Form C.
- B. Contact Ratings: NEMA ICS 2; as scheduled.
- C. Coil Voltage: As scheduled.

2.3 TIME-DELAY RELAYS

- A. Contacts: NEMA ICS 2; as scheduled.
- B. Contact Ratings: NEMA ICS 2; Class A150.
- C. Coil Voltage: As scheduled.
- D. Time-Delay Relays: NEMA ICS 2; as scheduled.

2.4 CONTROL POWER TRANSFORMERS

- A. Transformer: NEMA ST 1; machine tool transformer with isolated secondary winding.
- B. Power Rating: 500 va.
- C. Voltage Rating: As required.

2.5 ENCLOSURES

- A. Control Station Enclosure: NEMA ICS 6; Type as required to meet conditions of installation unless indicated on the Drawings.
- B. Relay Enclosure: NEMA ICS 6; Type as required to meet conditions of installation unless indicated on the Drawings.

2.6 FABRICATION

- A. Control Panels: Shop fabricate control panels to NEMA ICS 1, using cabinets and terminal blocks furnished under the provisions of Section 26 27 16.

PART 3 EXECUTION

3.1 INSTALLATION

- A. Install devices and equipment in accordance with manufacturer's instructions.
- B. Install individual relays and time delay relays in enclosures.
- C. Install cabinets under the provisions of Section 26 27 16.

- D. Make electrical wiring interconnections as shown on Drawings.

END OF SECTION

SECTION 26 51 00
LIGHTING FIXTURES

PART 1: GENERAL

1.1 WORK INCLUDED

- A. Interior luminaires and accessories.
- B. Exterior luminaires and accessories.
- C. Lamps.
- D. Ballasts.

1.2 REFERENCES

- A. ANSI C82.1 - Specification for Fluorescent Lamp Ballasts.
- B. ANSI C82.4 - Specifications for High-Intensity-Discharge Lamp Ballasts (Multiple Supply Type.)
- C. FS W-F-414 - Fixture, Lighting (Fluorescent, Alternating-Current, Pendant Mounting.)
- D. NEMA LE 2 - H-I-D Lighting System Noise Criterion (LS-NC) Ratings.

1.3 SUBMITTALS

- A. Submit product data under provisions of Division One.
- B. Include outline drawings, lamp and ballast data, support points, weights, and accessory information for each luminaire type.
- C. Submit manufacturer's installation instructions under provisions of Division One.
- D. Submit index listing all fixtures types and complete model number with submittal. Incomplete submittals will be returned without review.

1.4 SUBSTITUTIONS

- A. The lighting fixtures listed in the first line of each type of fixture in the Lighting Fixture Schedule, are the "basis of design" for the lighting systems. Alternate fixtures from manufacturers listed on the second and third lines of each type of fixture in the fixture schedule, will be considered, if proposed fixtures are equivalent in all respects as to performance, quality of construction, suitability for the application, and appearance, including aesthetic considerations for compatibility with the architecture. The Engineer shall have sole discretion in determining equivalency of fixtures.
- B. Requests for consideration of substitutes (fixtures from manufacturers that are not listed), must be made in advance of bidding. Complete data on each proposed substitute fixture, including catalog cuts and photometric data for both the specified and proposed substitute fixtures, together with an item by item comparison highlighting differences from the specified fixture, must be submitted to and received by the Architect and Engineer ten (10) business days prior to opening of bids.
- C. The Engineer will evaluate the submittal and advise the Proposer within five (5) business days after receipt thereof of the Architect's and Engineer's decision as to the acceptability of the proposed substitute.
- D. The Contractor shall be responsible for all changes and modifications to the work required to accommodate the substitute fixtures if accepted, including costs of additional design engineering work if any.

- E. Final review for fixtures will be when shop drawings are submitted. The Architect and Engineer reserve the right to reject any fixtures which, in their opinion, do not meet the intent of the overall lighting system design. Upon request, the fixture supplier shall submit sample fixtures.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Deliver products to site under provisions of Division One.
- B. Store and protect products under provision of Division One.
- C. There shall be no payment for products billed as stored material or work in place until respective data is approved by the Engineer. Include delivery slips and invoice with pay requisition for review.

PART 2: PRODUCTS

2.1 INTERIOR LUMINAIRES AND ACCESSORIES

- A. Recessed Fluorescent Luminaires: Provide trim type and accessories required for installation in ceiling system installed. Maximum depth of luminaire, 6 inch, including yokes and bridges.
- B. Exit Signs: LED type source. Stencil face; 6 inch high red letters on white background, directional arrows as indicated, mounting type as indicated.
- C. Provide in-line fuses in all fluorescent fixtures on emergency power.
- D. Recessed fixture housings shall be die-formed of cold rolled steel of not less than 22 gauge. Construction shall provide an approved method of locking lens or shielding in place. Enamel finish for light reflectance shall have a hardness between H and 3H. The metal shall be cleaned and prepared by "Bonderizing" or an equivalent process. All paint shall be applied after fabrication and have a minimum reflectivity of 88%.
- E. Plastic lenses for fluorescent fixtures shall be 100% virgin acrylic, not less than 3/16" nominal thickness, type K-19.
- F. Temperature in fixture housing shall not exceed 90-degrees C with ambient room temperature of 27-degrees C.
- G. All luminaires required to meet National Appliance Energy Conservation Amendments.
- H. All fixtures shall be equipped with a ground screw or lug to ensure mechanical bond.
- I. Recessed fixtures in plaster ceilings shall be furnished with plaster frames.
- J. Prior to placing orders for recessed fixtures, Contractor shall verify the types of ceilings and suspension systems that have been approved for the project and shall order fixtures with flanges as required to fit in the approved ceilings.
- K. All fixtures shall be provided complete with lamps.
- L. All fluorescent ballasts shall be electronic type with less than 10% total harmonic distortion (THD).
- M. Acceptable Manufacturers - Fluorescent Ballasts
 - 1. General Electric.
 - 2. Universal.
 - 3. Advance.

2.2 EXTERIOR POLE MOUNTED FIXTURES

- A. Fixture shall be approved for pole mounting.
- B. Fixture, pole, and base assembly shall be rated to withstand maximum winds in zone of the project location. Provide wind load calculations for the fixture, pole, base assembly (including embedment), performed and signed and sealed by a Florida Licensed Engineer.

PART 3: EXECUTION

3.1 INSTALLATION

- A. Install all lighting fixtures. Install lamps in luminaires and lampholders.
- B. Support surface-mounted luminaires directly from building structure. Fasten to T using screws, or approved ceiling framing member clips. Install fluorescent luminaires independent of ceiling framing.
- C. Install recessed luminaires to permit removal from below. Use plaster frames in drywall ceilings. All lay-in type recessed fixtures shall be fastened to acoustical ceiling main T-bars by screws or approved seismic clips. T-bars shall be supported at all four corners of fixture by #12 gauge tie wire.

3.2 RELAMPING

- A. Relamp luminaires which have failed lamps at completion of work. Obtain lamps from the Owner.

3.3 ADJUSTING AND CLEANING

- A. Align luminaires and clean lenses and diffusers at completion of Work. Clean paint splatters, dirt, and debris from installed luminaires.
- B. Touch up luminaires as necessary at completion of work to provide a clean, fully operational unit.
- C. All cracked or damaged lenses shall be replaced with new undamaged unit.

END OF SECTION

SECTION 26 52 00
EMERGENCY LIGHTING EQUIPMENT

PART 1 GENERAL

1.1 WORK INCLUDED:

- A. Emergency lighting units.
- B. Emergency LED exit signs.
- C. Emergency fluorescent lamp power supplies.

1.2 REFERENCES

- A. FS W-L-305 - Light Set, General Illumination (Emergency or Auxiliary)
- B. NFPA 101 - Code for Safety to Life from Fire in Buildings and Structures
- C. NEMA WD1 - General-Purpose Wiring Devices.

1.3 SUBMITTALS

- A. Submit product data under provisions of Division 1.
- B. Provide product data on emergency lighting units, exit signs, and emergency fluorescent lamp power supply units.

PART 2 PRODUCTS

2.1 INCANDESCENT EMERGENCY LIGHTING UNITS

- A. Emergency Lighting Unit: Self-contained unit with rechargeable storage batteries, charger, and lamps.
- B. Battery: 6-volt, nickel-cadmium type, with 1.5 hour capacity to supply the connected lamp load.
- C. Charger: Dual-rate charger, capable of maintaining the battery in a full-charge state during normal conditions and capable of recharging discharged battery to full charged within 12 hours.
- D. Lamps: 8 Watt minimum, sealed beam type PAR 36.
- E. Remote Lamps: Match lamps on unit.
- F. Unit Housing: Steel with bronze hammer tone finish.
- G. Indicators: Provide lamps to indicate AC ON and RECHARGING.
- H. Provide switch to transfer unit from normal supply to battery supply.
- I. Electrical Connection: Knockout for conduit connection.

2.2 SELF-CONTAINED EMERGENCY POWER LED EXIT SIGNS

- A. Type: Exit signs shall utilize LED's for light source and be provided with integral battery-operated emergency power supply, including power failure relay, test switch, AC ON pilot light, battery, and fully-automatic two-rate charger.
- B. Battery: Sealed lead acid or lead calcium cell, requiring no maintenance or replacement for 10 years under normal conditions.

PART 3 EXECUTION

3.1 INSTALLATION

- A. Install units plumb and level.
- B. Aim directional lampheads as directed.

END OF SECTION

SECTION 26 52 01
WIRING FOR EQUIPMENT FURNISHED BY OTHERS

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

- A. The other Contract Documents complement the requirements of this Section. The General Requirements apply to the work of this Section.
- B. Drawings and/or information provided by medical equipment vendor.

1.2 SCOPE

- A. Provide materials, labor, and supervision necessary to install electric services for equipment furnished by Mechanical Contractor, Equipment Contractor and Owner.
- B. In general, the equipment to be wired shall include but not be limited to the following:
 - 1. Mechanical Equipment.
 - 2. Medical Equipment.
- C. Provide equipment connections in accordance with the information provided on the drawings. Provide all conduit, conductors, boxes, outlets, devices, switches, etc. for a complete connection to make equipment operable.

PART 2 – PRODUCTS

NOT USED

PART 3 – EXECUTION

3.1 INSTALLATION

- A. Provide services and make final connections for motors and equipment. Make final connections except where notes on drawings state "rough-in only" or "final connections by others." Where final connections are to be made by others, install outlet box, pull in conductors, and leave 8" pigtail for each conductor.
 - 1. Conductors shall be dead-ended and taped, and appropriate cover plate installed over box.
- B. Furnish safety disconnects unless indicated to be supplied by Division 23 for motors and equipment, so as to make service complete to each item of equipment.
- C. Specific attention is made to the miscellaneous medical equipment to be installed throughout the space. The Contractor shall consult the equipment drawings and product information, and coordinate with the local representative, to ensure a complete understanding of the scope of work. All systems shall be provided complete and operational, in their entirety under this contract.
- D. Prior to roughing-in conduit, the Electrical Contractor shall consult with Mechanical Contractors, Equipment Contractors and Owner, and shall verify with them the exact locations for rough-ins, and the exact size and characteristics of the services required, and shall obtain from the Mechanical and Equipment Contractors and Owner a schedule of electrical loads for the equipment furnished by them. These schedules shall be used for verifying services, motor starters, disconnects, fuses, and overload protection.

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- E. The Owner reserves the right to relocate connection point of their equipment, 10'-0" in any direction from the location shown, at no additional cost. Final location must be established prior to conduit rough-in.
- F. Changes required in the work, due to the Contractor's failure to comply with these requirements, shall be made by the Electrical Contractor at no additional cost to the Owner.

END OF SECTION

28

DIVISION

ELECTRONIC SAFETY AND SECURITY

SECTION 28 05 28
SECURITY RACEWAY SYSTEM

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract, including, but not limited to, General, Special and Supplementary Conditions and other Division-1 Specification Sections, apply to the work of this section.

1.2 SCOPE

- A. Provide materials, equipment, labor, and supervision necessary to install conduit system only, for installation of complete security system to be provided by Owner. Raceway system is intended to accommodate intrusion detection and video surveillance system (CCTV), as would be provided by the Owner's vendors. Conduit system shall accommodate all wiring, devices, control panel, and interconnections to other systems.

1.3 QUALITY ASSURANCE

- A. Regulatory Requirements:
 - 1. National Electrical Code, (NEC).

1.4 SUBMITTALS

- A. Product Data: N/A
- B. Shop Drawings: N/A

PART 2 – PRODUCTS

2.1 MATERIALS

- A. Raceways:
 - 1. J-Hooks: Static load limit of 75 lbs. galvanized steel construction. Caddy "Cablecat" or equal.
 - 2. Provide #6 AWG insulated copper grounding conductor from each system control panel enclosure/rack, to ground bus in room.
 - 3. Interior conduits concealed in partitions and exposed above 4'-0" aff shall be EMT, ¾-inch minimum. Conduits in or under slab or exposed below 4'-0" aff shall be RGS, ¾-inch minimum, painted with two (2) coats of bitumastic paint.
- B. Outlet Boxes:
 - 1. Outlet boxes concealed in partitions shall be 4-11/16" x 2-1/8" DP, galvanized sheet metal. Provide with single-gang drywall ring mounted vertically. Stub ¾-inch conduit from box, up into ceiling space.
 - 2. Provide single-gang blank plate on each unused outlet opening. Color shall match all other device plates.

PART 3 – EXECUTION

3.1 INSTALLATION

- A. Provide 200 pound test line in all empty conduits.
- B. Ensure a complete pathway for cabling is possible from each outlet device, back to the respective security system control panel. Provide sleeves through firewalls/partitions as necessary to provide for future cabling.

END OF SECTION

SECTION 28 13 10
ACCESS CONTROL SYSTEM

PART 1 GENERAL

1.1 RELATED DOCUMENTS

- A. The provisions of the General Conditions, Supplementary Conditions, and the Sections included under Division 01, General Requirements, are included as a part of this Section as though bound herein.

1.2 PERFORMANCE REQUIREMENTS

- A. Purpose:
1. Provide electronic card access control system for all new construction and renovation projects.
 2. Electronic card access shall be located at designated perimeter doors leading to each of the program areas with electric re-strike rim exit device, controlled by card access system.
 3. Electronic card access control system shall include all necessary components, wiring for power and control to sensors, card access controls, door hardware devices, uninterruptible power supply system (UPS) and capable of interfacing with existing AMAG software for a complete operable and fully integrated system that is capable of control through the internet.
 4. Raceway system shall consist of conduit, J-hooks, sleeves, boxes and wiring for an automatic card access system.
 5. Electronic card access system shall be independent from Section Intrusion Detection System and shall be an internet-based control system, connected to MCSD main security control center.
 6. The system shall shunt the alarm system to allow passage through the doors when access card is swiped then rearm the alarm system when the door closes. On egress a passive infrared sensor shall shunt the alarm and unlock the door allowing for passage out of the building then resetting the alarm when the door closes.
- B. The System shall include but not be limited to:
1. Main Cabinet shall be surface mounted steel construction, AMAG Panel Model # 2100 installed on a plywood backboard. Main cabinet shall be installed in the MDF Room, including all required power supplies, batteries, integral charger and the software for a complete fully operational system.
 - a. Backboard: Plywood, 1/2 inch thick, AC Grade, covered with two coats of UL Classified, fire retardant intumescent paint, light gray color, painted front, rear, and all four sides.
 - b. Backboard shall be clearly labeled with the name of the backboard manufacturer, UL classification of the Fire Retardant Coating with the NFPA 255 Coating Flame Index and the APA Grade of the plywood. Backboard shall be securely fastened to the wall in order to support any and all attached equipment.
 2. Each cabinet shall feed a minimum of eight controlled devices (readers).
 3. Surge suppression for the 120 VAC power supply.
 4. Card readers.
 5. The distribution cabinet must be within 300 feet of the controlled devices.

6. Raceway shall not exceed 400 feet without a pull box.
 7. Grounding.
 8. Raceway, fittings, wire, and wire fittings.
 9. A 2 inch raceway from the main cabinet to the next building and floor distribution cabinet.
 10. Wire and cable labeling.
 11. Programming Software that is capable of interfacing with AMAG system.
 12. Electrical power required to comply with all functions and operations required for the system.
- C. Access Card Locations: Provide a card reader/controlled device at the following locations:
1. All designated perimeter doors at the discretion of MCSD Site Security and/or Electrical Engineer.
 2. Other doors may be installed to include;
 - a. Principal's Office
 - b. Bookkeeper's Office
 - c. AV Storage
 - d. CCTV Studio Area
 - e. Custodial Receiving
 - f. MDF Room
 - g. Other areas as defined in the plans specific review process

1.3 QUALITY ASSURANCE

- A. Installer Qualifications:
1. The Contractor shall use personnel who are manufacturer-certified, thoroughly trained and experienced with the specified requirements and methods needed for the proper performance of the work.
- B. Manufacturer Qualifications:
1. Manufacturer shall have completed a minimum of five projects of equal scope to systems described herein and shall have been in the business of supplying and installing specified type of systems for a minimum of five years.
- C. Fabricator Qualifications Mockups:
1. Fabricator shall have completed a minimum of five projects of equal scope to systems described herein and shall have been in the business of supplying and installing specified type of systems for a minimum of five years.

1.4 SUBMITTALS

- A. Shop Drawings:
1. Shop Drawings shall be prepared in latest version of AutoCAD 2006 or later format with electronic copies submitted along with full sized Shop Drawings.
 2. Shop Drawings shall indicate typical wire connections and cable types, keypad locations, and all main and remote panels. Provide wiring schematics including point-to-point, terminal strips, connections to batteries, and power supplies, including the estimated anticipated wiring lengths required for all connection points (i.e., zone and system communications bus runs) within the system. Indicate interfaces to equipment furnished by others.

3. Submit dimensioned Shop Drawings indicating mechanical layout of all card access equipment, including cabinets and interconnecting conduit for the main panel, typical remote panel, keypad, and indicator locations, identifying all parts by manufacturer and part number.
 4. Shop Drawings shall be accompanied by engineering documentation including:
 - a. Floor Plans indicating all components, raceways, and terminal boxes and cabling.
 - b. Riser diagram indicating all connections in a manner following the floor plan layout.
 - c. Cabling diagram indicating the Contractor's designed routing and number of cables in specific raceways or conduits, from the main panel connecting to other sub-panels, modules, or devices. Diagram shall include length, in wire feet, and capacitance calculation charts for all cables.
- B. Warranty Requirements:
1. Contractor shall warranty that all materials furnished shall be free from defects of material for a period of one year excluding specific items of work that require a warranty of a greater period that may be set forth in this Specification. Contractor shall warranty that workmanship for a period of one year from date of Final Completion, excluding specific items of work that require a warranty of a greater period that may be set forth in this Specification. Immediately upon receipt of written notice from the Owner, the Contractor shall repair or replace at no expense to the Owner, any defective material or work that may be discovered before final acceptance of work or within the warranty period; any material or work damaged thereby; and adjacent material or work that may be displaced in repair or replacement. Examination of or failure to examine work by the Owner shall not relieve Contractor from these obligations.

PART 2 PRODUCTS

2.1 MATERIALS, PRODUCTS, EQUIPMENT, MANUFACTURED UNITS

- A. Raceways
1. General:
 - a. Provide raceways (conduits, wireways, pull boxes, J-hooks, outlet boxes, etc.) in compliance with the requirements of the card access manufacturer, Section Conduit for Electrical Systems, and Section Outlet Boxes.
 2. Conduit:
 - a. Provide conduit sized and based on fill in accordance with the NEC. Minimum size of conduit is to be 1 inch.
 - b. Provide pull cords in all raceway installed without cable.
 3. J-Hooks:
 - a. Provide J-hooks in accordance with the NEC, EIA/TIA requirements for structured cabling systems. All cable supports shall be UL listed.
 - i. Design Selection: Enrico Caddy or J-Hook
 4. Boxes:
 - a. Provide boxes sized as required by the system manufacturer and the NEC for cables and/or devices installed.
- B. Conduit and Boxes
1. Provide and install the building and floor distribution cabinets for each building according to the following criteria:
 - a. There must be one of these main cabinets within 300 feet of a door access reader.

- b. Each cabinet shall feed a minimum of eight controlled devices (access readers) and the cabinet can be located on any floor in an MDF or IDF room. It does not have to be located on the same floor as the controlled devices.
 - c. The main cabinet can serve as the distribution cabinet for its area of eight door access readers.
 - d. Minimum conduit size shall be 1 inch. No conduit shall be installed more than 150 feet without a pull box.
 2. Provide 1 inch conduits if needed from the distribution cabinets and distribute to feed the junction and mounting boxes for each device.
 - a. If a separate 120V feed is needed at any device, a separate conduit will be needed.
 - b. Each separate 1 inch feed will supply no more than one Controlled Device/Card Reader Feed locations however if multiple devices are being installed in the same area, conduit sizes will need to be increased.
 3. Provide and extend conduit to feed 2 inch x 4 inch x 2 1/8 inch flush mounted boxes with single gang mud ring and weatherproof covers; mounted with the opening vertical, at all designated card reader locations.
 - a. Locate to the strike side of single doors, and as designated for double doors, and gates.
 - b. Center 42 inches above finished floor/grade.
 - c. Exact location to be determined during plan review.
 4. Provide a 2 inch x 4 inch x 2 1/8 inch card access feed junction box with cover at the interior side of all designated card access door locations.
 - a. If the area location has removable ceiling tiles, the box shall be located above the tile.
 - b. If the location has a structure of fixed ceiling material, then flush-mount the box with a square to round mud ring and cover
 - c. Both boxes from a) and b) above shall be connected. Also if door is a double door an additional single gang box will be installed, connected and centered on the top of the door frame.
 5. Provide a 1 inch conduit from the AMAG control box to the closet network switch if conduit is determined to be needed.
 6. Cable:
 - a. Provide at each card reader location, a single home run cable to the locations to be identified in the drawings. The cable for the Card Access System shall be Belden # 658AFS or manufacturer recommended equivalent.
 - b. Provide between Access Control Panel and Access Control Terminal Cabinet one (1) Belden # 9502 cable or manufacturer recommended equivalent.
 - c. Card Access system cables installed in interior, exterior and/or underground raceways shall comply with the applicable section of the NEC.
 7. Power Feeds:
 - a. Provide a double duplex, dedicated 120-volt clean power receptacle adjacent to the lower portion of the main terminal cabinet and each distribution cabinet.
 8. Surge Suppression:
 - a. Provide surge suppression equipment listed by Underwriters' Laboratories, bearing the UL seal, and marked accordingly. Surge suppression equipment is to be UL listed and labeled for the intended use.

PART 3 EXECUTION

3.1 FIELD QUALITY CONTROL

- A. Training of the School's administrative and maintenance personnel is required in cooperation with the District's Representative.
 - 1. Engage a factory-authorized service representative to inspect, test, and adjust components, assemblies, and equipment installations, including connections, and to assist in field testing.
 - 2. Report results in writing.
- B. Startup Service:
 - 1. Engage a factory-authorized service representative to perform startup service in accordance with the manufacturer's requirements.
 - a. Complete installation and startup checks according to manufacturer's written instructions.
 - b. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.
 - c. Report results in writing.
- C. Adjusting
 - 1. When requested within 12 months of date of Substantial Completion, provide on-site assistance in adjusting system to suit actual occupied conditions. Provide up to three visits to site during other-than-normal occupancy hours for this purpose. These visits are not be considered as "warranty calls."

3.2 ERECTION TOLERANCES

- A. Install system in accordance with NECA "Standard of Installation" and Divisions 26 and 28.
- B. Permanently label all conduits as to plan room number destination, at all terminal cabinets.
- C. Install 200 lb strength pull string throughout the conduit system.
- D. The Card Access System shall be independent and shall not interconnect with or be used by any other system.
- E. Mount all junction boxes located above the ceiling with the opening facing down unless mounted to the wall above the ceiling, and with a reasonable immediate access pathway provided.
 - 1. Note: The requiring of removing of a light fixture or other similar ceiling equipment is not a reasonable access pathway.
- F. All conduit runs shall be as direct as possible in order to save on wiring costs and to reduce poor performance due to cable loss.
- G. Refer to Section Door Hardware for Card Access Door preparation.
- H. The Contractor shall be advised that the circuit routing for the card access system may not be shown on the project drawings and that he is responsible to install all raceways, wiring and cabling for a complete and fully functional system.
- I. General:
 - 1. The Contractor shall provide and install the card access system (including raceways, pull and back boxes, and wire) in accordance with the Card Access System manufacturer's requirements.

2. The Contractor shall size and route raceways to accommodate the proper installation of the system cabling. T-tapped cabling is not acceptable.
3. Where raceway and/or conduit is not accessible after completion of the project, conduit shall be routed from device to device or fire rated access panels shall be installed to provide access to junction and pull boxes.
4. Device to device wiring is only to be acceptable where the wiring scheme of the system, as recommended by the manufacturer, requires cable to pass from device to device.
5. Termination of devices is to be in accordance with manufacturer's requirements.
6. Install Card Access System wiring with at least 12 inches of separation from line voltage power wiring on parallel runs. Wiring crossing power circuits shall be at right angles. For metal enclosed electric light or power or Class 1 circuits, separation may be reduced as described in the National Electrical Code. Increase separation if so required to comply with EIA/TIA referenced standards.
7. Each Card Access System outlet shall have splice-free cables homerun to the respective control panel in the associated Main/Intermediate Distribution Frame (MDF/IDF) at the communication equipment room (CER), communication closet (CC), or communication panel (CP) as indicated on the drawings. Each cable shall be tagged at each end.
8. Provide a minimum of three-hundred (300) access cards in addition to the original compliment required by the Owner.

3.3 DEMONSTRATION

- A. Training of the School's Administrative and Maintenance Personnel is required in cooperation with the District's Representative:
- B. Engage a factory-authorized service representative to train school administrative and maintenance personnel to adjust, operate, and maintain Card Access System. Refer to Division 01 Section Closeout Procedures for information regarding Demonstration and Training.

END OF SECTION

SECTION 28 31 00
FIRE ALARM AND SMOKE DETECTION SYSTEMS

PART 1: GENERAL

1.1 SCOPE

- A. The work covered under this section of the specification includes the provision of all labor, materials, and supervision necessary to install and test a Fire Alarm System, associated devices, and components in the project. This shall include, but not be limited to provision of the following:
- Control Panel
 - Voice Alarm Panel
 - Terminal Cabinet
 - Pull Stations
 - Heat Detectors
 - Area Smoke Sensors
 - Strobe Lights
 - Audible/Strobe Combinations
 - Programming
 - System Start-up, Test
 - Supervisory Switches
 - Remote Annunciators
 - Duct Smoke Detectors and Test Switches
 - Water Flow Switches
 - Magnetic Door Holders

1.2 DESCRIPTION

- A. The system installed under this contract shall be able to communicate with and report to the existing 'Siemens' fire alarm system serving the entire building. Provide all zone modules, power supplies, programming, etc. as required for an approved, fully functional system. All components of the system must be listed by Underwriters Laboratories (U.L.).
- B. All duct detectors shall be equipped with test switches and annunciator light.
- C. Conduit fill shall not exceed 40%.
- D. All fire alarm devices shall be white. All conduit junction boxes and couplings will be painted RED and marked "FA" in white.
- E. All wiring entering and leaving the panel and junction boxes will be permanently labeled in such a manner as to indicate the type of device and its location.
- F. All wires that leave or enter the panel from outside the building must have surge and transient protection at the panel with devices that will limit the voltage to no more than 10% above the peak operating voltage of the devices connected to the wires.
- G. The system shall provide a three-pulse temporal signal to the horns or voice evacuation system. A switch shall be provided on the control panel for silencing the alarm devices. Any additional incoming alarm shall operate normally. Each alarm shall be represented on the control panel by an audio and visual indication.
- H. See attached list of acceptable and pre-approved equipment.

1.3 QUALITY ASSURANCE AND WARRANTY

- A. Perform all work in accord with the following codes and standards:
 - 1. Federal, State, and local codes, regulations, and ordinances.
 - 2. National Electrical Code (NEC), latest edition.
 - 3. Occupational Safety and Health Act (OSHA).
 - 4. All authorities having jurisdiction.
 - 5. Factory Mutual system (FM) requirements.
 - 6. EIA, Electronics Institute of America.
 - 7. UL, Underwriters Laboratories.
 - 8. American Disability Act (ADA).
 - 9. National Fire Alarm Code NFPA 72
 - 10. Life Safety Code (NFPA 101).
- B. System Warranty: All components, parts, assemblies, and software shall be guaranteed against defects in material and workmanship for a period of at least 12 months, beginning on the date of acceptance by the local Fire Marshall and the Owner's designated representative. Warranty service shall be provided by a manufacturer's authorized representative 24 hours per day, 7 days per week. The representative shall be based in a fully staffed branch office located within one (1) hour travel time of the installation site and respond within this time. All repairs performed during the warranty period must be non-chargeable for labor, material, and travel time. All repairs performed during the warranty period shall be completed within the time limitations imposed by NFPA rules. The initial fire alarm call will be handled by the Owner who will assess the problem and notify the vendor of corrective actions required.

1.4 SUBMITTALS

- A. At completion of project, prior to final payment provide to Owner copies of the following:
 - 1. Manufacturer's installation diagrams, written product specifications, and instructions for installation, operation, and maintenance.
 - 2. Manufacturer's published product warranties and warranty instructions.
 - 3. Point to point wiring diagrams for devices/circuits added under this contract. (2 sets)
 - 4. Data sheets on each item of equipment.
 - 5. List of device location indicating specific zone designation. (2 sets)
 - 6. List of all programming and access codes associated with the panel. (2 sets)
 - 7. Supply all software required to program/re-program fire alarm panel/components, dialers and any other device required for operation of the system.
- B. At the Fire Alarm Panel(s), install the following:
 - 1. Plan drawings (1/16" = 1'-0" or larger as required for clarity), modified to include new equipment, showing location of automatic detectors and manual pull stations. Drawings shall be professionally drawn on suitable drafting medium 8.5" x 11" and shall reflect the system as installed. Devices shall be numbered in a manner that reflects the ZONE/DEVICE location.
 - 2. A Certificate of Completion as required by NFPA.
 - 3. A Certificate of Inspection, showing a completed 100% test, as required by NFPA.

1.5 SYSTEM OPERATION

- A. System Supervision:
1. Initiation Circuits: The occurrence of an open circuit in the initiation circuit shall cause a trouble indication. The occurrence of a ground condition in the initiation circuit shall cause a trouble and a panel ground fault indication. A single open circuit or a single ground condition, or both at the same time on the same initiation circuit, shall not inhibit the panel from recognizing an alarm condition from any other initiation device on that same circuit or any other circuit.
 2. Signal Circuits: The occurrence of an open circuit in a signal circuit cause a signal zone trouble indication. The occurrence of a ground condition in a signal circuit shall cause a signal zone trouble indication and a panel ground fault indication. A single ground in a signal circuit shall not inhibit the signals from working properly.
 3. Remote Annunciator: Shall be supervised as required for signal circuits, and be of LCD design, with alpha-numeric display.
 4. The system shall detect the following conditions:
 - a. Loss of primary and/or secondary operating power.
 - b. A single ground, open, or short on any installation wiring to supervisory or alarm initiating devices.
 - c. A single ground, open or short on any installation wiring to the system speakers, remote supervised annunciator, and remote telephone station.
 - d. Failure of a tone generator, pre-amplifier, or power amplifier in the audio subsystem.
 5. If any of the above faults develop, the system shall produce both an audible and visual trouble signal at the Fire Alarm Control Panel (FACP) and/or the remote annunciator.
 6. If the switch of a supervisory device is operated, the system shall product audible and visible supervisory signals at the Fire Alarm Control Panel and Remote Annunciator.
- B. Alarm Initiating Devices: If an alarm initiating device is activated, the following responses shall automatically occur:
1. Visual indications shall identify the specific device in alarm, and common audible and visual alarm signals shall be generated by the Fire Alarm Control Panel.
 2. An audio indication shall produce a message to the speakers sufficient to product an audio signal 15db over ambient noise.
 3. Auxiliary relays shall be installed to accommodate accessories such as: air-handler shutdown, vent fans (etcetera), to match the design of the system, as required by NFPA standards and rules.
 4. Each device shall be a measured device having the capability to send measured and intelligent signals back to the panel stating the condition of the device (e.g. measured level of obscuration, measure particles of dirt/dust and measured temperature levels).
- C. Alarm/Trouble Silencing:
1. The general alarm devices may be silenced only by entering a locked control cabinet and operating the proper silencing switch. However, a subsequent alarm shall reactive the signals. Operation of the silencing switch shall be indicated by a trouble light and an audible signal.

2. Power failure, opens, grounds, or an interruption of the system wiring or components, shall be indicated by a visual and audible trouble signal. The audible trouble signal may be silenced, however, the visual trouble indications shall remain illuminated until the system has been returned to a normal operating condition.

1.6 OPERATION AND MAINTENANCE DATA

- A. Submit data under provision of Division One.
- B. Include operating instructions, and maintenance and repair procedures.
- C. Include manufacturer representative's letter stating that system is operational.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Deliver products to site under provisions of Division One.
- B. Store and protect products under provisions of Division One.

PART 2 PRODUCTS

2.1 FIRE ALARM AND SMOKE DETECTION CONTROL PANEL

- A. Control Panel: The control panel shall provide power, annunciation, supervision, and control for the detection and alarm system and shall be modular in construction and contain all modules necessary to operate according with this section.
 1. The detection system shall remain 100% operational and capable of responding to an alarm condition while in the routine maintenance mode.
 - a. The system shall be capable of having the entire total number of detection devices in alarm at the same time, without any loss of function.
 - b. The control panel shall be capable of supporting non-addressable as well as addressable detection devices.
 - c. The panel annunciator shall be a minimum, 32-character alphanumeric display, providing an optional user definable message associated with each detection device or zone.
 2. The control system shall provide the supervision of system electronics, wiring, devices, and software.
 - a. Monitor for the failure of system hardware or wiring with an independent hardware watchdog, which will indicate their failure.
 - b. The system shall provide failsafe operation, i.e. incoming alarms shall automatically override all other modes of operation, and the panel shall automatically return to normal operating mode from any operator initiated mode.
 - c. Provide ground fault detection for all initiating and audible circuits.
 3. Provide lamp test capability to test all visual panel indicators and associated software.
 - a. Make provisions for remote trouble and remote alarm silencing switches.
 - b. The control panel shall be equipped with a silence before reset feature, designed to prevent accidental system reset during an alarm condition.
 4. The system alarm lamp shall flash upon receipt of any alarm condition.
 - a. Acknowledgement of the alarm by operation of the silence switch shall silence the audible alarm and cause the alarm lamp to light steadily.
 - b. Receipt of subsequent alarms shall cause the audible devices to resound and the alarm lamp to flash.

5. The system trouble lamp shall flash and an integral trouble buzzer shall sound upon the occurrence of any trouble condition.
 - a. Acknowledgement of the trouble condition by operation of the silence switch shall silence the audible alarm and cause the trouble lamp to light steadily.
 - b. Receipt of subsequent troubles shall cause the trouble buzzer to resound and the trouble lamp to flash.
6. Use the same pair of wires to perform the individual input and output device addressability.
 - a. The system shall be capable of having all addressable devices in alarm simultaneously.
7. The service mode shall permit the arming and disarming of individual input or output devices as well as manually operating output devices.
 - a. Provide one-step function switches to allow the disarming & arming of groups of inputs or outputs.
 - b. The control panel shall display the status of these devices upon command.
 - c. The panel shall automatically return to normal mode in the event the panel remains unattended in the service mode for more than 4-hours.
 - d. The panel shall be capable of receiving and processing alarms even when in the service mode.
8. The control shall operate from a three-wire 120 VA supply and internal 24V back-up battery.
 - a. Separately fuse all power connections whether AC or DC within the control unit.
 - b. Include light emitting diodes (LED's) to indicate (green) system power, (yellow) trouble, and (red) alarm; with trouble and alarm annunciated on an alphanumeric display, giving device number and location plus diagnosis of trouble.
 - c. Momentary contact switches shall provide for Locate, Next Alarm, Next Trouble, Acknowledge/Silence, and Reset.
 - d. An audible device shall sound within the control for alarm or trouble.
 - e. This device shall have two distinct sounds and shall be silenceable by the acknowledge/silence switch.
 - f. Alarms shall override any trouble condition.
9. The control CPU and power supply shall be capable of powering up to 960 addressable early warning detectors and up to 960 addressable auxiliary relays.
 - a. All system expansion modules shall interconnect through a card edge connector and shall require no inter-module wiring.
 - b. The control shall be capable of measuring and adjusting the sensitivity of detectors.
 - c. Provide an alphanumeric display, to display custom messages and give readings of detector sensitivity, detector by detector.
 - d. The system shall check each device on an addressable initiating circuit continuously for the following: sensitivity, response, open shorts, ground faults, functionality, and status.
 - e. The control CPU shall report the failure of a device's transmitting component(s) for open or shorts on an addressable initiating circuit.
 - f. Recognize and identify the device by location with the circuit to the specific device, and all other devices shall continue to function properly.
10. The control shall report, by specific device number, any device removed from an addressable initiating circuit and all other devices shall continue to function.
11. The control shall allow changing the status of configured circuits (arming or disarming and changing status of relays).

- a. If any change in status degrades system operation as configured, a trouble condition shall be reported and remain until system operation again meets configured status.
12. FACP shall include the necessary hardware to provide remote access via an Internet/Intranet Interface.
 - a. The Internet Interface shall provide an alternative access to system information using the familiar interface of a standard Internet browser.
 - b. Remotely located authorized personnel can use this access to analyze control panel status during non-alarm conditions and to assist responder during alarm conditions.
 - c. The Internet Interface shall provide single user access for multi-user accounts each with separate password.
 - i) Provide programmable lockout to prevent excessive login attempts by unauthorized users.
 - ii) Provide a built-in email feature that will automatically notify user accounts of individually selected status changes
 - iii) (i.e.: Alarm, Trouble, Supervisory, Sensor Sensitivity Status, and Historical Logs, for the same, on demand or via a selectable schedule-weekly, bi-weekly, or monthly).
13. The control panel shall allow for expansion and shall be configurable without system inter-wiring.
 - a. Leave 20% of points or addresses on each mapnet loop available for future additions on fire alarm system.
14. The manufacturer shall provide all system software, configuration software, licensing and required certification that is necessary.
15. The system shall have capability to provide a level III access to view all past trouble and alarm events on site.
16. The system shall be capable of providing a hardcopy written record of all alarms, troubles, and system activity by means of full carriage width terminal to print detection device designations and location messages on a single line of up to 128 characters wherein 32 are reserved for device or zone custom identification. Printer is not required.
17. New unacknowledged alarms and troubles shall be distinctively displayed on the visual display and differentiated from previous alarm and troubles.
18. The system shall automatically indicate the total quantity of alarms and of troubles, which have occurred prior to reset at the control unit.
19. No alarm or trouble indication shall be re-settable until acknowledged.
20. It shall not be possible to reset the system without acknowledging all alarms It shall be possible to display up to 250 alarms and up to 250 trouble indications, one at a time, on the digital annunciator, which shall be capable of listing, upon request:
 - a. Alarms with time, date, and location
 - b. Troubles with time, date, and location
 - c. Status of output functions, "on" or "off"
 - d. Sensitivity of addressable smoke detectors
 - e. Device number, type, and location
 - f. Status of remote relays, "on" or "off"
21. The fire alarm system's programmed database of initiation devices shall be "hard burned" (stored in permanent memory) not reliant on a power source of any form.
- B. Voice Alarm Panel: Provide and install a new voice alarm panel. System shall be capable of distributing voice messages throughout the building via an audio amplifier and fire alarm speakers. Provide the following features:
 1. Multiplexed audio wiring.
 2. Distributed audio.

3. Pre-recorded evacuation message using solid-state electronics. May provide different message or tones based on events.
 4. Remote All-Call page option.
 5. Medium system capacity.
 6. Multiple channel capability for up to 4 audio channels.
 7. Style Y or Style Z speaker circuit operation.
 8. Speaker and telephone on/off manual switches with custom labels.
 9. 30 watt and 120 watt audio amplifiers with switch-mode power supplies.
 10. All-call switch and indicator.
 11. Field configurable and programmable.
 12. Field recorded message option.
 13. Zone-coded voice options.
- C. Audio Amplifier: Provides up to 120 watts of 25 VRMS audio power, low-power standby mode for low battery drain, high-efficiency switched regulation, plug-in terminal strips and cable connectors, and 10-position level adjust and indicator LED's, and includes a built-in automatic tone generator (slow whoop on high/low).
- D. Include a digital communicator in the control panel capable of automatically transmitting alarm and trouble information, annunciated by device, via a Cat 6 cable, to the dispatcher located in PBX room.
- E. Power Supply: Adequate to serve control panel modules, remote detectors, remote annunciator(s), door holders, smoke dampers, relays, and alarm signaling devices and 20% spare capacity.
- F. Connect the system to the life safety branch of emergency generator.
1. The system shall have battery back up.
 2. Size the batteries to provide 24-hours of standby operation followed by five-minutes of alarm.
 3. Provide a dual rate battery charger, which is capable of recharging the batteries to 80% capacity in 12-hours.
 4. Loss of commercial power shall annunciate as a system trouble.
 5. System trouble shall indicate for over or under voltage conditions, blown fuse or disconnected batteries.
 6. The system shall indicate visually and audibly when operating from standby power.
 7. The system shall automatically restart upon the return of power.
- G. Detection Circuits:
1. Addressable device input supervisory modules capable of Class A or Class B supervision, Class B is allowed with the following conditions:
 - a. No more than 25 devices on one circuit
 - b. The end line resistors shall be located in the fire alarm terminal cabinets.
 - c. Any construction on an active campus requires hand excavation in locations within 10' of any known or suspected location of utility or wiring.
 2. Addressable devices shall be monitored, each device uniquely identifiable.
 3. Capable of supporting non-addressable initiating devices through installation of additional modules.
 4. Sized and programmed, suitable for all initiating devices connected to the system and an additional 100 possible future expansion devices.
- H. Signal Circuits:
1. Supervised march time signal modules, sufficient for signal devices connected to system and two additional unused circuits, tested, installed and programmed for future expansion.

- I. Remote Station Outputs: Provide a self-restoring relay to output common trouble conditions and a re-settable relay to output common alarm conditions to the Owner's security interface equipment.
- J. Auxiliary Relays: Provide sufficient SPDT auxiliary relay contacts to provide accessory functions specified.
- K. Supervised booster panels, or remote power supplies may be used to power and supervise the notification appliance circuits.
 - 1. Install Manufacturer recommended transient absorption devices at booster panels.
 - 2. Install remote booster panels or remote power supplies in electrical or mechanical rooms.
 - 3. Do not install fire alarm system equipment in locations that are not readily accessible.
 - 4. Connect booster panels and remote power supplies to the life safety branch of generator.

2.2 INITIATING DEVICES

- A. Manual Station: Semi-flush mounted, double action manual station equipped with an addressable interface module that interfaces the manual station and the addressable initiating circuit. It shall be field programmable. The double action product shall be self restoring and not a disposable component.
- B. Heat Detectors: NFPA 72; Combination rate-of-rise and fixed temperature, rated 135 degrees F and temperature rate of rise of 15 degrees F or (fixed only) 190 degree F as specified. Addressable and controlled by the system control panel. Each detector to be uniquely identifiable and be field programmed. Calibration and device identification monitored by the system control panel.
- C. Ceiling Mounted Smoke Detector: NFPA 72; Addressable detector that is controlled by the system control panel. Photoelectric type with adjustable sensitivity, plug-in base, auxiliary relay contact, integral thermal element rated 135 degrees F, and visual indication of detector actuation, suitable for mounting on 4 inch (100 mm) outlet box. Each detector shall be uniquely identifiable and can be field programmed. Calibration, device identification and sensitivity shall be monitored by the system control panel. The sensitivity controlled by the system control panel.
- D. Duct Mounted Smoke Detector: NFPA 72; photoelectric type with auxiliary SPDT relay contact, duct sampling tubes extending width of duct, and visual indication of detector actuation, in duct-mounted housing.

2.3 SIGNALING DEVICES

- A. Alarm Lights: NFPA 72; strobe lamp and flasher with red lettered FIRE on white lens. 2-3 (flash rate) per second. Strobes shall comply with ADA requirements and NFPA 72 placement requirements. If any one room or area contains more than 3 visual devices, flashing shall be synchronized.
- B. Alarm Speaker: NFPA 72; flush type with wall or ceiling trim plate (interior), surface type (exterior), fire alarm speaker. Sound Rating: 87 dB at 10 feet (3 m). As designated, provide additional integral strobe lamp and flasher with red lettered FIRE on white lens. (Strobes cannot be mounted on ceiling.)
- C. Remote Annunciator: Remote annunciator shall be 32 character LCD display type, similar to the annunciator in the FACP.
- D. Duct detector remote test switch: flush mounted with red L.E.D. to indicate remote (above ceiling or obscured from normal view) duct detectors alarm status. Normal - off, Alarm - on. Provide with magnetic test switch.

2.4 AUXILIARY DEVICES

- A. Waterflow Detector: Shall be suitable for installation into Schedule 10 and Schedule 40 Steel or Black Iron Pipe. Unit shall be sealed in metal enclosure, be provided with two SPDT switches, each with N.O. and N.C. contacts, have aluminum saddles, and steel U-bolts.
- B. Supervisory (tamper) Switch: Shall be suitable for installation on OSY, butterfly, and post-indicating valves with rising or falling flags. Unit shall be sealed in metal, weatherproof enclosure, be provided with two SPDT switches each with N.O. and N.C. contacts, and be suitable for use on 1" through 12" valves.
- C. Magnetic Door Hold Devices: Devices shall be suitable for flush mounting on walls, have 25 pounds holding force, and have an adjustable swivel contact plate.

2.5 SYSTEM RACEWAY

- A. Install all raceway necessary to provide specified equipment function and per print sheets as under the provisions of Sections 26 05 33, 26 05 34, and 26 05 53.
- B. All raceway for fire alarm system shall be rigid galvanized steel underground, painted with two (2) coats of bitumsatic paint RGS exposed below 4'-0" AFF, and EMT exposed above 4'-0" AFF. Flexible liquidtight conduit to duct detectors.
- C. Install ground rod and provide grounding bar and bond to the ground rod with solid #8 minimum wire. Grounding bar buss is to be used as earth potential for the installed transient protection devices.
- D. All fire alarm terminal boxes, panels and relay enclosures shall be permanently labeled in accordance with Section 26 05 53. (Fire Alarm)

2.6 FIRE ALARM WIRE AND CABLE

Note: Approved cabling not installed in conduit, may be used for fire alarm wiring as long as it complies with NEC Article 760, AHCA, and the local building authority.

- A. Fire Alarm Power Branch Circuits: Building wire as specified in Section 26 05 13.
- B. Initiating Circuits and Auxiliary Control: Building wire as specified in Section 26 05 13. Non-power limited fire-protective signaling cable, copper conductor, Class 1, 600 volt insulation and Article 760 of NEC Power limited circuits, Constructed in accordance with articles 318, 340, 500 & 501 of NEC. Passing VW-1 Vertical Flame Test. If stranded, (maximum of seven strands).
- C. Signal Circuits, and Annunciator point wiring: Building wire as specified in Section 26 05 13. 600 volt insulation, Type THWN stranded (maximum of 19 strands), and in accordance with NEC 310.
- D. Each separate circuit, initiation, signal, and auxiliary shall have a specific number. Label each conductor by this circuit number at the control connections and at each terminal connection in the terminal boxes.
- E. A grounding conductor shall be installed through the entire conduit system and bonded to each device, junction box, terminal box, and control panel.

2.7 APPROVED EQUIPMENT

- A. Manufacturers listed below are acceptable under this contract, contingent upon their compatibility with the main fire alarm control panel. It shall be the Contractor's responsibility to coordinate and verify this compatibility.

1. Simplex
2. Notifier
3. EST

PART 3 EXECUTION

3.1 INSTALLATION

- A. Install system in accordance with manufacturer's instructions.
- B. Install manual station with operating handle 48 inches above finished floor. Install audible and visual signal devices 90 inches above finished floor.
- C. Waterflow switches and tamper switches shall be provided by the Division 26 Contractor, installed by the Division 23 Contractor, and wired by the Division 26 Contractor. Contractors shall coordinate as required.
- D. Make conduit and wiring connections to door release devices, sprinkler flow switches, sprinkler valve tamper switches, fire suppression system control panels, duct smoke detectors, and all other specified peripherals.
- E. Automatic Detector Installation shall be in compliance with NFPA-72.
- F. Fire Alarm equipment mounting boxes shall house only the wiring pertinent to the equipment mounted on the box and are not to be used as junction points or run through pathways.
- G. All exterior equipment, mounting boxes and junction boxes shall be installed with all precautions necessary to insure the wiring and equipment being "weatherproof".
- H. Install Manufacturer recommended transient absorption MOV's from field wiring to ground plane for all circuit conductors, (NOT just those circuits that exit the building).
- I. All wiring shall be in conduit (see note in paragraph 2.6).
- J. There shall be no splices made in any wiring.
- K. All terminations, other than at devices, shall be made in terminal cabinets, wall mounted in electrical rooms or equipment spaces. (No terminations shall be made in boxes above the ceiling.)
- L. All visual indicating circuits shall be wired on a separate circuit independent of horn/speaker circuits. All strobe circuits, during an alarm condition, shall have the option of remaining active after a signal silence and only turn off on a panel reset or turning off after the signal silence is activated.
- M. All fire alarm junction/pull/device boxes shall be red.

3.2 FIELD QUALITY CONTROL

- A. Field inspection and testing will be performed under provisions of Division One.
- B. Test in accordance with NFPA 72 and additional owner requirements.

3.3 MANUFACTURER'S FIELD SERVICES

- A. Provide manufacturer's field services under provisions of Division One.
- B. Include services of certified technician to supervise installation, adjustments, final connections, and system testing and field service certification per NFPA 72A. Services shall also include on-site presence of a trained factory technician during the final inspection.

3.4 SYSTEM TESTING & ACCEPTANCE

- A. It is the responsibility of the vendor to meet with the appropriate Owner's representative to compare the placement and installation of proper devices with the drawings and specifications (as-built prints must be furnished to the Owner). A 100% device by device test shall be conducted by the vendor under the supervision of the Owner. Punch lists will be developed at this time by Owner's representative and furnished to the vendor. All punch list items must be corrected and verified as such by the Owner, prior to acceptance of the system.
- B. Vendor shall have manufacturer's trained technician present for final AHCA survey. Coordinate time and date with Contractor. At the survey, provide sensitivity test reports with the required range for all smoke and duct detectors installed in the project area. Also provide an approved 'Record of Completion' for the fire alarm system at the final AHCA survey.

3.5 TRAINING

- A. The Contractor and/or manufacturer's representative shall instruct the Owner's representative in the operation, maintenance, and repair of the system to the sub-assembly level, including familiarization with the operation, maintenance, and parts manual.

3.6 SPARE PARTS

- A. A spare parts inventory equal to ten (10) percent of the total number of each of the smoke detectors, heat detectors, speakers, pull stations, and strobes shall be supplied to the Owner, prior to acceptance.

END OF SECTION

32

DIVISION

EXTERIOR IMPROVEMENTS

SECTION 32 13 13
CONCRETE SIDEWALKS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. The provisions of the General Conditions, Supplementary Conditions, Drawings, Specifications, and the Sections included under Division 1, General Requirements and References are included as a part of this Section as though bound herein.

1.2 SUMMARY

- A. Section Includes:
 - 1. Provide labor, material, services, and equipment necessary to furnish and install work as indicated and as specified herein, which includes, but is not limited to:
 - a. Sidewalks.

1.3 REFERENCES

- A. ACI 117 – Standard Tolerances for Concrete Construction and Materials.
- B. ACI 211.1 – Standard Practice for Selecting Proportions for Normal, Heavyweight, and Mass Concrete.
- C. ACI 304R – Guide for Measuring, Mixing, Transporting, and Placing Concrete.
- D. Concrete Reinforcing Steel Institute, "Manual of Standard Practice.
- E. ACI 308 – Standard Practice for Curing Concrete.
- F. ACI347R – Guide to Formwork for Concrete.
- G. ASTM A185 – Standard Specification for Carbon-Steel Wire and Welded Wire Reinforcement, Plain and Deformed, for Concrete.
- H. ASTM C33/C33M – Standard Specification for Concrete Aggregates.
- I. ASTM C150/C150M – Standard Specification for Portland Cement.
- J. ASTM C494 – Specification for Chemical Admixtures for Concrete.
- K. FBC – Florida Building Code.

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Design Mixtures: For each concrete sidewalk mixture. Include alternate design mixtures when characteristics of materials, Project conditions, weather, test results, or other circumstances warrant adjustments.

1.5 INFORMATIONAL SUBMITTALS

- A. Material Certificates: For the following, from manufacturer:
 - 1. Cementitious materials.
 - 2. Steel reinforcement and reinforcement accessories.
 - 3. Fiber reinforcement.
 - 4. Admixtures.
 - 5. Curing compounds.
 - 6. Joint fillers.

1.6 QUALITY ASSURANCE

- A. Ready-Mix-Concrete Manufacturer Qualifications: A firm experienced in manufacturing ready-mixed concrete products and that complies with ASTM C 94/C 94M requirements for production facilities and equipment.
 - 1. Manufacturer certified according to NRMCA's "Certification of Ready Mixed Concrete Production Facilities" (Quality Control Manual - Section 3, "Plant Certification Checklist").

1.7 FIELD CONDITIONS

- A. Hot-Weather Concrete Placement: Comply with ACI 301 (ACI 301M) and as follows when hot-weather conditions exist:
 - 1. Cool ingredients before mixing to maintain concrete temperature below 90 deg F (32 deg C) at time of placement. Chilled mixing water or chopped ice may be used to control temperature, provided water equivalent of ice is calculated in total amount of mixing water. Using liquid nitrogen to cool concrete is Contractor's option.
 - 2. Cover steel reinforcement with water-soaked burlap, so steel temperature will not exceed ambient air temperature immediately before embedding in concrete.

PART 2 - PRODUCTS

2.1 CONCRETE, GENERAL

- A. ACI Publications: Comply with ACI 301/ 301M unless otherwise indicated.

2.2 FORMS

- A. Form Materials: Plywood or other approved panel-type materials to provide full-depth, continuous, straight, and smooth exposed surfaces.
 - 1. Use flexible or uniformly curved forms for curves with a radius of 100 feet or less.
- B. Form-Release Agent: Commercially formulated form-release agent that will not bond with, stain, or adversely affect concrete surfaces and that will not impair subsequent treatments of concrete surfaces.

2.3 STEEL REINFORCEMENT

- A. Plain-Steel Welded-Wire Reinforcement: ASTM A 1064/A 1064M, fabricated from galvanized-steel wire into flat sheets.

2.4 CONCRETE MATERIALS

- A. Cementitious Materials: Use the following cementitious materials, of same type, brand, and source throughout Project:
 - 1. Portland Cement: ASTM C 150/C 150M
- B. Normal-Weight Aggregates: ASTM C 33/C 33M, uniformly graded. Provide aggregates from a single source.
 - 1. Maximum Coarse-Aggregate Size: 3/4 inch nominal.
 - 2. Fine Aggregate: Free of materials with deleterious reactivity to alkali in cement.
- C. Air-Entraining Admixture: ASTM C 260/C 260M.

- D. Chemical Admixtures: Admixtures certified by manufacturer to be compatible with other admixtures and to contain not more than 0.1 percent water-soluble chloride ions by mass of cementitious material.
 - 1. Water-Reducing Admixture: ASTM C 494/C 494M, Type A.
 - 2. Retarding Admixture: ASTM C 494/C 494M, Type B.
 - 3. Water-Reducing and Retarding Admixture: ASTM C 494/C 494M, Type D.
 - 4. High-Range, Water-Reducing Admixture: ASTM C 494/C 494M, Type F.
 - 5. High-Range, Water-Reducing and Retarding Admixture: ASTM C 494/C 494M, Type G.
 - 6. Plasticizing and Retarding Admixture: ASTM C 1017/C 1017M, Type II.
- E. Water: Potable and complying with ASTM C 94/C 94M.

2.5 FIBER REINFORCEMENT

- A. Synthetic Fiber: Monofilament polypropylene fibers engineered and designed for use in concrete, complying with ASTM C 1116/C 1116M, Type III.

2.6 CURING MATERIALS

- A. Moisture-Retaining Cover: ASTM C 171, polyethylene film or white burlap-polyethylene sheet.
- B. Water: Potable.

2.7 RELATED MATERIALS

- A. Joint Fillers: ASTM D 1751, asphalt-saturated cellulosic fiber in preformed strips.

2.8 CONCRETE MIXTURES

- A. Prepare design mixtures, proportioned according to ACI 301, for each type and strength of normal-weight concrete, and as determined by either laboratory trial mixtures or field experience.
 - 1. When automatic machine placement is used, determine design mixtures and obtain laboratory test results that comply with or exceed requirements.
- B. Cementitious Materials:
 - 1. Fly Ash or Pozzolan: 25 percent.
 - 2. Slag Cement: 50 percent.
 - 3. Combined Fly Ash or Pozzolan, and Slag Cement: 50 percent, with fly ash or pozzolan not exceeding 25 percent.
- C. Add air-entraining admixture at manufacturer's prescribed rate to result in normal-weight concrete at point of placement having an air content as follows:
 - 1. Air Content: 2-1/2 percent plus or minus 1-1/2 percent for 1-1/2-inch nominal maximum aggregate size.
- D. Limit water-soluble, chloride-ion content in hardened concrete to 0.15 percent by weight of cement.
- E. Chemical Admixtures: Use admixtures according to manufacturer's written instructions.
 - 1. Use water-reducing admixture in concrete as required for placement and workability.
 - 2. Use water-reducing and retarding admixture when required by high temperatures, low humidity, or other adverse placement conditions.

- F. Synthetic Fiber: Uniformly disperse in concrete mixture at manufacturer's recommended rate, but not less than 1.0 lb/cu. yd. (0.60 kg/cu. m).
- G. Concrete Mixtures: Normal-weight concrete.
 - 1. Compressive Strength (28 Days): 3500 psi.
 - 2. Maximum W/C Ratio at Point of Placement: 0.45.
 - 3. Slump Limit: 5 inches

2.9 CONCRETE MIXING

- A. Ready-Mixed Concrete: Measure, batch, and mix concrete materials and concrete according to ASTM C 94/C 94M and ASTM C 1116/C 1116M. Furnish batch certificates for each batch discharged and used in the Work.
 - 1. When air temperature is between 85 and 90 deg F, reduce mixing and delivery time from 1-1/2 hours to 75 minutes; when air temperature is above 90 deg F, reduce mixing and delivery time to 60 minutes.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine exposed subgrades and subbase surfaces for compliance with requirements for dimensional, grading, and elevation tolerances.
- B. Proof-roll prepared subbase surface below concrete sidewalks to identify soft pockets and areas of excess yielding.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Remove loose material from compacted subbase surface immediately before placing concrete.

3.3 EDGE FORMS AND SCREED CONSTRUCTION

- A. Set, brace, and secure edge forms, and intermediate screed guides to required lines, grades, and elevations. Install forms to allow continuous progress of work and so forms can remain in place at least 24 hours after concrete placement.
- B. Clean forms after each use and coat with form-release agent to ensure separation from concrete without damage.

3.4 STEEL REINFORCEMENT INSTALLATION

- A. General: Comply with CRSI's "Manual of Standard Practice" for fabricating, placing, and supporting reinforcement.
- B. Install welded-wire reinforcement in lengths as long as practicable. Lap adjoining pieces at least one full mesh, and lace splices with wire. Offset laps of adjoining widths to prevent continuous laps in either direction.

3.5 JOINTS

- A. General: Form construction, isolation, and contraction joints and tool edges true to line, with faces perpendicular to surface plane of concrete. Construct transverse joints at right angles to centerline unless otherwise indicated.
 - 1. When joining existing sidewalks, place transverse joints to align with previously placed joints unless otherwise indicated.
- B. Construction Joints: Set construction joints at locations where sidewalk operations are stopped for more than one-half hour.
 - 1. Continue steel reinforcement across construction joints unless otherwise indicated. Do not continue reinforcement through sides of sidewalk strips unless otherwise indicated.
 - 2. Keyed Joints: Provide preformed keyway-section forms or bulkhead forms with keys unless otherwise indicated. Embed keys at least 1-1/2 inches into concrete.
- C. Isolation Joints: Form isolation joints of preformed joint-filler strips abutting concrete curbs, catch basins, manholes, inlets, structures, other fixed objects, and where indicated.
 - 1. Locate expansion joints at intervals of 50 feet on center unless otherwise indicated.
 - 2. Extend joint fillers full width and depth of joint.
 - 3. Place top of joint filler flush with finished concrete surface.
 - 4. Furnish joint fillers in one-piece lengths.
- D. Contraction Joints: Form weakened-plane contraction joints at 10'-0" on center, sectioning concrete into areas as indicated. Construct contraction joints for a depth equal to at least one-fourth of the concrete thickness with either method, as follows:
 - 1. Grooved Joints: Form contraction joints after initial floating by grooving and finishing each edge of joint with grooving tool to a 3/8-inch radius. Repeat grooving of contraction joints after applying surface finishes.
 - a. Tolerance: Ensure that grooved joints are within 3 inches either way from centers of dowels.
 - 2. Sawed Joints: Form contraction joints with power saws equipped with shatterproof abrasive or diamond-rimmed blades. Cut 1/8-inch wide joints into concrete when cutting action will not tear, abrade, or otherwise damage surface and before developing random contraction cracks.
 - a. Tolerance: Ensure that sawed joints are within 3 inches either way from centers of dowels.
- E. Edging: After initial floating, tool edges of sidewalk, gutters, curbs, and joints in concrete with an edging tool to a 3/8-inch radius. Repeat tooling of edges after applying surface finishes.

3.6 CONCRETE PLACEMENT

- A. Before placing concrete, inspect and complete formwork installation.
- B. Moisten subbase to provide a uniform dampened condition at time concrete is placed. Do not place concrete around manholes or other structures until they are at required finish elevation and alignment.
- C. Comply with ACI 301 (ACI 301M) requirements for measuring, mixing, transporting, and placing concrete.
- D. Do not add water to concrete during delivery or at Project site. Do not add water to fresh concrete after testing.
- E. Deposit and spread concrete in a continuous operation between transverse joints. Do not push or drag concrete into place or use vibrators to move concrete into place.
- F. Consolidate concrete according to ACI 301 (ACI 301M) by hand spading, rodding, or tamping.
- G. Screed sidewalk surface with a straightedge and strike off.

- H. Commence initial floating using bull floats or darbies to impart an open-textured and uniform surface plane before excess moisture or bleedwater appears on the surface. Do not further disturb concrete surfaces before beginning finishing operations or spreading surface treatments.
- I. Curbs and Gutters: Use design mixture for automatic machine placement. Produce curbs and gutters to required cross section, lines, grades, finish, and jointing.

3.7 FLOAT FINISHING

- A. General: Do not add water to concrete surfaces during finishing operations.
- B. Float Finish: Begin the second floating operation when bleedwater sheen has disappeared and concrete surface has stiffened sufficiently to permit operations. Float surface with power-driven floats or by hand floating if area is small or inaccessible to power units. Finish surfaces to true planes. Cut down high spots and fill low spots. Refloat surface immediately to uniform granular texture.
 - 1. Medium-to-Coarse-Textured Broom Finish: Provide a coarse finish by striating float-finished concrete surface 1/16 to 1/8 inch deep with a stiff-bristled broom, perpendicular to line of traffic.

3.8 DETECTABLE WARNING INSTALLATION

- A. Stamped Detectable Warnings: Install stamped detectable warnings as part of a continuous concrete paving placement and according to stamp-mat manufacturer's written instructions.
 - 1. Before using stamp mats, verify that the vent holes are unobstructed.
 - 2. Apply liquid release agent to the concrete surface and the stamp mat.
 - 3. Stamping: While initially finished concrete is plastic, accurately align and place stamp mats in sequence. Uniformly load, gently vibrate, and press mats into concrete to produce imprint pattern on concrete surface. Load and tamp mats directly perpendicular to the stamp-mat surface to prevent distortion in shape of domes. Press and tamp until mortar begins to come through all of the vent holes. Gently remove stamp mats.
 - 4. Remove residual release agent according to manufacturer's written instructions, but no fewer than three days after stamping concrete. High-pressure-wash surface and joint patterns, taking care not to damage stamped concrete. Control, collect, and legally dispose of runoff.

3.9 CONCRETE PROTECTION AND CURING

- A. General: Protect freshly placed concrete from premature drying and excessive cold or hot temperatures.
- B. Comply with ACI 306.1 for cold-weather protection.
- C. Begin curing after finishing concrete but not before free water has disappeared from concrete surface.
- D. Curing Methods: Cure concrete by moisture curing or moisture-retaining-cover curing or a combination of these as follows:
 - 1. Moisture Curing: Keep surfaces continuously moist for not less than seven days with the following materials:
 - a. Water.
 - b. Continuous water-fog spray.
 - c. Absorptive cover, water saturated and kept continuously wet. Cover concrete surfaces and edges with 12-inch lap over adjacent absorptive covers.

2. Moisture-Retaining-Cover Curing: Cover concrete surfaces with moisture-retaining cover, placed in widest practicable width, with sides and ends lapped at least 12 inches and sealed by waterproof tape or adhesive. Immediately repair any holes or tears occurring during installation or curing period, using cover material and waterproof tape.

3.10 SIDEWALK TOLERANCES

- A. Comply with tolerances in ACI 117 (ACI 117M) and as follows:

1. Elevation: 3/4 inch.
2. Thickness: Plus 3/8 inch, minus 1/4 inch.
3. Joint Spacing: 3 inches.
4. Contraction Joint Depth: Plus 1/4 inch, no minus.

3.11 REPAIR AND PROTECTION

- A. Remove and replace concrete sidewalk that is broken, damaged, or defective or that does not comply with requirements in this Section. Remove work in complete sections from joint to joint unless otherwise approved by Architect.
- B. Protect concrete sidewalk from damage. Exclude traffic from sidewalk for at least 14 days after placement. When construction traffic is permitted, maintain sidewalk as clean as possible by removing surface stains and spillage of materials as they occur.
- C. Maintain concrete sidewalk free of stains, discoloration, dirt, and other foreign material. Sweep sidewalk not more than two days before date scheduled for Substantial Completion inspections.

END OF SECTION 32 13 13

CITRUS GROVE ELEMENTARY SCHOOL ENHANCED SECURITY PROJECT A2

MARTIN COUNTY SCHOOL DISTRICT
PERMIT DOCUMENTS SUBMITTAL

ARCHITECTURAL DESIGN CONSULTANT:

HARVARD JOLLY ARCHITECTURE

2047 VISTA PARKWAY, SUITE 100
WEST PALM BEACH, FL 33411
PHONE: 561-478-4457

STRUCTURAL ENGINEER:

MASTER CONSULTING ENGINEERS INC.

4101 RAVENSWOOD ROAD - SUITE 307
FORT LAUDERDALE, FLORIDA 33312
PHONE: 954-210-7671

MECHANICAL, PLUMBING & ELECTRICAL ENGINEER:

JLRD INC. ENGINEERS

1450 CENTREPARK BLVD - SUITE 350
WEST PALM BEACH, FLORIDA 33401
PHONE: 561-689-2303

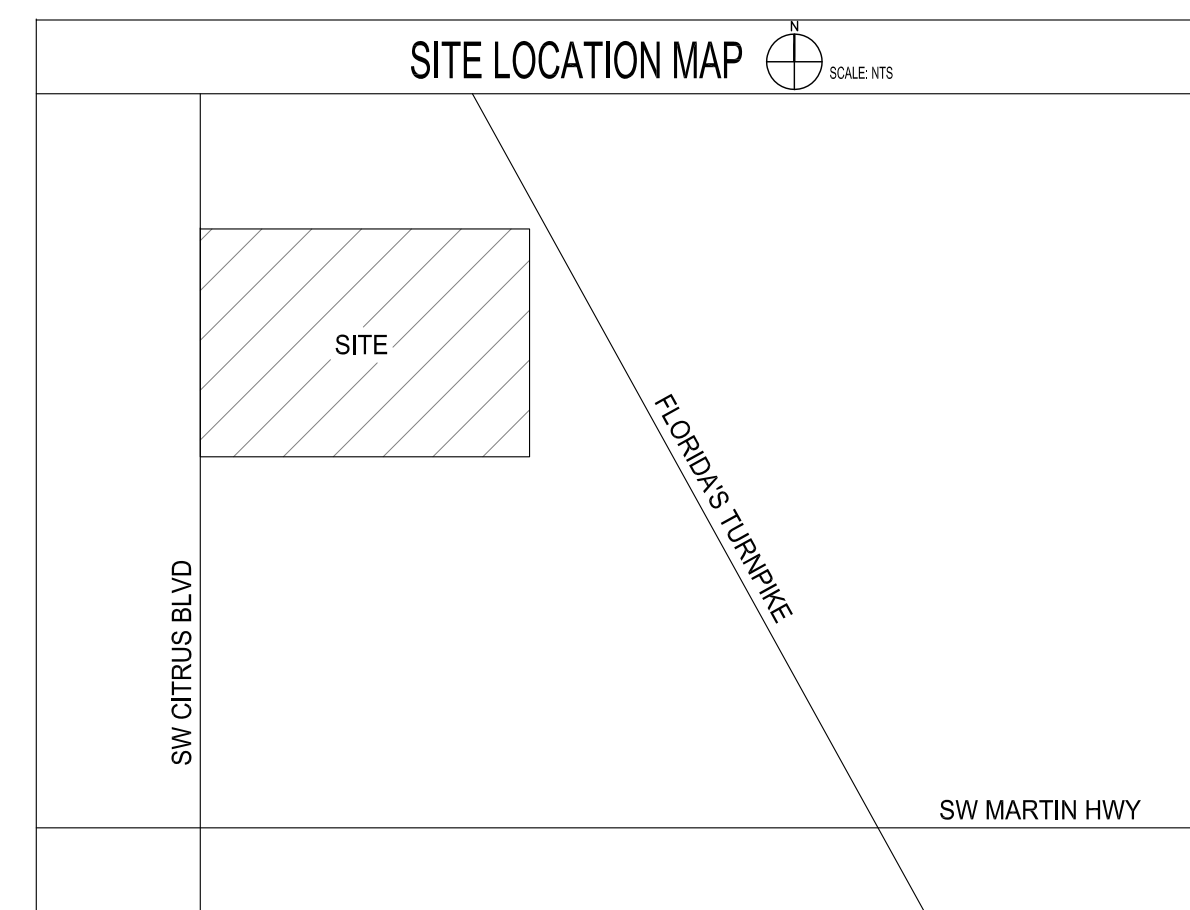
BOARD MEMBERS:

CHRISTIA LI ROBERTS
MICHAEL DITERLIZZI
MARSHA POWERS
VICTORIA DEFENTHALER
TONY ANDERSON

LAURIE J GAYLORD

CHAIR
VICE CHAIR
MEMBER
MEMBER
MEMBER

SUPERINTENDENT



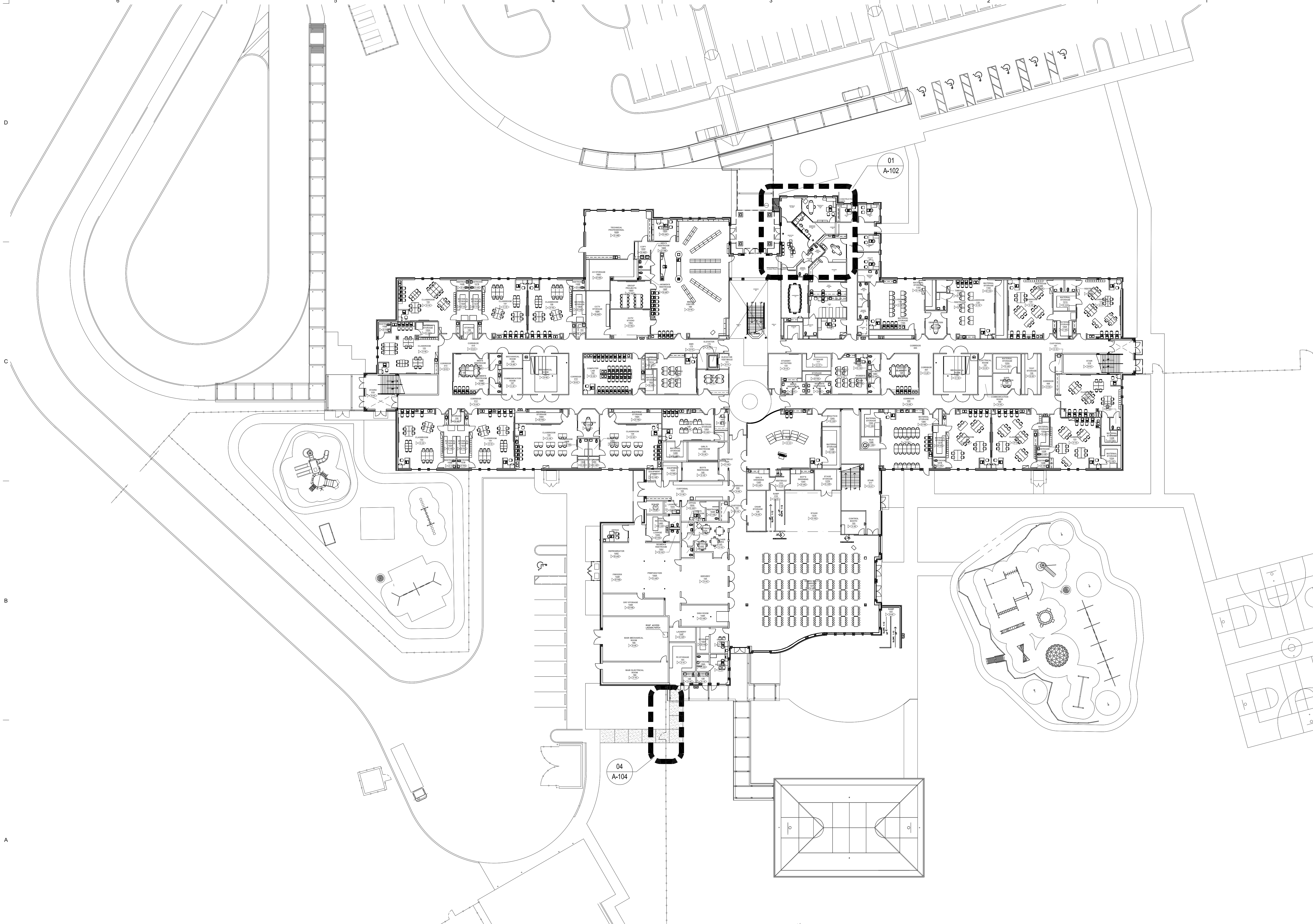
PROJECT NARRATIVE

THIS PROJECT INCLUDES THE SECURITY ENHANCEMENT OF INSTALLING A NEW ENTRY VESTIBULE WITHIN THE EXISTING LOBBY OF THE ADMINISTRATION AREA AT CITRUS GROVE ELEMENTARY SCHOOL LOCATED WITHIN THE MARTIN COUNTY SCHOOL DISTRICT. THE INSTALLATION OF THE NEW IMPACT RESISTANT STOREFRONT VESTIBULE WILL CORRESPOND WITH A REMOVAL OF AN EXISTING EXTERIOR WINDOW AND REPLACING IT WITH A NEW STOREFRONT DOOR AND WINDOW ASSEMBLY. NEW CASEWORK, INTERIOR PARTITION WALLS AND DOORS WILL BE INSTALLED AS WELL. NEW CONSTRUCTION SHALL BE IN ACCORDANCE WITH DRAWINGS AND SPECIFICATIONS SET FORTH IN THESE DOCUMENTS, FROM DIRECTION GIVEN FROM THE MARTIN COUNTY SCHOOL DISTRICT AND PER MANUFACTURERS RECOMMENDED INSTALLATION REQUIREMENTS. ALL AREAS, REGARDLESS OF LOCATION, WILL BE REQUIRED TO BE REPAIRED IF DISTURBED BY THE INSTALLATION OF THE SCOPE OF WORK. CONTRACTOR TO REVIEW ALL AS-BUILT DOCUMENTS BEFORE COMMENCING CONSTRUCTION AND VISIT THE SITE TO RECOGNIZE THE AREAS WITHIN THE SCOPE OF WORK. ALL NEW CONSTRUCTION SHALL BE IN CONFORMANCE WITH THE MARTIN COUNTY SCHOOL DISTRICT STANDARDS, APPLICABLE CODES AND AUTHORITY HAVING JURISDICTION. THIS INCLUDES THE REQUIREMENTS OF SREF THE 2017 FLORIDA BUILDING CODE SIXTH EDITION AND THE FLORIDA FIRE PREVENTION CODE.

ARCHITECT'S STATEMENT OF COMPLIANCE:
TO THE BEST OF OUR KNOWLEDGE, THESE DRAWINGS AND THE PROJECT MANUAL ARE COMPLETE AND COMPLY WITH THE MINIMUM REQUIREMENTS OF THE 2017 FLORIDA BUILDING CODE SIXTH EDITION.

SHEET NO.	TITLE	ORIGINAL DATE	REVISION NO.	LATEST REVISION DATE
ARCHITECTURAL				
G-001	COVER SHEET & INDEX	07/23/2020		
A-101	OVERALL PLAN	07/23/2020		
A-102	DEMOLITION FLOOR & RCP PLAN	07/23/2020		
A-103	PROPOSED FLOOR & RCP PLAN	07/23/2020		
A-104	ELEVATIONS & DETAILS	07/23/2020		
A-105	DETAILS & SCHEDULES	07/23/2020		
STRUCTURAL				
S-101	GENERAL STRUCTURAL NOTES	07/23/2020		
S-201	FOUNDATION & CANOPY FRAMING PLANS & SECTIONS	07/23/2020		
MECHANICAL				
M0.1	MECHANICAL LEGEND AND GENERAL NOTES	07/23/2020		
M1.1	FIRST FLOOR HVAC PLAN - NEW WORK	07/23/2020		
ELECTRICAL				
E0.1	ELECTRICAL NOTES AND LEGEND	07/23/2020		
E1.1	ELECTRICAL PLAN - OVERALL	07/23/2020		
E2.1	LIGHTING PLAN - DEMOLITION	07/23/2020		
E2.2	LIGHTING PLAN - NEW WORK	07/23/2020		
E3.1	POWER AND SYSTEMS PLAN - DEMOLITION	07/23/2020		
E3.2	POWER AND SYSTEMS PLAN - NEW WORK	07/23/2020		
E4.1	ELECTRICAL RISERS AND SCHEDULES	07/23/2020		
E5.1	ELECTRICAL DETAILS	07/23/2020		

Revisions		
No.	Date	Note



D

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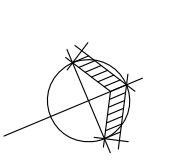
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OVERALL PLAN

SCALE: 1/24" = 1'-0"



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Date: 07/23/2020
Drawn: ER

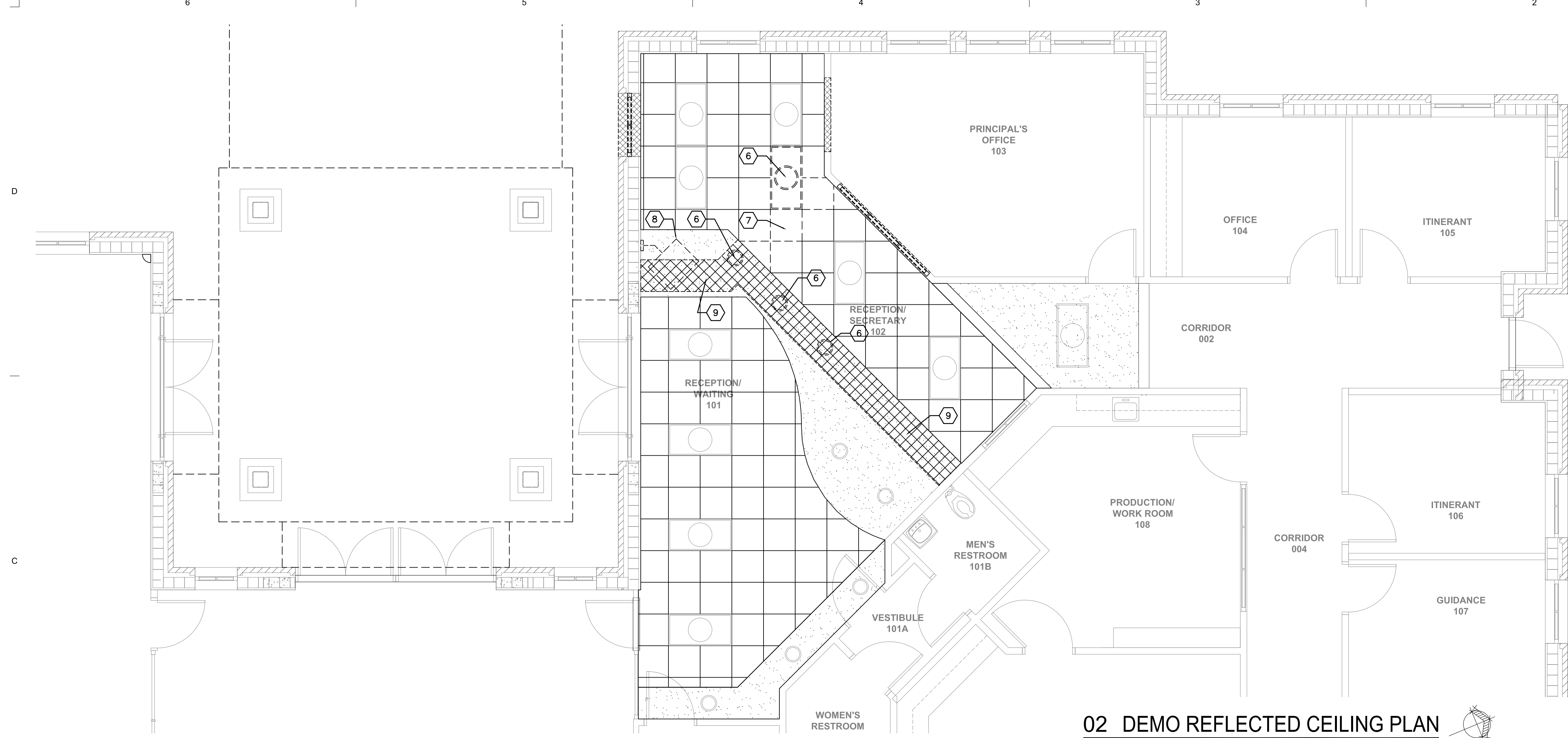
Revisions		
No.	Date	Note

TO THE BEST OF MY KNOWLEDGE, THE PLANS AND SPECIFICATIONS COMPLY WITH THE MINIMUM BUILDING CODES.

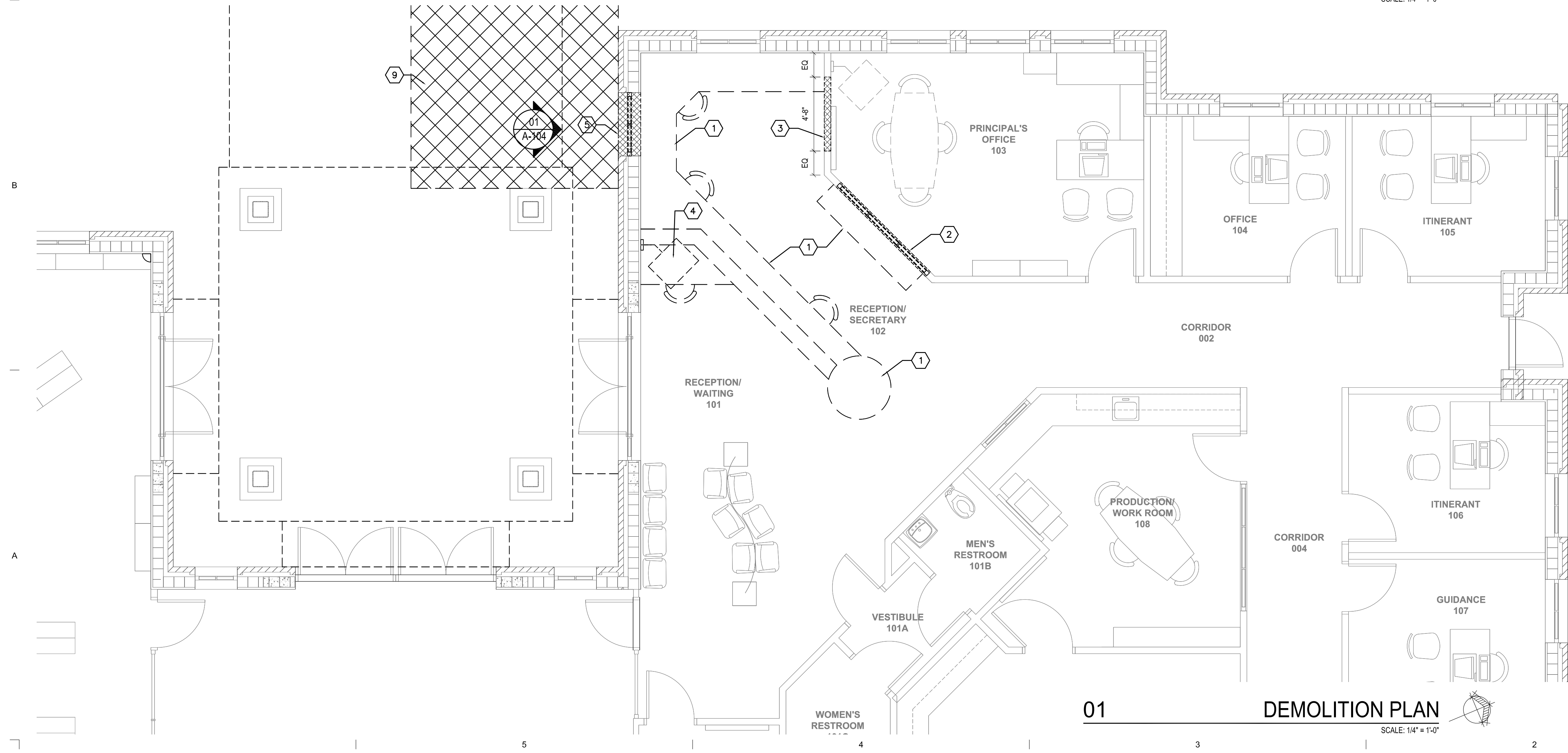
Daniel T. Canavan, AIA
FL License #AR10250
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OVERALL PLAN

A-101



02 DEMO REFLECTED CEILING PLAN
SCALE: 1/4" = 1'-0"



01 DEMOLITION PLAN
SCALE: 1/4" = 1'-0"

LEGEND

- EXISTING WALL TO REMAIN
- EXISTING TO BE DEMOLISHED
- NEW STUD AND GWB PARTITION
- LIMIT OF NEW WORK/ CONSTRUCTION

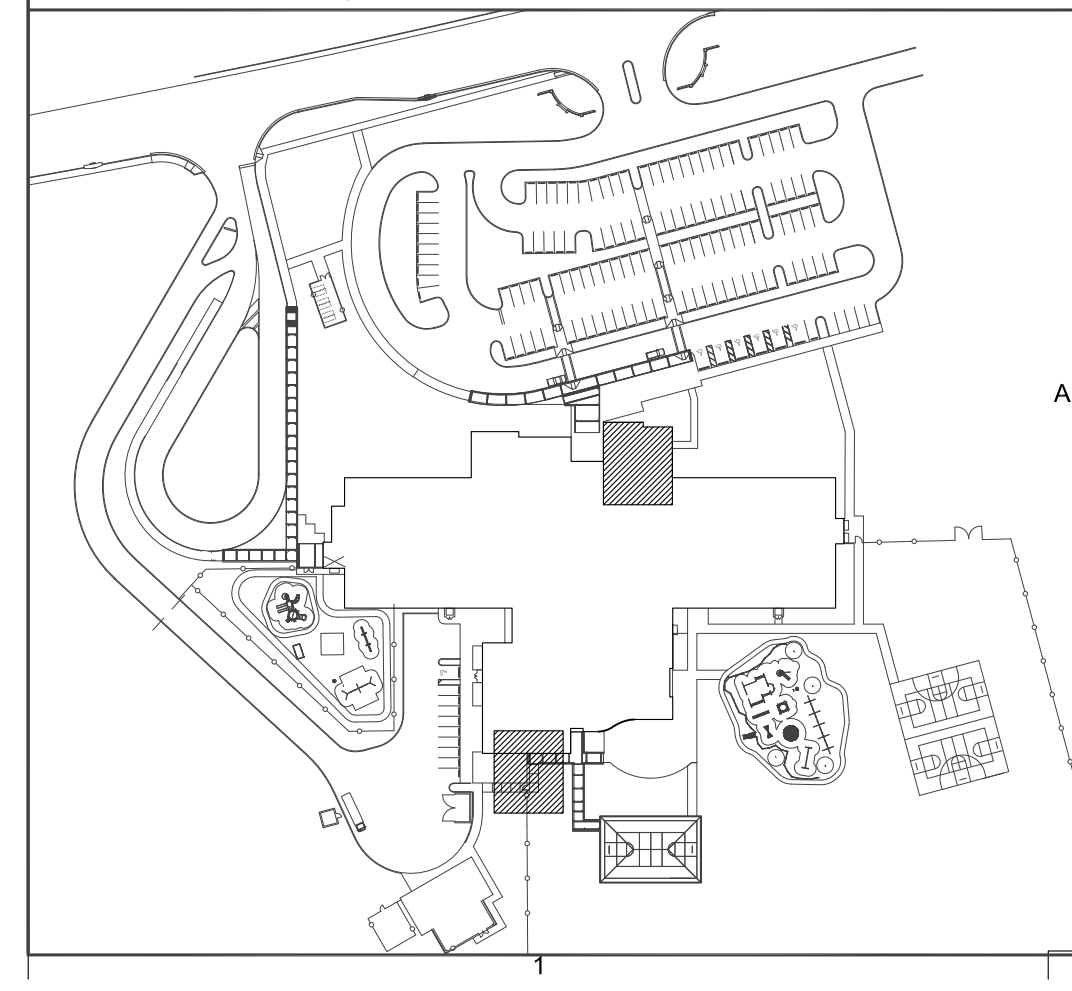
DEMOLITION GENERAL NOTES

- A. CONTRACTOR(S) ARE RESPONSIBLE FOR FIELD VERIFYING THE EXTENT OF DEMOLITION WORK PRIOR TO BIDDING, AND FOR COORDINATING THE EXTENT OF DEMOLITION WITH THE INSTALLATION OF NEW SYSTEMS AND FINISHES INDICATED IN THE CONTRACT DOCUMENTS. REFER TO THE NEW CONSTRUCTION DRAWINGS FOR DEMOLITION REQUIRED, BUT NOT SHOWN ON DEMOLITION PLANS.
- B. REFER TO THE MECHANICAL, PLUMBING AND ELECTRICAL DOCUMENTS FOR ADDITIONAL DEMOLITION ITEMS, PATCH, REPAIR AND RESTORE FINISHES TO MATCH EXISTING TO ALL BUILDING CONSTRUCTION REQUIRING DEMOLITION IN ORDER TO INSTALL ALL NEW ITEMS OF MECHANICAL, ELECTRICAL & PLUMBING WORK.
- C. MECHANICAL, PLUMBING AND ELECTRICAL ITEMS REMOVED SHOULD BE CAPPED AND ABANDONED; THEY SHALL BE LOCATED BEHIND FINAL FINISH SYSTEMS.
- D. WHEN OPENINGS ARE CUT INTO AN EXISTING WALL, THE OPENING SHALL BE A MINIMUM OF 1'-4" LONGER THAN THE FINISHED OPENING REQUIRED TO ALLOW FOR 8" MINIMUM OF NEW CMU TOOTHED IN AT EDGES.
- E. "CEILING" DENOTES CEILING MATERIALS INCLUDING SUSPENSION SYSTEMS, ADHESIVE RESIDUES, MOULDINGS, UP TO BUT EXCLUSIVE OF STRUCTURAL SYSTEMS.
- F. REMOVE EACH ITEM SHOWN WITH DASHED LINES ON THIS DRAWING WHETHER OR NOT EACH ITEM IS SPECIFICALLY NOTED TO BE REMOVED.
- G. AFTER THE DEMOLITION OF MATERIALS, THE RESULTING EXPOSED SURFACE SHALL BE SMOOTH AND FLUSH WITH EXISTING CONDITIONS.
- H. MATERIALS OF DEMOLITION SHALL BE DISPOSED OF OFF SITE UNLESS DIRECTED OTHERWISE BY OWNER.
- I. OWNER SHALL HAVE "FIRST RIGHTS OF REFUSAL" PRIOR TO DEMOLITION OPERATIONS AND SHALL SALVAGE ALL EXISTING EQUIPMENT PRIOR TO START OF CONSTRUCTION. ANY REMAINING EQUIPMENT SHALL BE DISPOSED OF OR SALVAGED BY THE CONTRACTOR.
- J. WHERE WALLS ARE SHOWN TO BE REMOVED, REMOVE ALL ITEMS IN THE WALLS; ELECTRICAL, PLUMBING, ETC. PER ALL APPLICABLE CODES AND STANDARDS.
- K. IN ALL AREAS OF DEMOLITION, ALL DUCTWORK, DOORS AND WALLS NOT TO BE DEMOLISHED SHOULD BE PROTECTED SO THAT NO DEBRIS/ DUST CAN FILTER THRU TO OTHER PARTS OF THE BUILDING.
- L. MAINTAIN THE EGRESS REQUIRED IN ALL AREAS PER ALL APPLICABLE CODES AND STANDARDS DURING CONSTRUCTION.
- M. TO THE BEST OF OWNER'S KNOWLEDGE THERE ARE NO HAZARDOUS CONTAINING MATERIALS IN THE LIMITS OF CONSTRUCTION. THE CONTRACTOR SHALL NOTIFY THE OWNER IMMEDIATELY IF ANY HAZARDOUS CONTAINING MATERIALS ARE ENCOUNTERED.
- N. GENERAL CONTRACTOR SHALL REMOVE OR RELOCATE ANY EXISTING CEILING COMPONENTS SUCH AS CEILING TILES AND GRID, DIFFUSERS, LIGHT FIXTURES AND CEILING DEVICES AS REQUIRED FOR DEMOLITION OF EXISTING AND INSTALLATION OF NEW MECHANICAL SYSTEM. CONTRACTOR SHALL REINSTALL CEILING COMPONENTS UPON COMPLETION OF MECHANICAL INSTALLATION LOCATING COMPONENTS BACK TO THEIR ORIGINAL LOCATION. CONTRACTOR SHALL REPLACE ANY BROKEN CEILING TILES OR GRID AS REQUIRED FOR COMPLETE INSTALLATION. SEE MECHANICAL DRAWINGS FOR ADDITIONAL INFORMATION.
- O. GENERAL CONTRACTOR SHALL SALVAGE ALL EXISTING CEILING TILES IN AREAS IDENTIFIED FOR REMOVAL AND SHALL BE USED TO REPLACE DAMAGED TILE OR MISSING TILE IN AREAS OF RENOVATION.
- P. GENERAL CONTRACTOR SHALL CONFIRM WITH OWNER PRIOR OF DISPOSAL OF EXTRA TILE NOT USED IF THE OWNER DOES NOT WANT IT AS SURPLUS INVENTORY.
- Q. CONTRACTOR SHALL FILL VOIDS AROUND PENETRATIONS WITH FIRE RATED CAULK IN FIRE RATED DRYWALL DECKING AND FIRE RATED PARTITIONS.

DEMOLITION KEY NOTES

1. REMOVE EXISTING MILLWORK.
2. REMOVE EXISTING INTERIOR WINDOW AND FRAME. PREPARE FOR THE INSTALLATION OF NEW FRAME AND IMPACT RESISTANT GLAZING.
3. REMOVE SECTION OF WALL AND PREPARE FOR THE INSTALLATION OF A NEW WINDOW FRAME AND IMPACT GLAZING.
4. REMOVE EXISTING MONITOR. PROTECT & STORE FOR FUTURE RE-INSTALLATION IN SIMILAR LOCATION. SEE ELECTRICAL DRAWINGS.
5. REMOVE EXISTING WINDOW & SECTION OF WALL ABOVE/ BELOW FOR INSTALLATION OF NEW DOOR.
6. REMOVE EXISTING LIGHT FIXTURE. PATCH & REPAIR CEILING GRID OR DRYWALL CEILING BASED ON TYPE OF FIXTURE INSTALLATION.
7. REMOVE EXISTING ACOUSTICAL CEILING TILE GRID AS REQUIRED TO ALLOW FOR NEW WALL ASSEMBLY INSTALLATION.
8. REMOVE EXISTING DRYWALL CEILING AS REQUIRED TO ALLOW FOR NEW WALL ASSEMBLY INSTALLATION.
9. REMOVE SECTIONS OF CONCRETE SIDEWALK TO THE NEAREST CONTROL JOINT TO ALLOW FOR NEW CONCRETE SIDEWALK TO BE FLUSH WITH NEW DOOR OPENING.

KEYPLAN



Comm. No:	16025.20	
Date:	07/23/2020	
Drawn:	ER	
Revisions		
No.	Date	Note

TO THE BEST OF MY KNOWLEDGE, THE PLANS AND SPECIFICATIONS COMPLY WITH THE MINIMUM BUILDING CODES.

Daniel T. Canavan, AIA
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DEMOLITION PLAN

BUILDING CODE/ LIFE SAFETY CODE ANALYSIS

REVIEW QUALIFICATION:
 THIS REVIEW IS BASED ON CODES INTERPRETATIONS BY THE AUTHOR AND INCLUDES ARCHITECTURAL ISSUES ASSOCIATED WITH THE BUILDING AND LIFE SAFETY CODES. NOTE THAT NO CONFIRMATION OF THE INFORMATION HEREIN HAS BEEN OBTAINED BY THE REVIEW AGENCIES, WHICH, AS STATED IN THE CODES, HAVE THE AUTHORITY TO DIRECT MORE STRINGENT REQUIREMENTS.
 THE ARCHITECT OF RECORD RESERVES THE RIGHT TO IMPLEMENT MORE STRINGENT REQUIREMENTS.

PROJECT LOCATION/ GOV'T AGENCY JURIS.

PALM CITY, FLORIDA/ MARTIN COUNTY SCHOOL DISTRICT

APPLICABLE CODES

- A. FLORIDA BUILDING CODE - BUILDING (FBC - B) 6TH EDITION, 2017
- B. FLORIDA BUILDING CODE - ACCESSIBILITY (FBC - A) 6TH EDITION, 2017
- C. STATE REQUIREMENTS FOR EDUCATIONAL FACILITIES (SREF), 2017
- D. PUBLIC LAW 101-336: AMERICAN WITH DISABILITIES ACT OF 1993 (ADA)
- E. NATIONAL ELECTRIC CODE
- F. FLORIDA FIRE PREVENTION CODE, 2017 (FFPC) INCLUDING NFPA 10, 13 AND 101
- G. FLORIDA BUILDING CODE - MECHANICAL (FBC-M) 6TH EDITION, 2017

OCCUPANCY CLASSIFICATION

EXISTING BUILDING IS CLASSIFIED AS FOLLOWS:

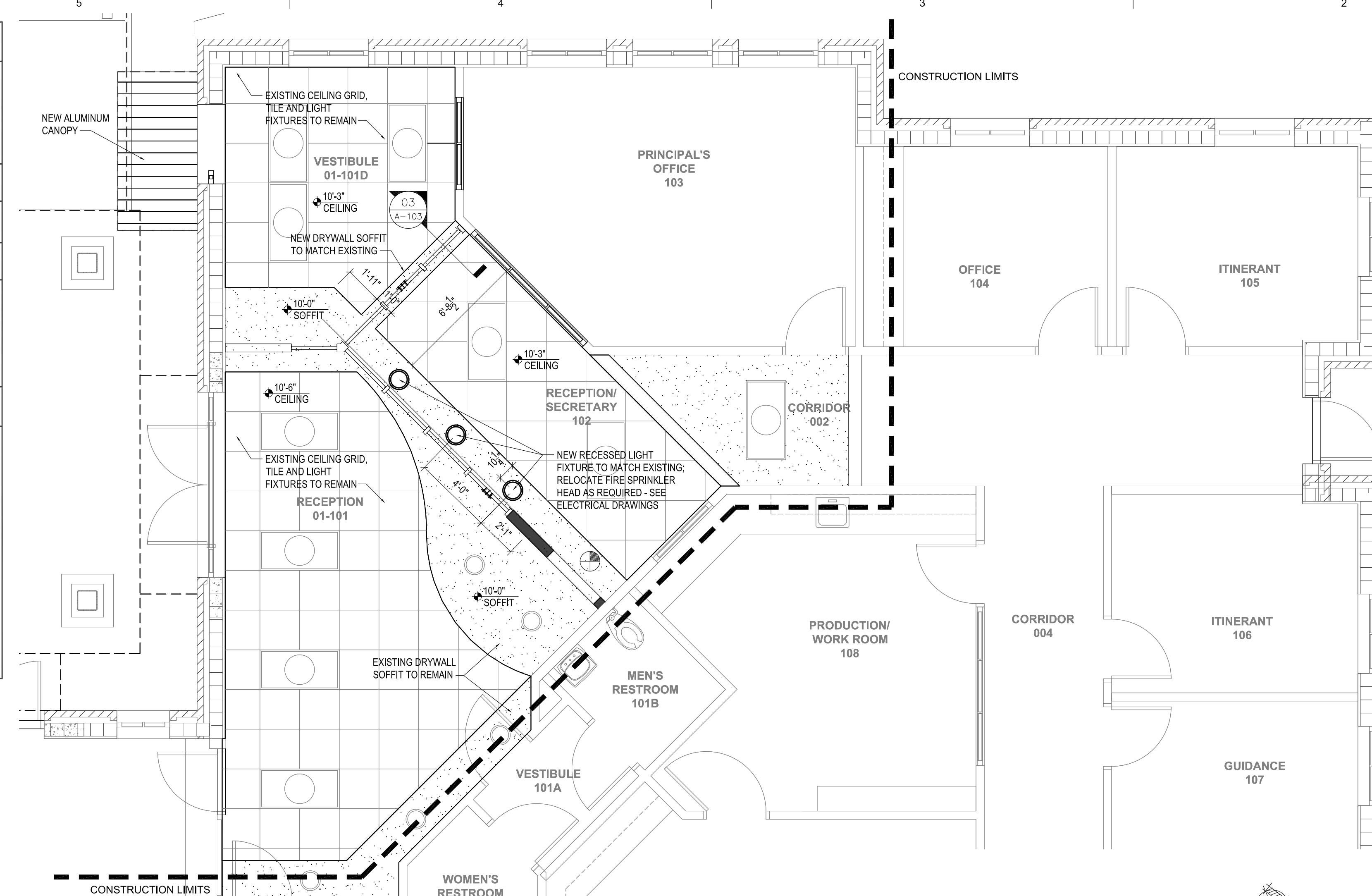
SECTION 305: EDUCATIONAL (GROUP E OCCUPANCY)
 -NO CHANGE IN OCCUPANCY, OCCUPANT LOAD OR SQUARE FOOTAGE
 -BUILDING IS FULLY SPRINKLERED

BUILDING DATA:

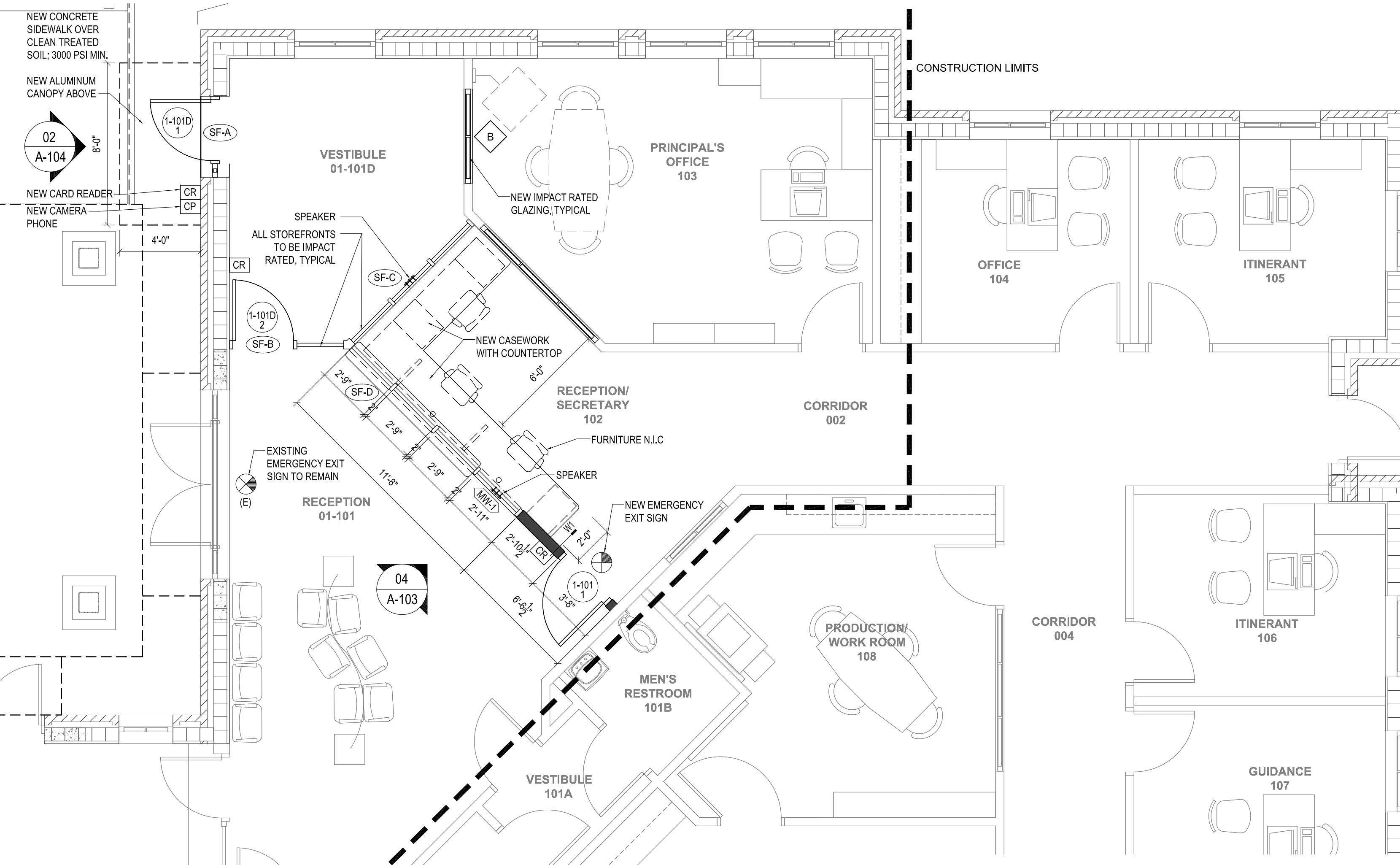
THE EXISTING BUILDING IS A TWO STORY, ADMINISTRATIVE/CLASSROOM USE BUILDING ON THE CITRUS GROVE ELEMENTARY SCHOOL CAMPUS WITHIN THE MARTIN COUNTY SCHOOL DISTRICT. THE ENHANCED SECURITY A2 PROJECT INVOLVES CREATING A NEW VESTIBULE AT THE MAIN ENTRY WITH AN IMPACT RESISTANT STOREFRONT SYSTEM. THERE WILL ALSO BE NEW IMPACT RESISTANT GLAZING INSTALLED AT THE PRINCIPALS OFFICE AND A NEW RECEPTION DESK WILL BE PROVIDED AS WELL.

TRAVEL DISTANCE TO AN EXIT:

FBC-B TABLE 1017.2: EDUCATIONAL OCCUPANCY, 250' MAXIMUM (WITH SPRINKLER SYSTEM)
 WORST CASE: 36' 6" IS LESS THAN 250' THEREFORE COMPLIANT.
 THERE IS NO CHANGE IN TRAVEL DISTANCE OR IN EXIT CAPACITY REQUIREMENTS.



02 REFLECTED CEILING PLAN
 SCALE: 1/4" = 1'-0"

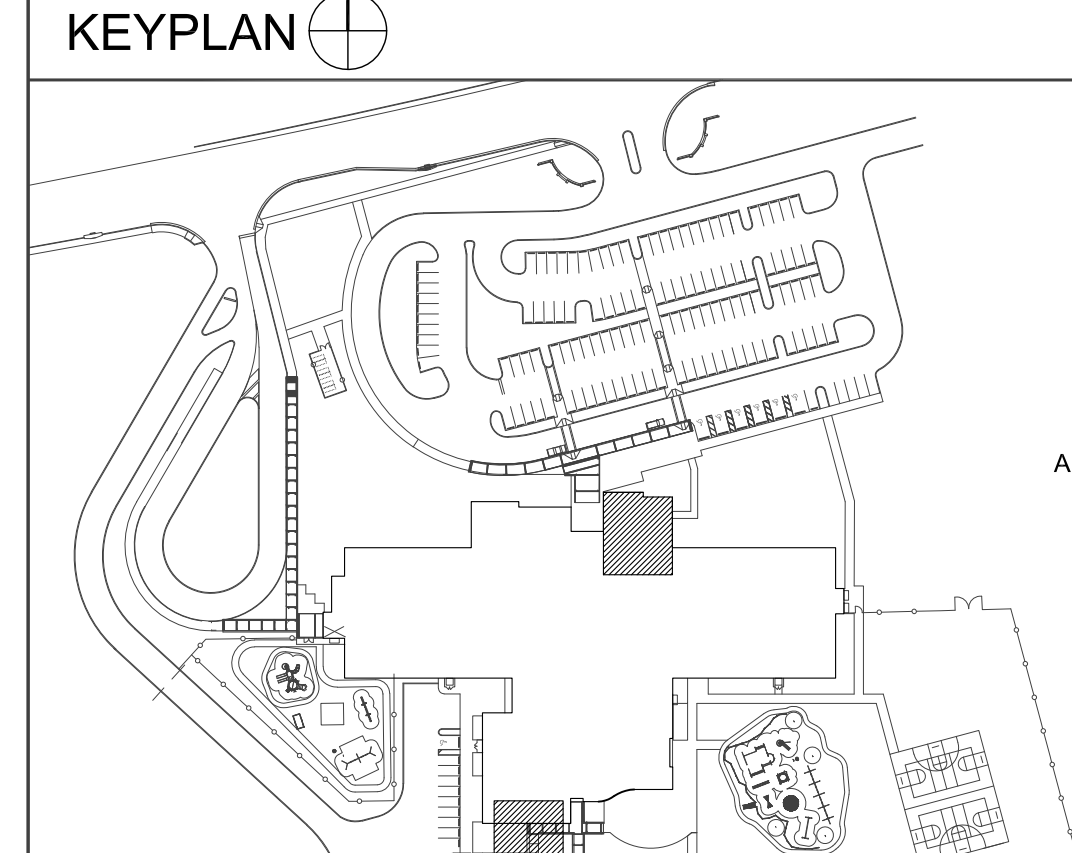


01 PROPOSED FLOOR PLAN
 SCALE: 1/4" = 1'-0"

LEGEND

	EXISTING WALL TO REMAIN
	NEW STUD AND GWB PARTITION - BRACE AS REQUIRED
	CARD READER - SEE ELECTRICAL DRAWINGS
	CAMERA PHONE
	EXIT LIGHT
	2'X2' LAY-IN ACOUSTICAL CEILING ON GRID
	DRYWALL SOFFIT, PAINTED
	RECESSED LED LIGHT FIXTURE - REFER TO ELECTRICAL DRAWINGS
	2'X4' RECESSED LED LIGHT FIXTURE - REFER TO ELECTRICAL DRAWINGS
	DIFFUSER GRILLE, REFER TO MECHANICAL DRAWINGS
	RETURN AIR GRILLE, REFER TO MECHANICAL DRAWINGS

- ### GENERAL NOTES
- CONTRACTOR SHALL COMPLY WITH FLORIDA BUILDING CODE SIXTH EDITION (2017) WITH ALL APPLICABLE REVISIONS, FLORIDA FIRE PREVENTION CODE SIXTH EDITION, ALL STATE AND LOCAL ZONING CODES AND THE THE DISTRICT SCHOOL BOARD OF MARTIN COUNTY CRITERIA. PERMITS SHALL BE POSTED IN A VISIBLE PLACE AT ALL TIMES. ALL PERMITS, UTILITY AND METER CONNECTIONS FEES SHALL BE OBTAINED AND PAID FOR BY THE CONTRACTOR.
 - ALL WORK, MATERIALS AND EQUIPMENT UTILIZED IN THIS PROJECT SHALL BE NEW AND INSTALLED IN STRICT ACCORDANCE WITH THE MANUFACTURERS RECOMMENDATIONS AND SPECIFICATIONS.
 - ALL WORK FOR THIS PROJECT SHALL CONFORM TO STANDARDS PUBLISHED BY RECOGNIZED PROFESSIONAL AND INDUSTRY ORGANIZATIONS.
 - CONTRACTOR SHALL BE RESPONSIBLE FOR VISITING THE SITE PRIOR TO BIDDING AND FAMILIARIZING HIMSELF WITH ALL EXISTING CONDITIONS AFFECTING THE WORK INCLUDING BUT NOT LIMITED TO PUBLIC UTILITIES, ON AND OFF SITE ACCESS ROADS AND OTHER SUPPORT FACILITIES.
 - CONTRACTOR SHALL REMOVE, RELOCATE OR RE-ROUTE, AS NECESSARY, ELECTRICAL, TELEPHONE, WATER, SEWER, GAS OR ANY OTHER UTILITY LINES ENCOUNTERED AND SHALL COORDINATE THIS WORK WITH ALL LOCAL UTILITY COMPANIES.
 - CONTRACTOR SHALL IMMEDIATELY NOTIFY THE ARCHITECT OF ANY UNEXPECTED OR UNKNOWN FIELD CONDITIONS, ERRORS, OMISSIONS, OR DISCREPANCIES IN THE DRAWINGS, PROJECT MANUAL, OR CONTRACT DOCUMENTS PRIOR TO PROCEEDING WITH THE WORK OR SHOP FABRICATIONS.
 - CONTRACTOR SHALL PREPARE AND MAINTAIN ALL CONSTRUCTION AREAS, AS WELL AS, SURROUNDING AREAS FREE OF DEBRIS OR HAZARDOUS EQUIPMENT AT ALL TIMES.
 - CONTRACTOR SHALL BE RESPONSIBLE FOR THE REPAIR AND/OR THE REPLACEMENT OF ANY ITEMS DAMAGED DURING CONSTRUCTION OR CLEAN-UP. CONSTRUCTION PERSONNEL SHALL BE CONFINED TO THE LIMITS OF THE CONSTRUCTION AREA. ALL OSHA REGULATIONS FOR CONSTRUCTION AREAS SHALL BE STRICTLY FOLLOWED.
 - DRAWINGS ARE NOT TO BE SCALED. WRITTEN DIMENSIONS SHALL BE FOLLOWED.
 - ALL DIMENSIONS ARE BASED ON NOMINAL SIZES OF MEMBERS AND ARE GIVEN TO THE OUTER FACE OF SUCH MEMBERS, NOT TO FACE OF FINISH MATERIALS UNLESS OTHERWISE NOTED ON DRAWINGS. WHERE A DIMENSION IS LABELED "CLEAR" IT IS TAKEN FROM THE FACE OF FINISH MATERIALS TO FACE OF FINISH MATERIALS.
 - CONTRACTOR SHALL SUBMIT SHOP DRAWINGS FOR APPROVAL BEFORE COMMENCING FABRICATION AND/OR INSTALLATION OF ALL APPLICABLE ITEMS FOR CONSTRUCTION. ALL SHOP DRAWINGS DIMENSIONS SHALL BE FIELD VERIFIED, REVIEWED AND APPROVED BY CONTRACTOR BEFORE SUBMITTAL.
 - CONTRACTOR SHALL BE RESPONSIBLE FOR REMOVING ALL DEBRIS AND CONSTRUCTION MATERIAL FROM THE SITE. CONTRACTOR SHALL ALSO BE RESPONSIBLE FOR CLEANING ALL AREAS PRIOR TO FINAL ACCEPTANCE BY THE OWNER INCLUDING BUT NOT LIMITED TO WINDOWS, FLOORS, CARPETS, WALLS, DOORS, EQUIPMENT, ETC.
 - UPON COMPLETION OF THIS PROJECT, THE CONTRACTOR SHALL GIVE TO THE OWNER A COMPLETE SET OF AS-BUILT ARCHITECTURAL, MECHANICAL AND ELECTRICAL DRAWINGS IN CAD FORMAT ALONG WITH THE WRITTEN GUARANTEES, OPERATION AND MAINTENANCE MANUALS OF ALL EQUIPMENT AND FINISHES INSTALLED. THE CONTRACTOR SHALL MAINTAIN A CURRENT SET OF AS-BUILT DRAWINGS AND SPECIFICATIONS. INFORMATION SHALL BE RECORDED BY CONTRACTOR AS CONSTRUCTION PROGRESSES AND REVIEWED FOR COMPLETENESS AT EACH REQUISITION REQUEST. REFER TO PROJECT MANUAL.
 - CONTRACTOR SHALL INSTALL BARRIERS AS NECESSARY AND REQUIRED AROUND PERIMETER OF CONSTRUCTION LIMITS TO PROTECT THE PUBLIC. EGRESS FROM THE EXISTING BUILDINGS SHALL NOT BE REDUCED OR LIMITED.
 - CONTRACTOR SHALL FURNISH AND INSTALL ALL METAL AND/OR WOOD BLOCKING REQUIRED FOR WALL MOUNTED OR BRACED FIXTURES, COUNTERTOPS, SHELVES, B AND ACCESSORIES OR 'BY OTHERS' ITEMS DESCRIBED IN INTERIOR DESIGN AND ARCHITECTURAL DRAWINGS. BLOCKING SHALL BE CONSTRUCTED TO SUPPORT THE IMPOSED LOAD AND SHALL COMPLY WITH SCHOOL DISTRICT REQUIREMENTS.
 - CONTRACTOR SHALL PROVIDE A SAFETY AND STAGING PLAN PRIOR TO START OF CONSTRUCTION TO CLEARLY DELINEATE AREAS FOR CONSTRUCTION, SAFETY BARRIERS, EXITS, CONSTRUCTION TRAFFIC DURING THE VARIOUS PHASES AND WHEN CONDITIONS CHANGE.
 - CONTRACTOR SHALL SUBMIT SHOP DRAWINGS FOR REVIEW AND APPROVAL BY THE AUTHORITY HAVING JURISDICTION (AHJ) FOR THE FOLLOWING BUT NOT LIMITED TO ALL FINISHES, STOREFRONT ASSEMBLIES, LIGHT FIXTURES, MECHANICAL EQMT, ETC. ALL INTERIOR NON-LOAD BEARING WALLS SHALL EXTEND TO UNDERSIDE OF DECK ABOVE U.N.O.
 - ALL FIRE-RATED AND SMOKE-RATED NON-LOAD BEARING WALLS SHALL EXTEND TO UNDERSIDE OF DECK ABOVE U.N.O.
 - ALL STUD WALLS TO HAVE HIGH IMPACT 5/8" G.W.B. TO 4'-0" A.F.F. PROVIDE STANDARD G.W.B. ABOVE 4'-0".
 - ALL WALL FRAMING STUDS TO BE MIN. 20 GAUGE U.N.O. ON DRAWINGS OR IN SPECIFICATIONS.
 - CONTRACTOR SHALL PROTECT THE EXISTING FLOOR FROM DAMAGE DURING DEMOLITION AND NEW CONSTRUCTION ACTIVITIES.



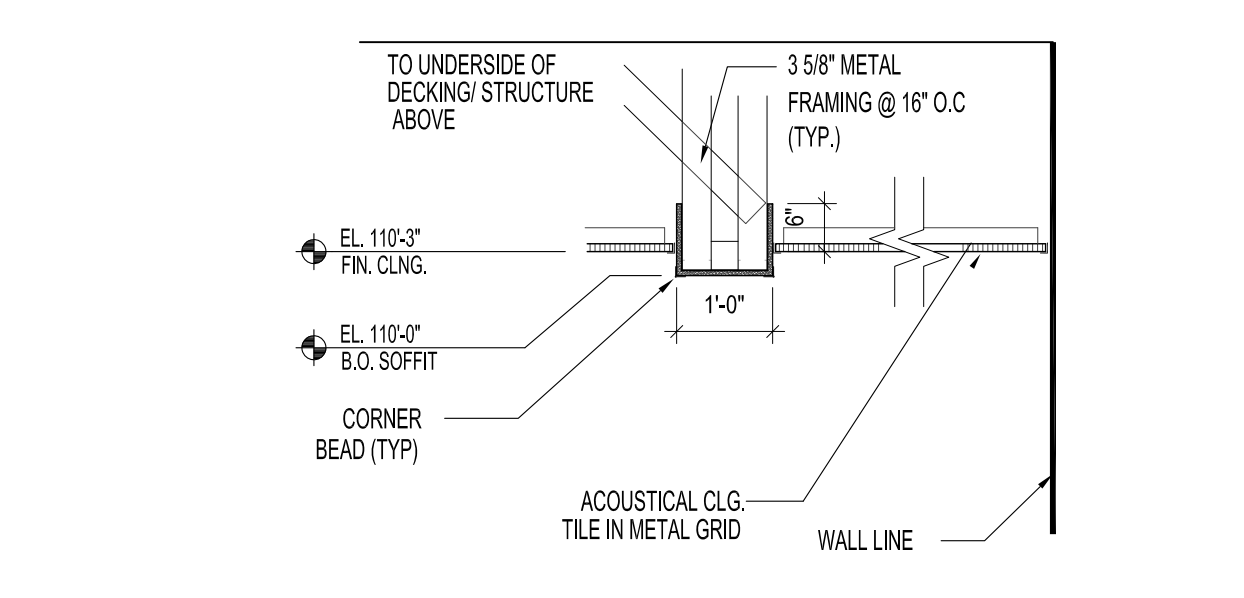
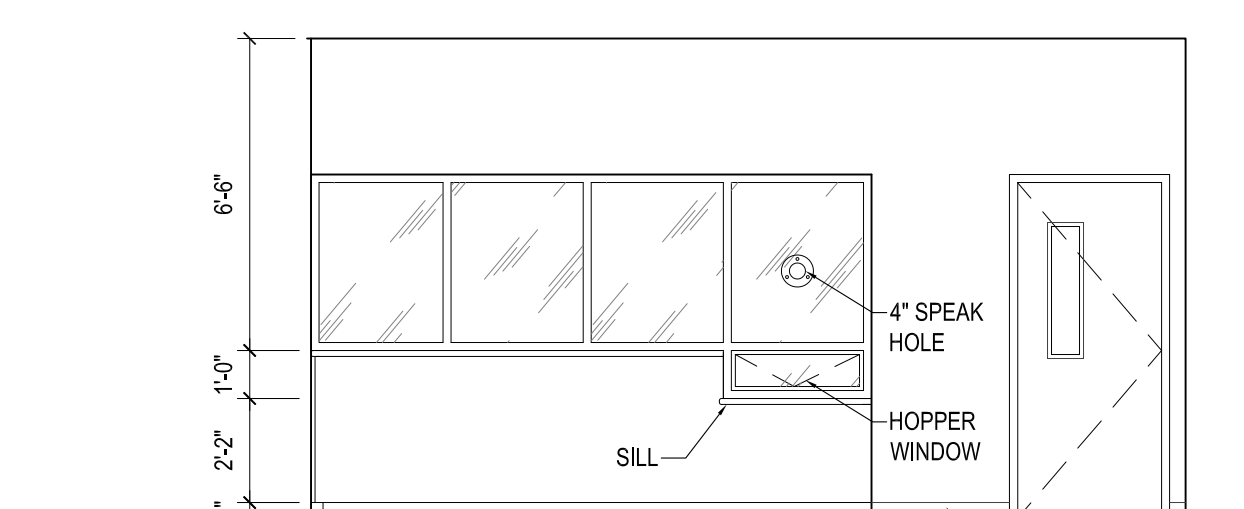
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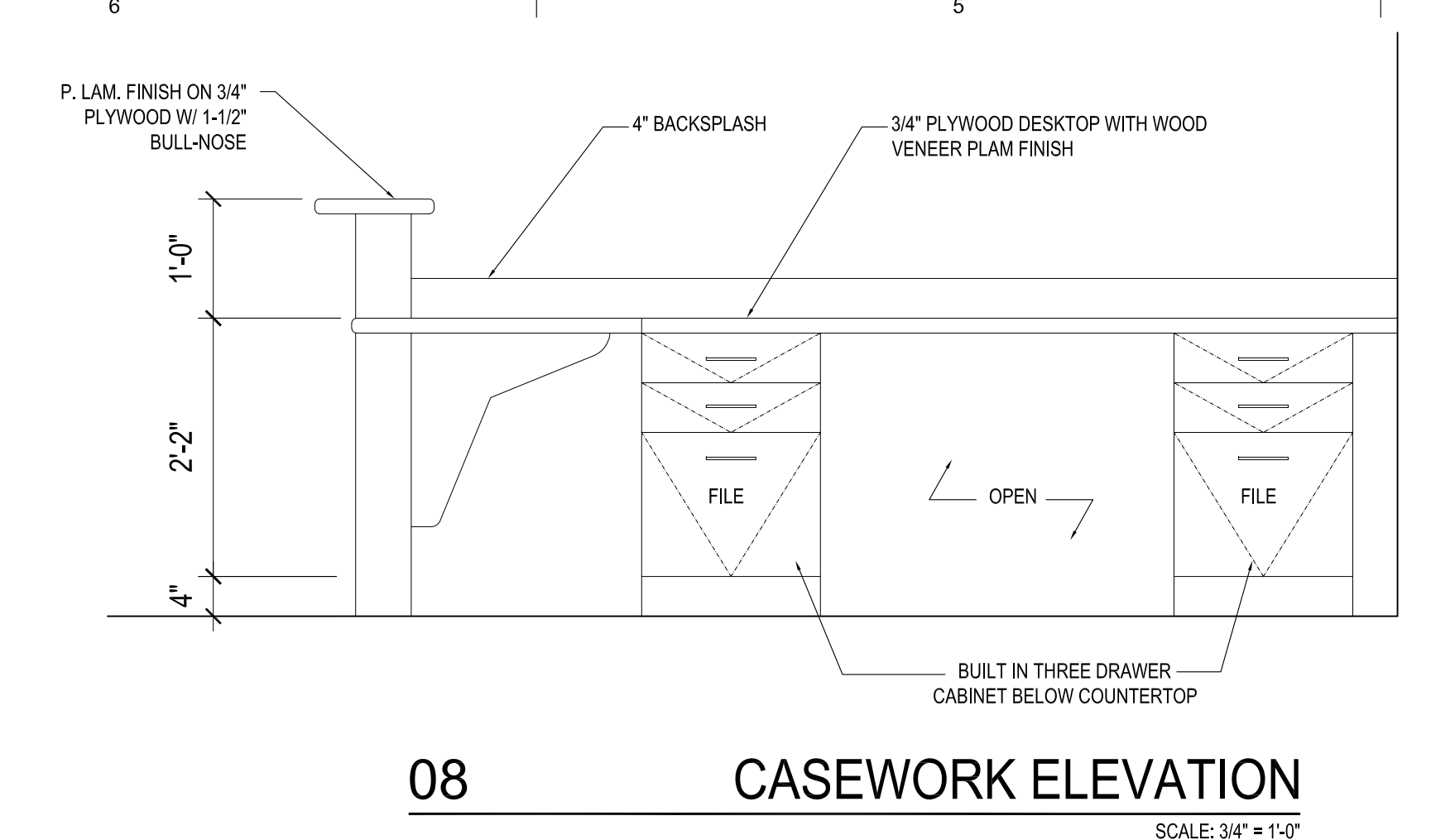
Martin County School District
 Citrus Grove Elementary School
 Enhanced Security Project A2
 2527 SW Citrus Blvd, Palm City, FL 34990
 Permit Documents Submittal

Comm. No:	16025.20	
Date:	07/23/2020	
Drawn:	ER	
Revisions		
No.	Date	Note

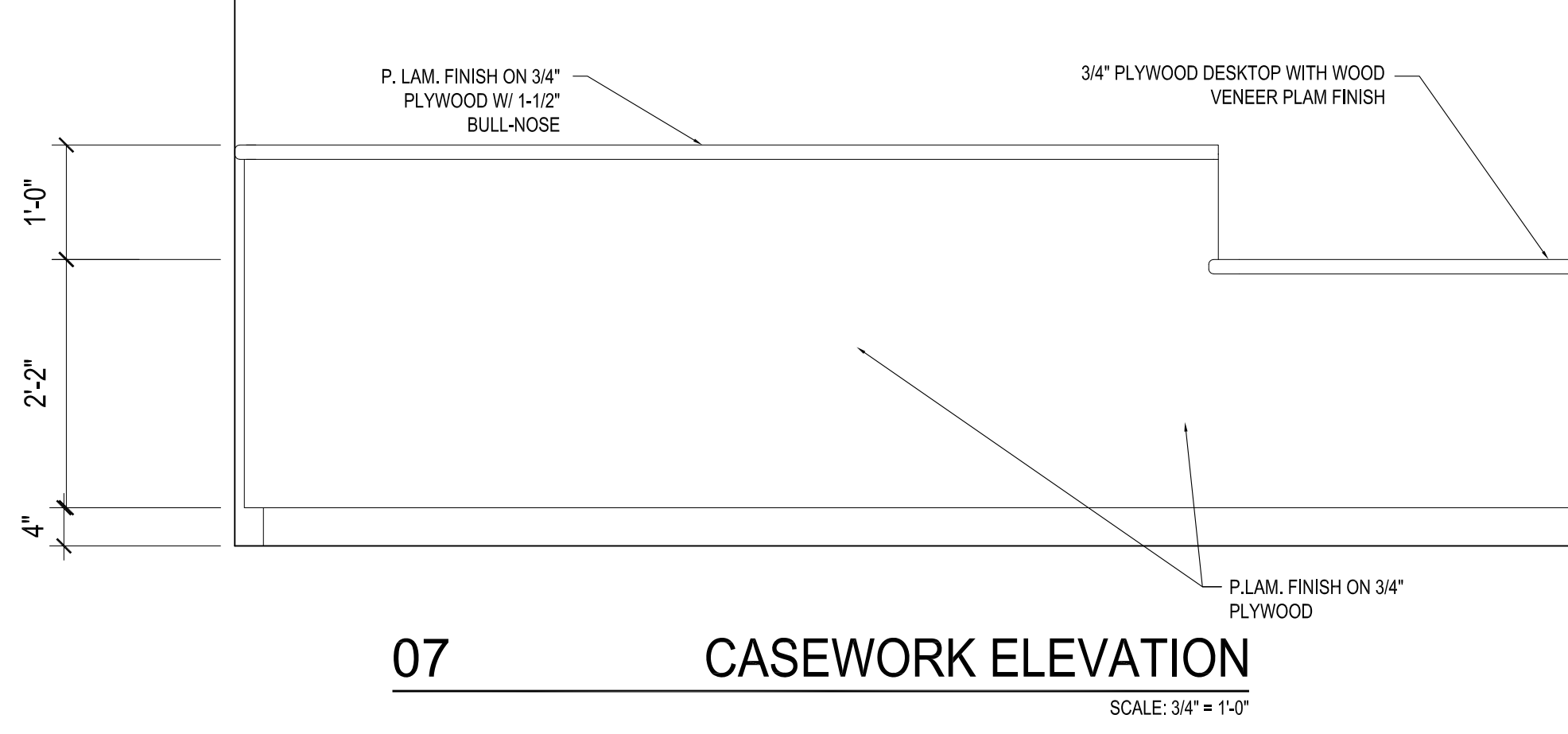
Daniel T Canavan, AIA
 FL License #AR10250
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PROPOSED FLOOR PLAN
A-103

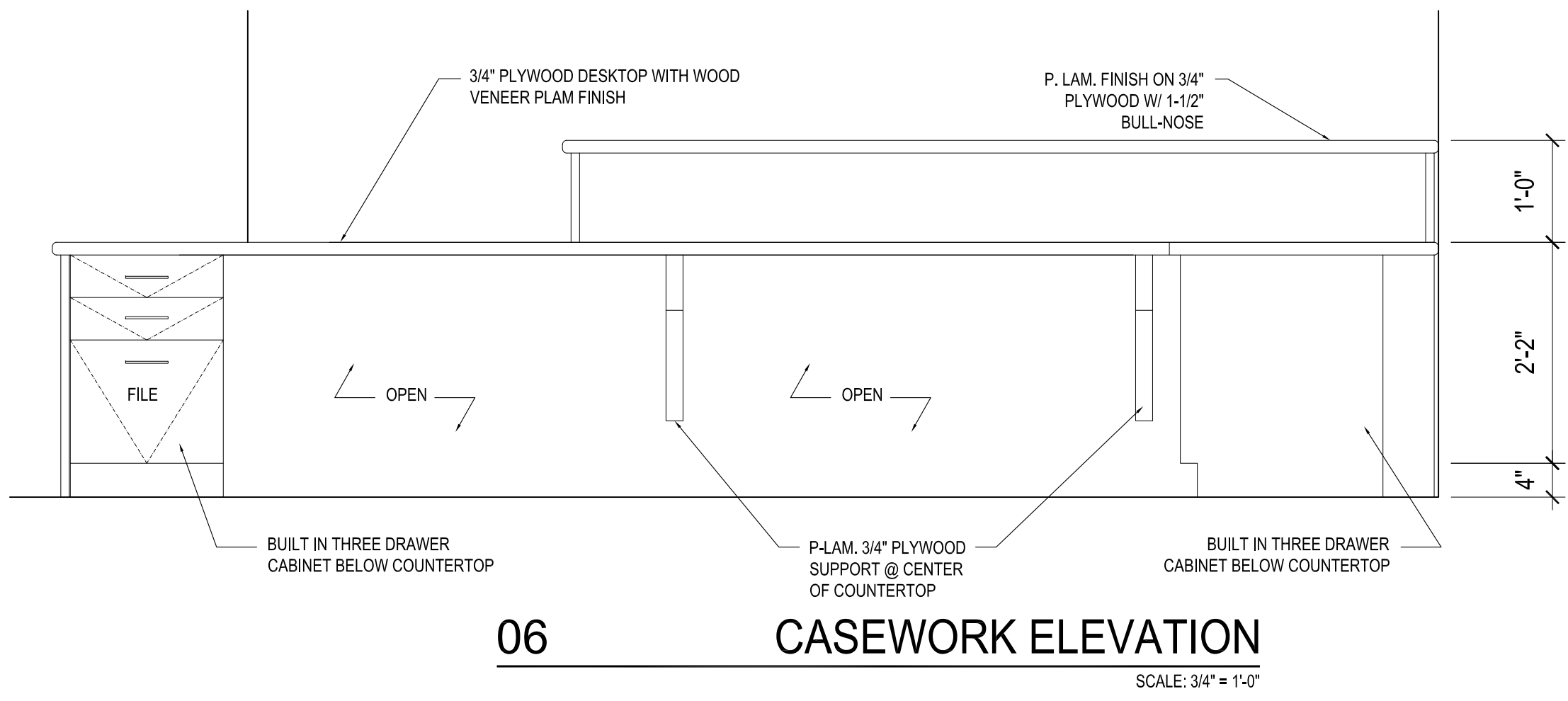




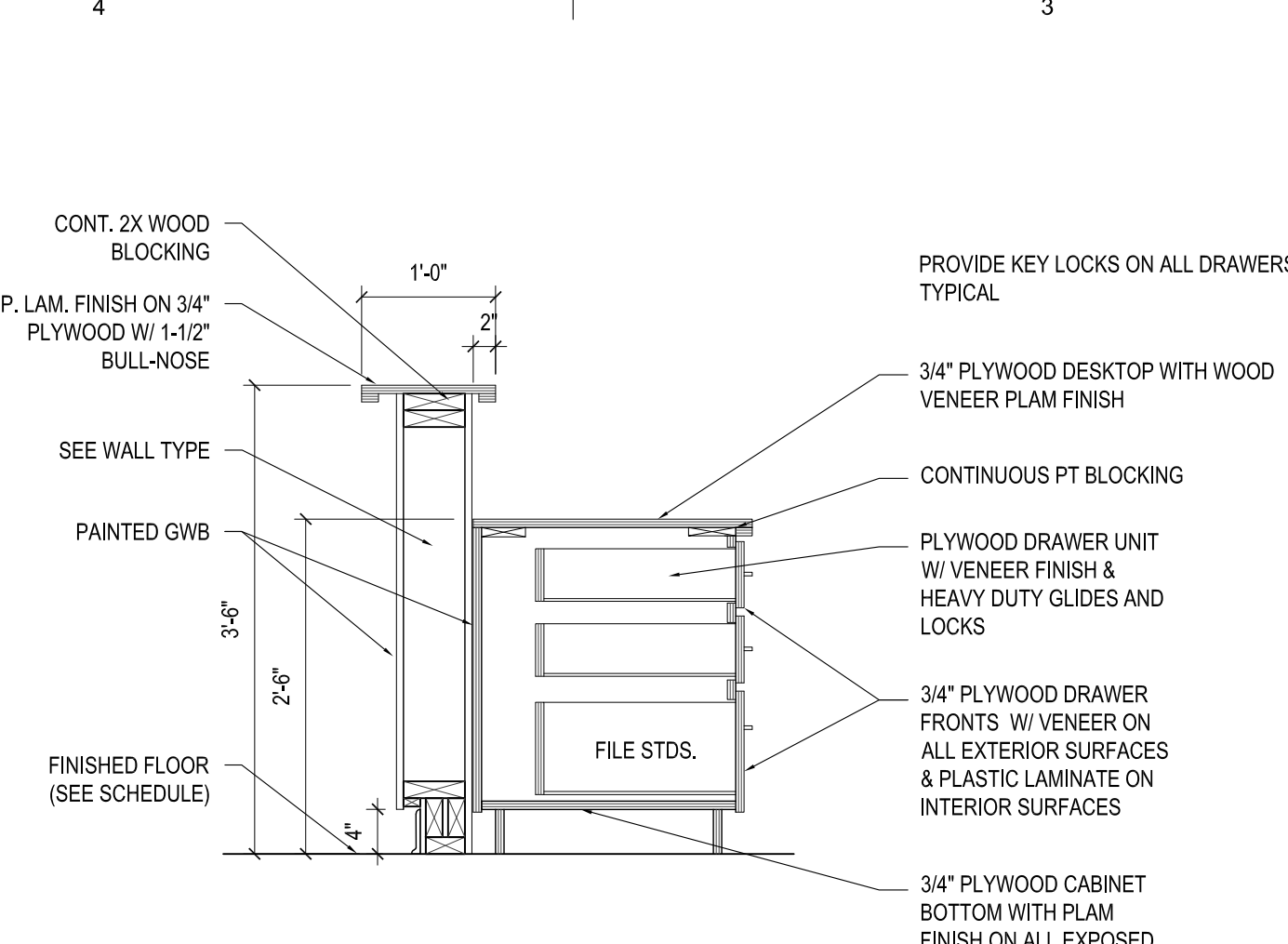
08 CASEWORK ELEVATION
SCALE: 3/4" = 1'-0"



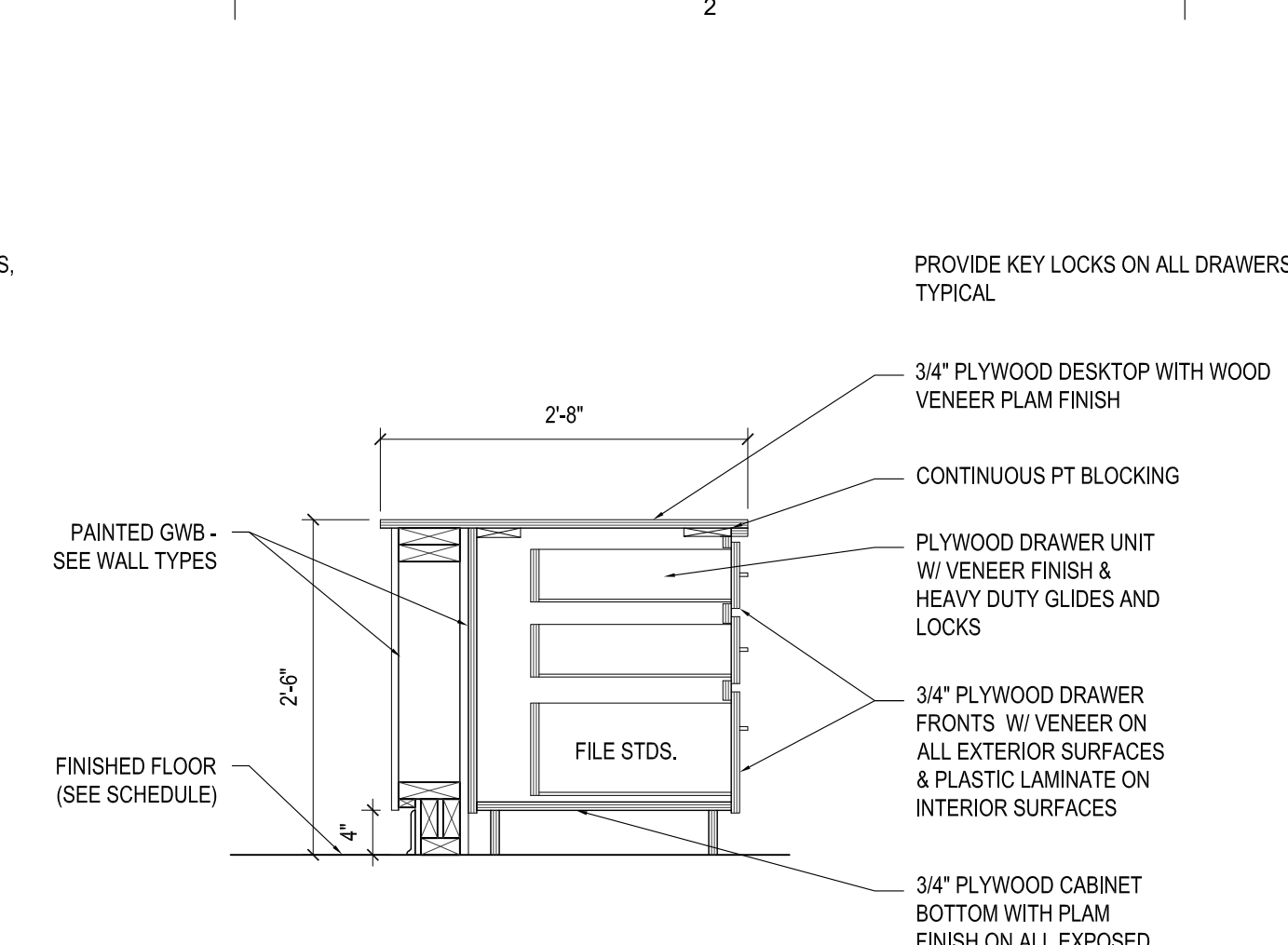
07 CASEWORK ELEVATION
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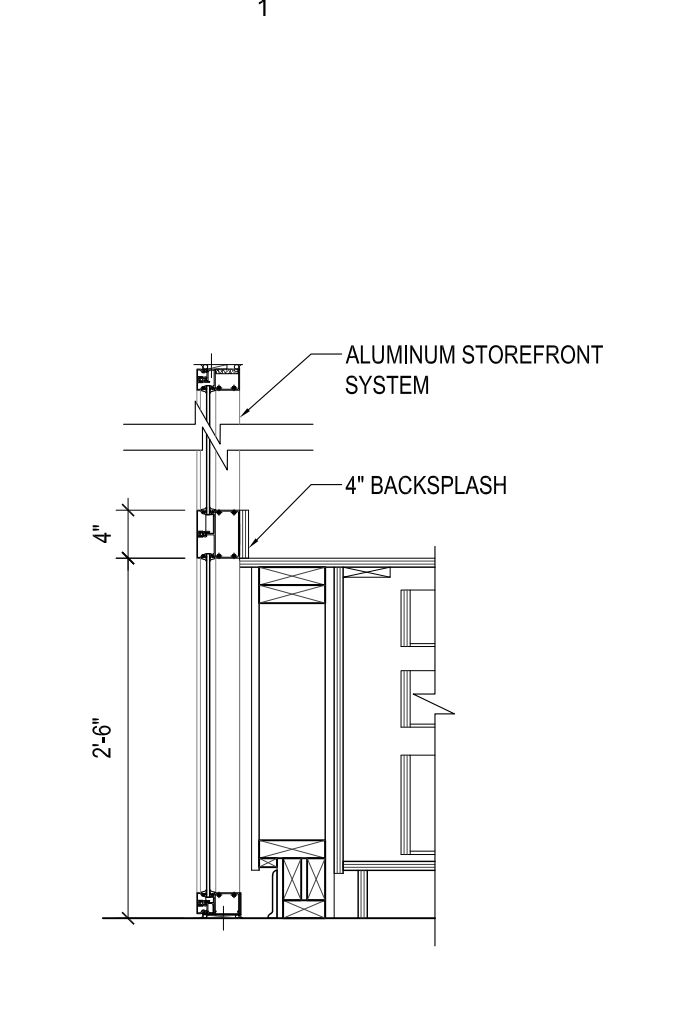
06 CASEWORK ELEVATION
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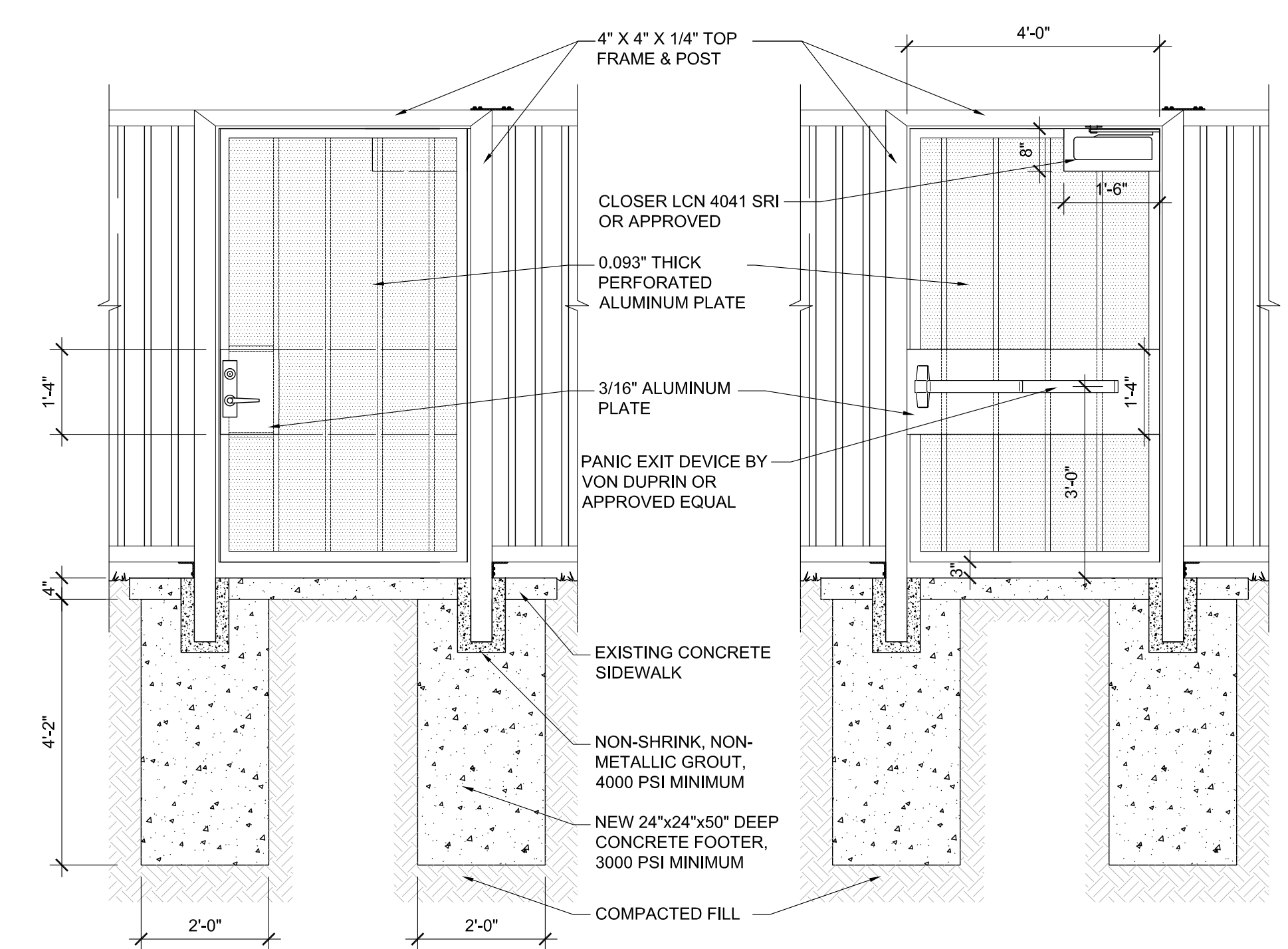
09 CASEWORK SECTION
SCALE: 3/4" = 1'-0"



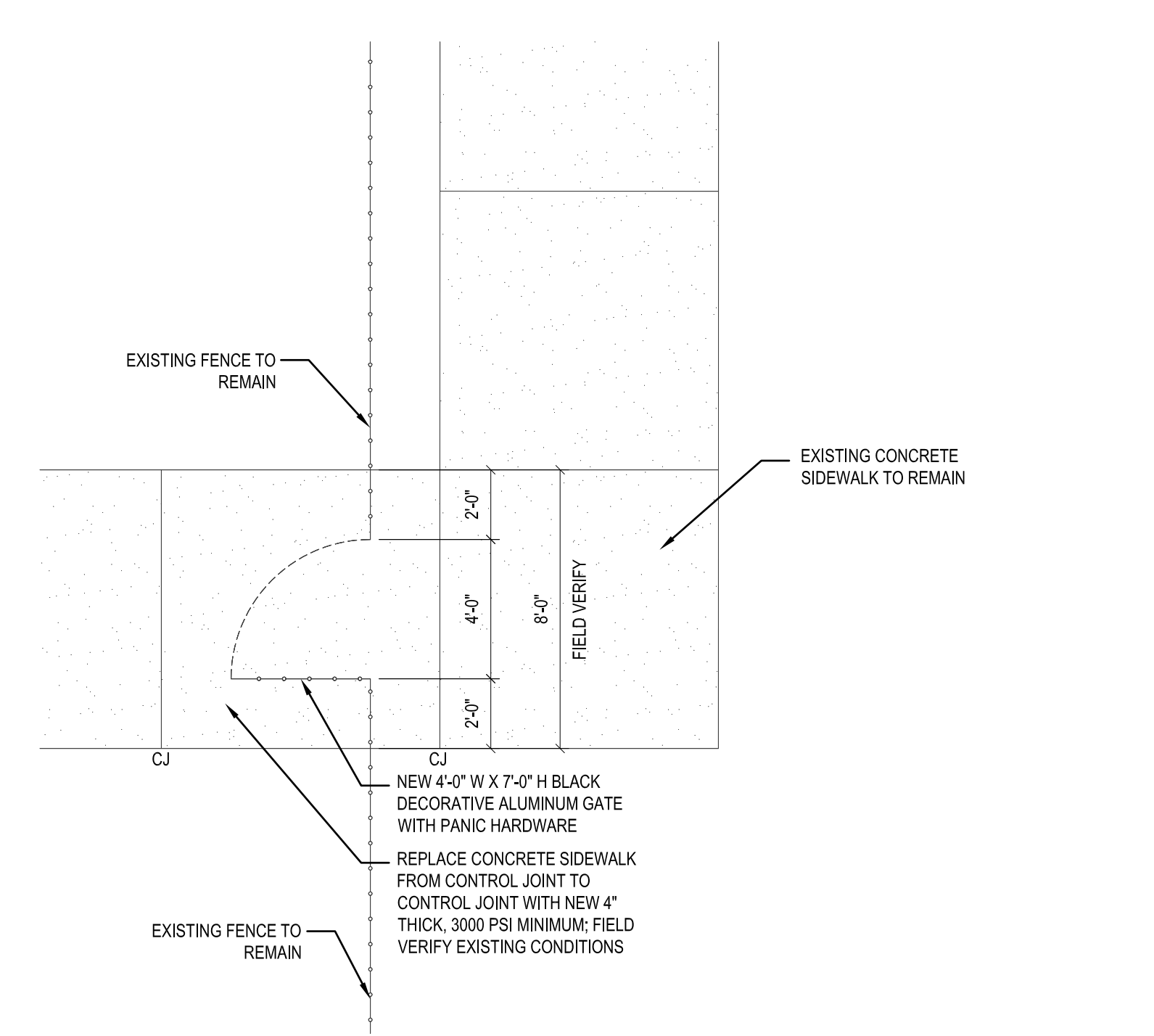
10 CASEWORK SECTION
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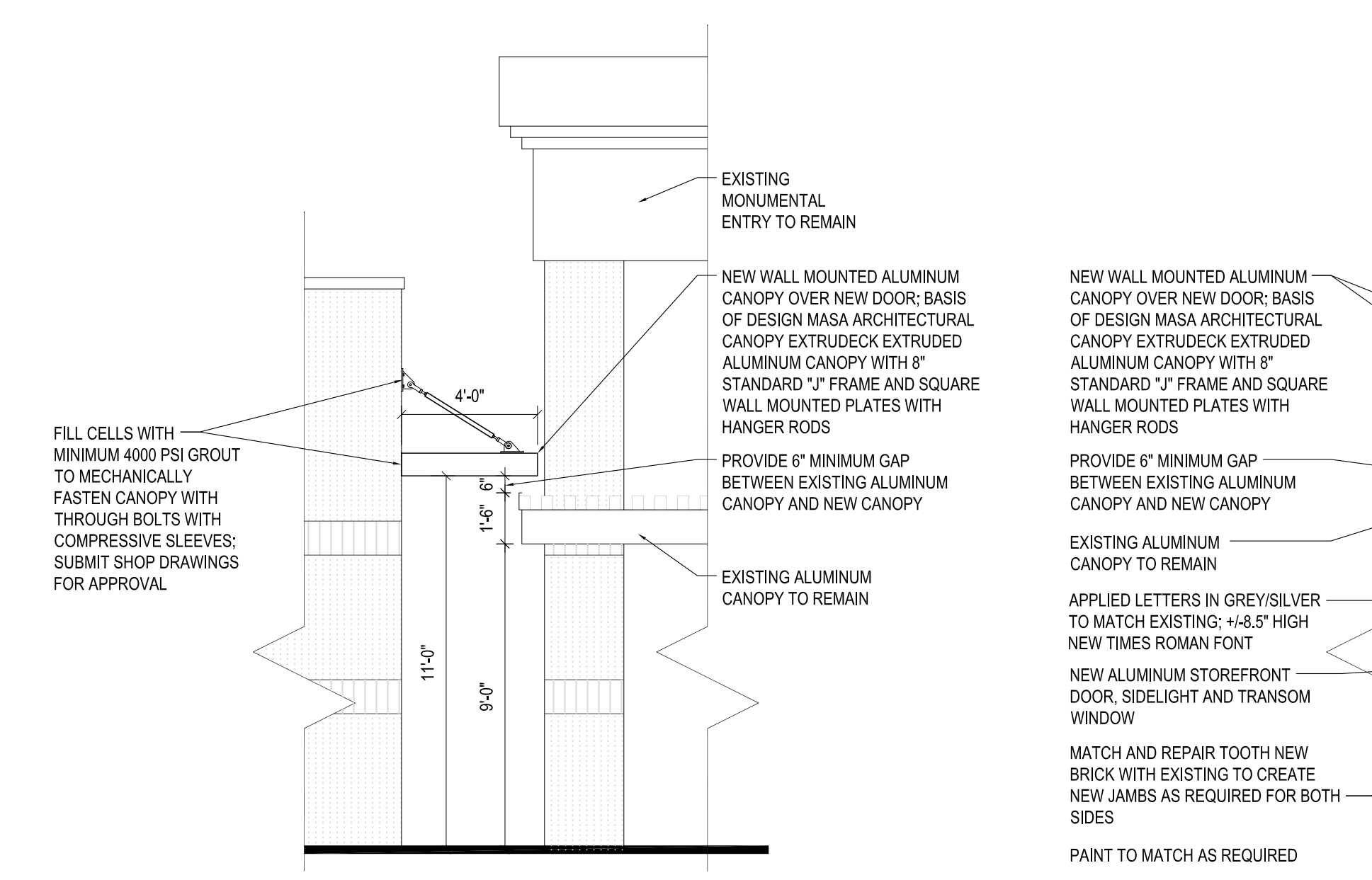
11 BACKSPLASH DETAIL
SCALE: 3/4" = 1'-0"



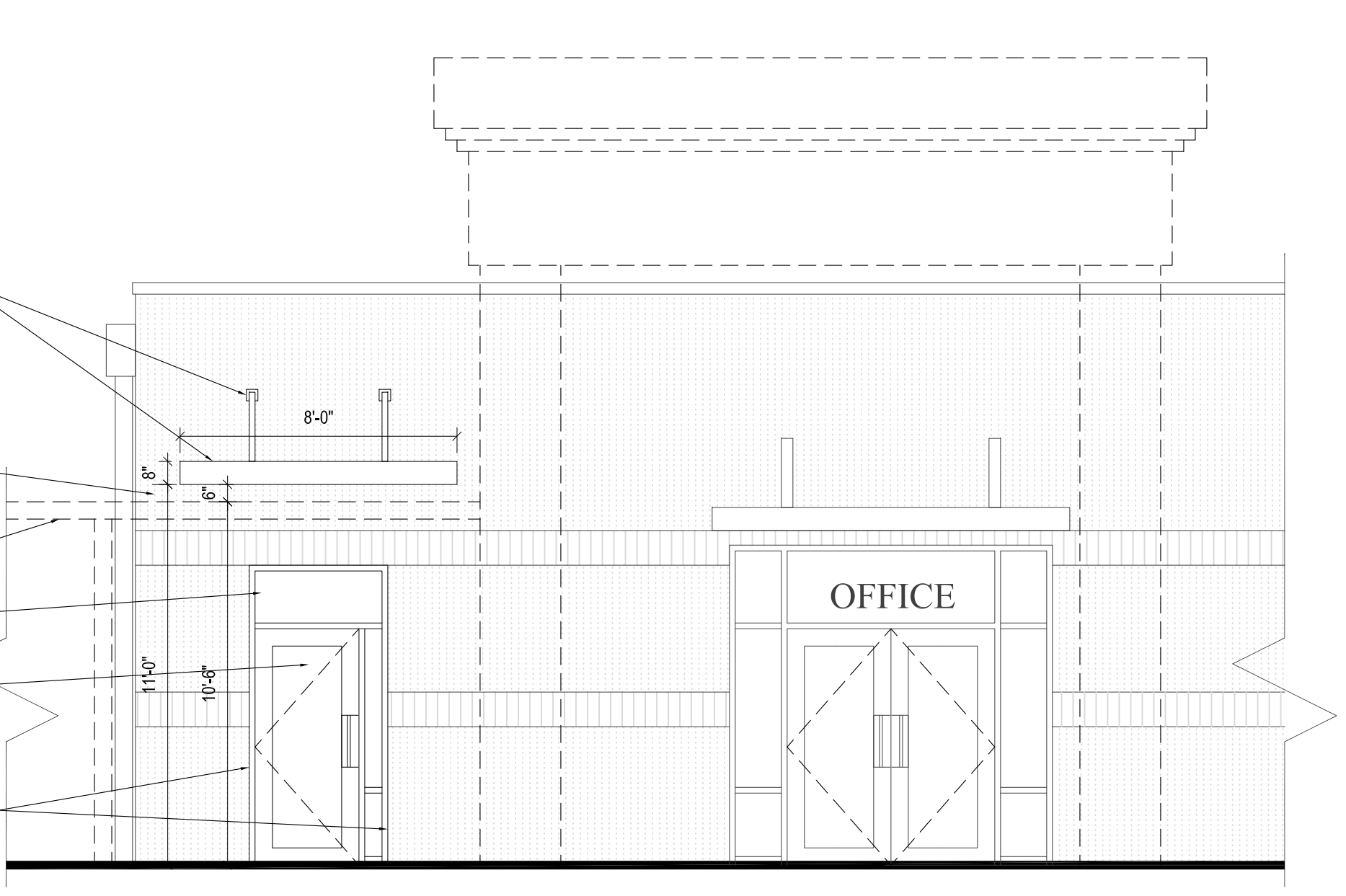
05 GATE DETAIL
SCALE: 1/2" = 1'-0"



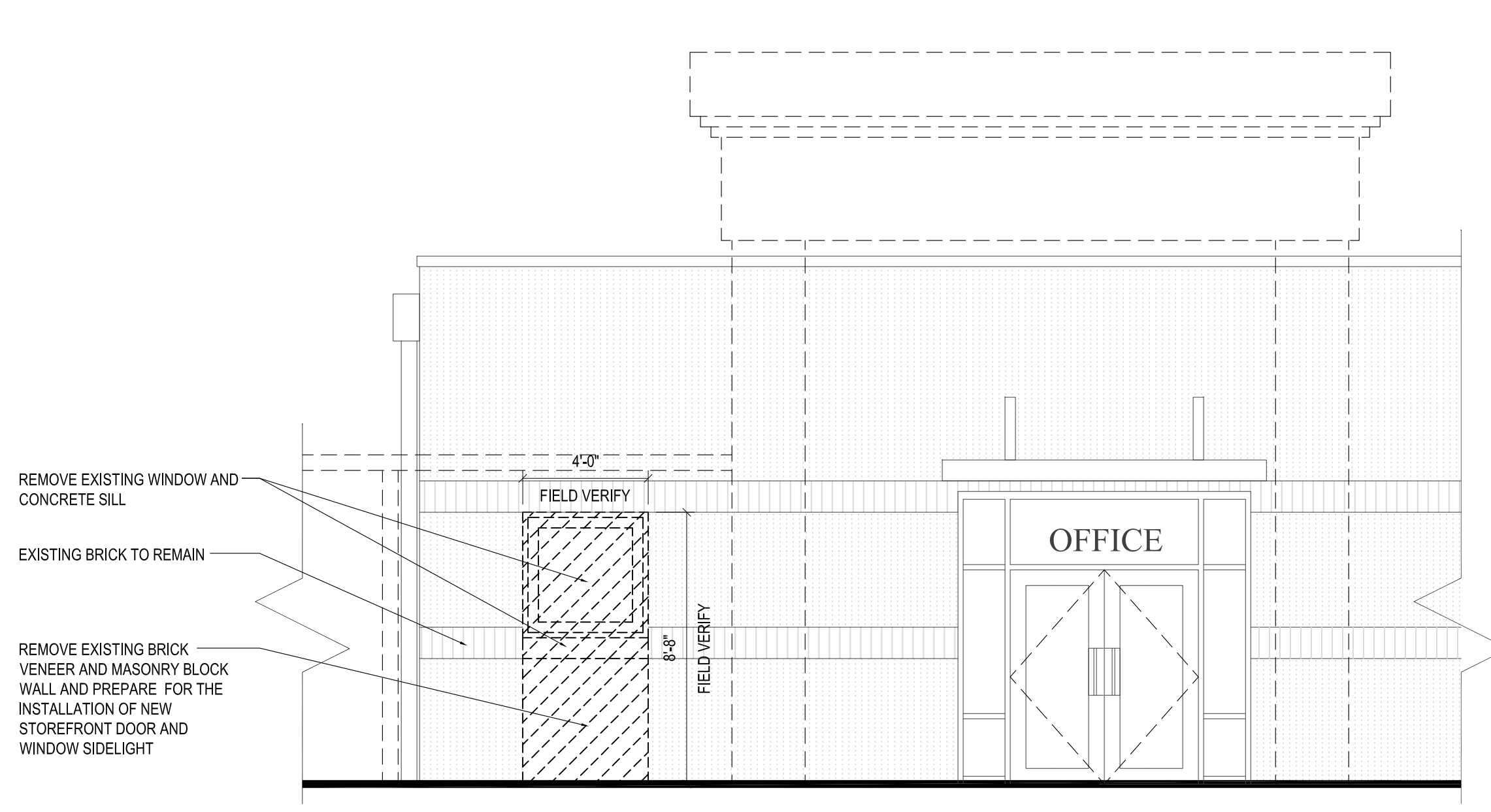
04 ENLARGED PLAN
SCALE: 1/4" = 1'-0"



03 ELEVATION - PROPOSED
SCALE: 1/4" = 1'-0"



02 ELEVATION - PROPOSED
SCALE: 1/4" = 1'-0"

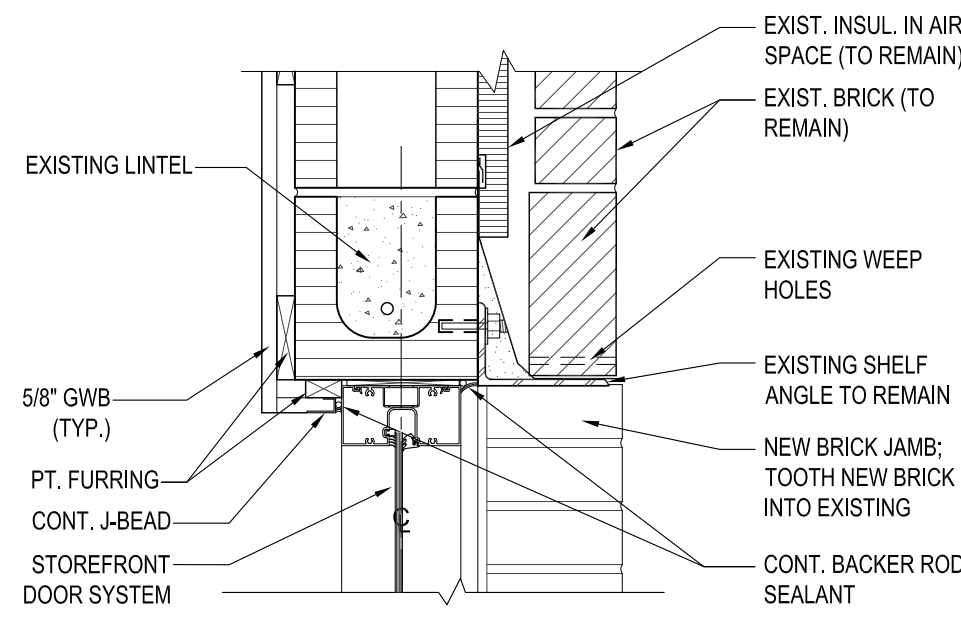


01 ELEVATION - DEMO
SCALE: 1/4" = 1'-0"

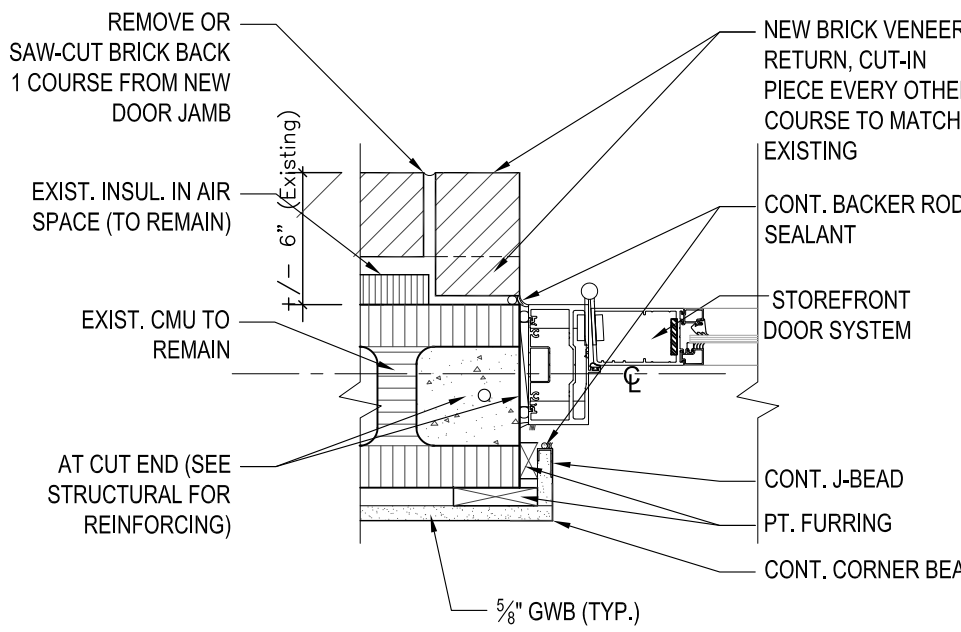
Revisions		
No.	Date	Note

TO THE BEST OF MY KNOWLEDGE, THE PLANS AND SPECIFICATIONS COMPLY WITH THE MINIMUM BUILDING CODES.

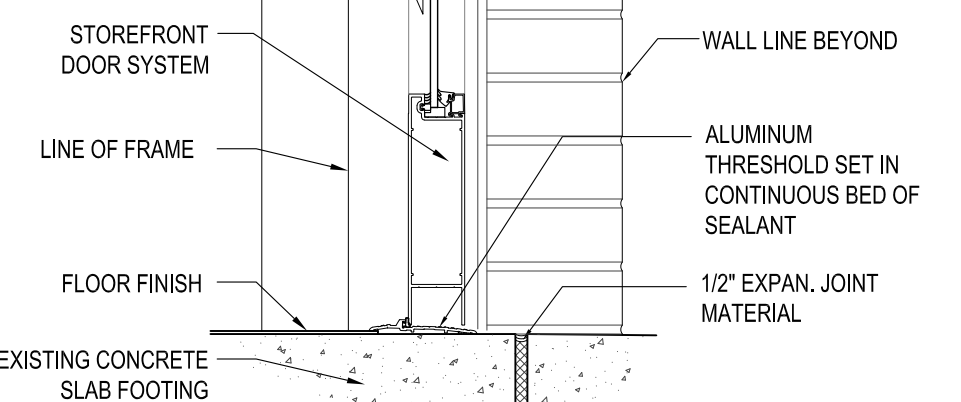
STOREFRONT - DOOR @ BRICK



14 STOREFRONT HEAD DETAIL (BRICK) -H5
SCALE: 1-1/2"=1'-0"

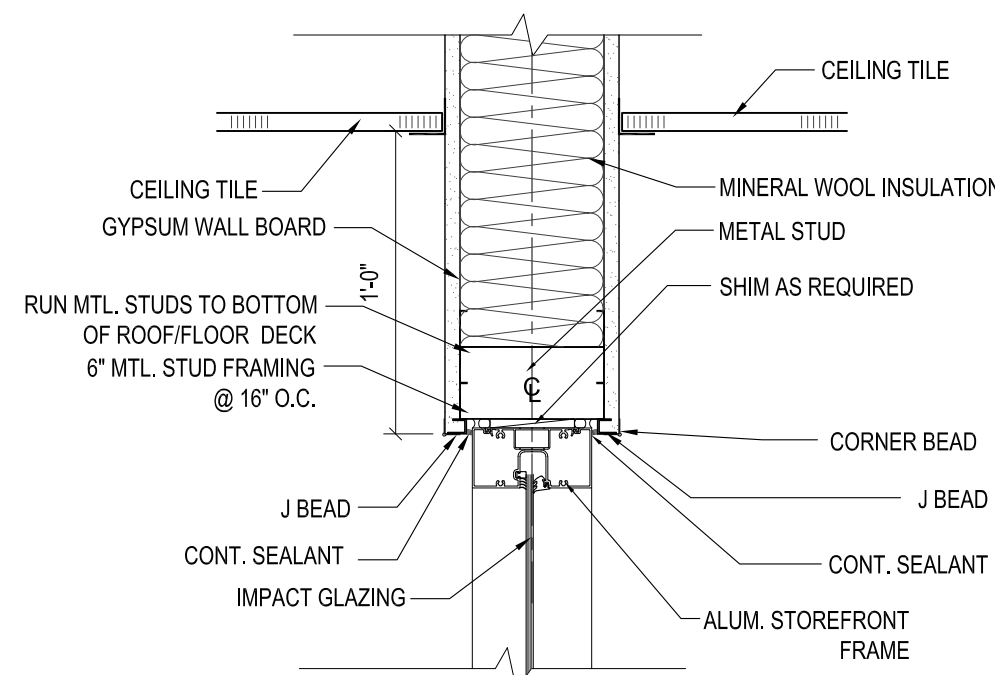


15 STOREFRONT JAMB DETAIL (BRICK) -J5
SCALE: 1-1/2"=1'-0"

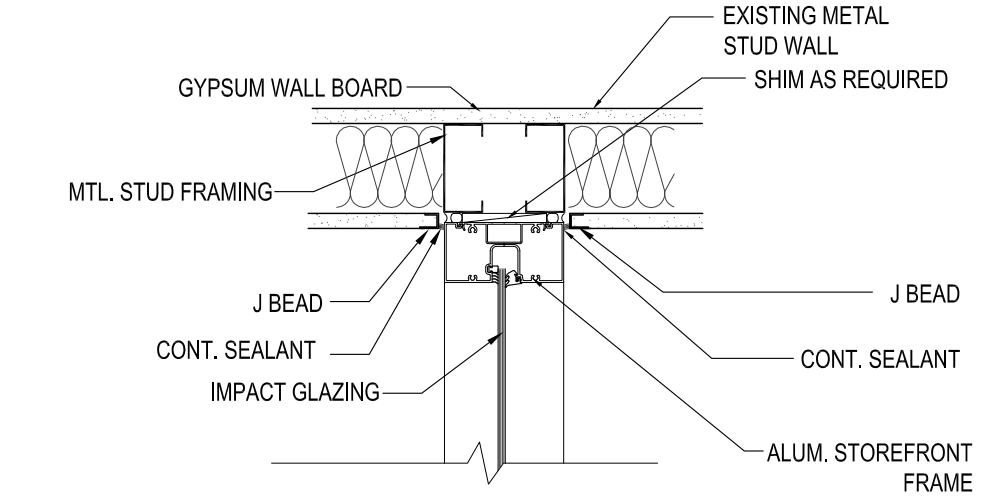


16 DOOR THRESHOLD DETAIL (BRICK) -S5
SCALE: 1-1/2"=1'-0"

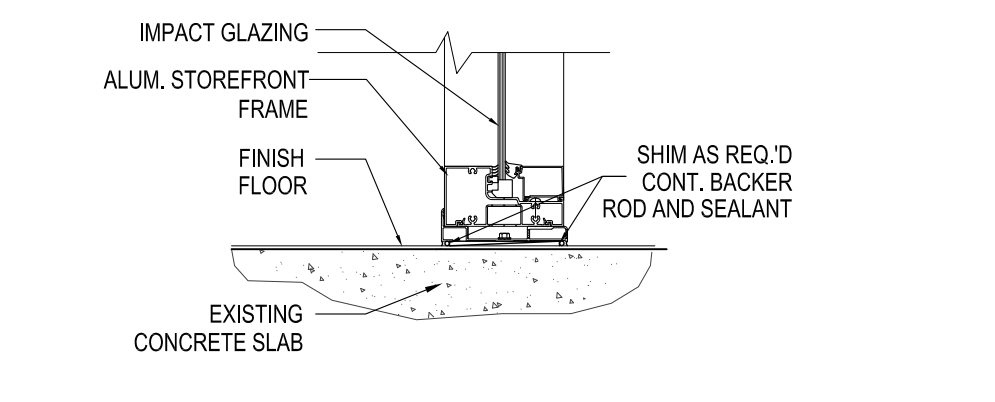
STOREFRONT - WINDOWS



11 STOREFRONT HEAD DETAIL
SCALE: 1-1/2"=1'-0"

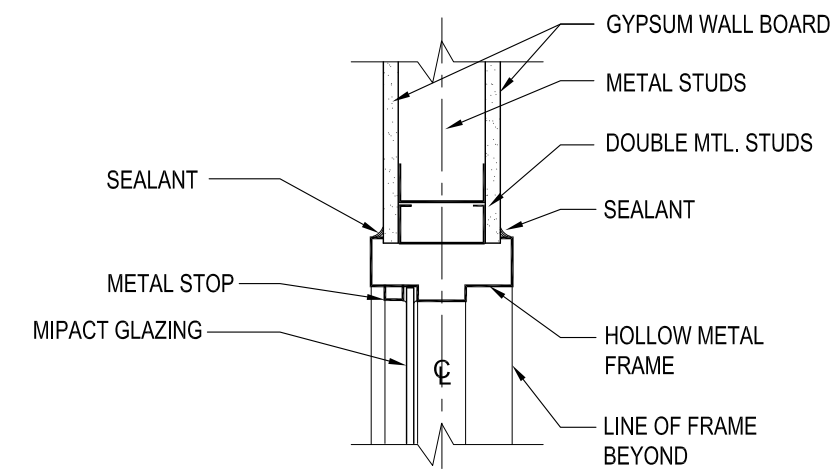


12 STOREFRONT JAMB DETAIL
SCALE: 1-1/2"=1'-0"

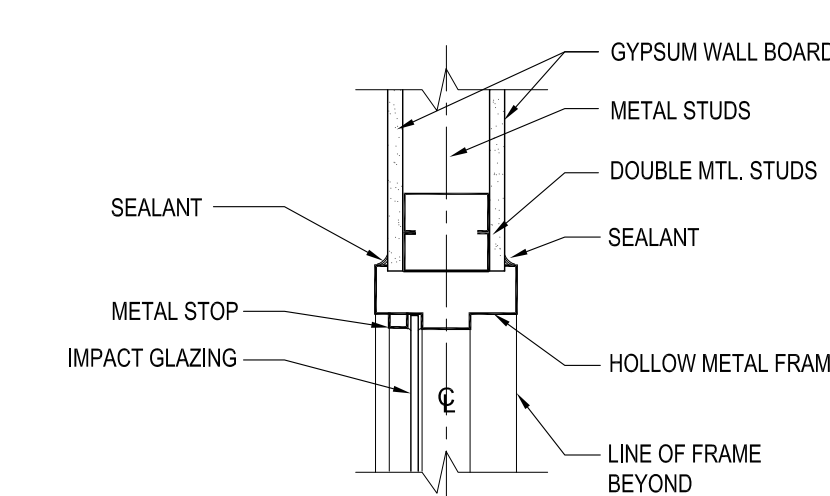


13 STOREFRONT SILL DETAIL
SCALE: 1-1/2"=1'-0"

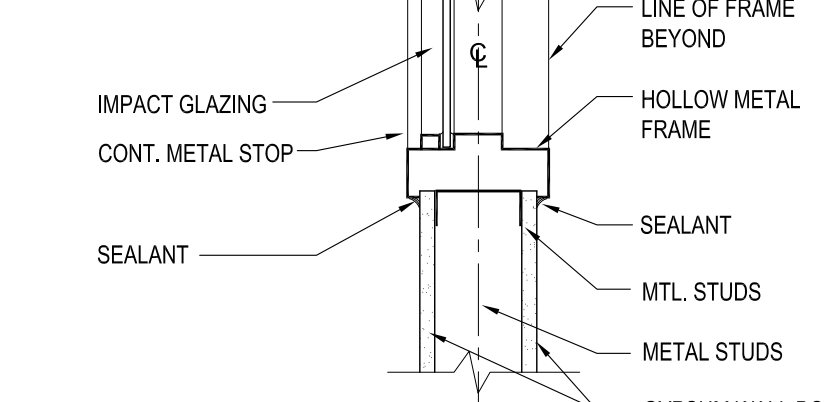
WINDOWS



08 WINDOW HEAD DETAIL-H4
SCALE: 1-1/2"=1'-0"

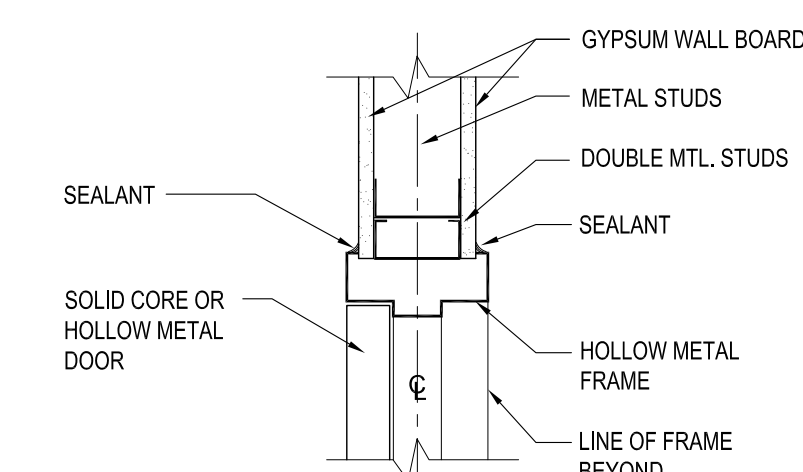


09 WINDOW JAMB DETAIL-J4
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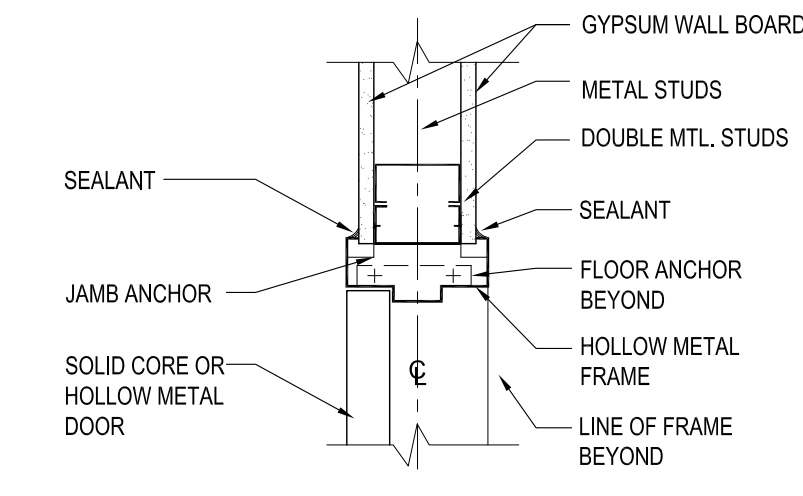


10 WINDOW SILL DETAIL-S4
SCALE: 1-1/2"=1'-0"

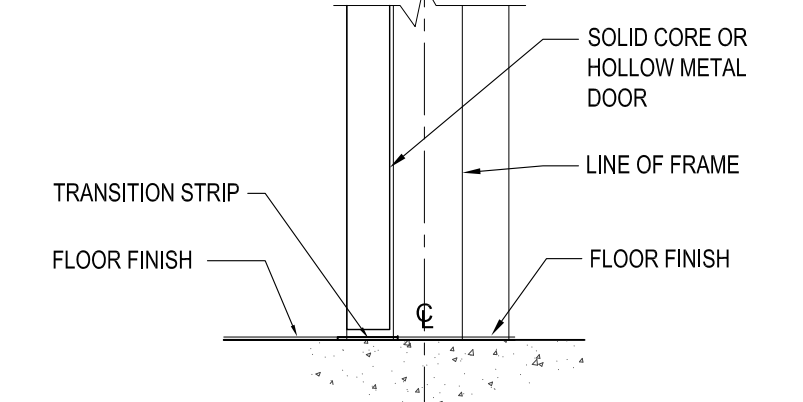
DOORS



05 HEAD DETAIL -H3
SCALE: 1-1/2"=1'-0"

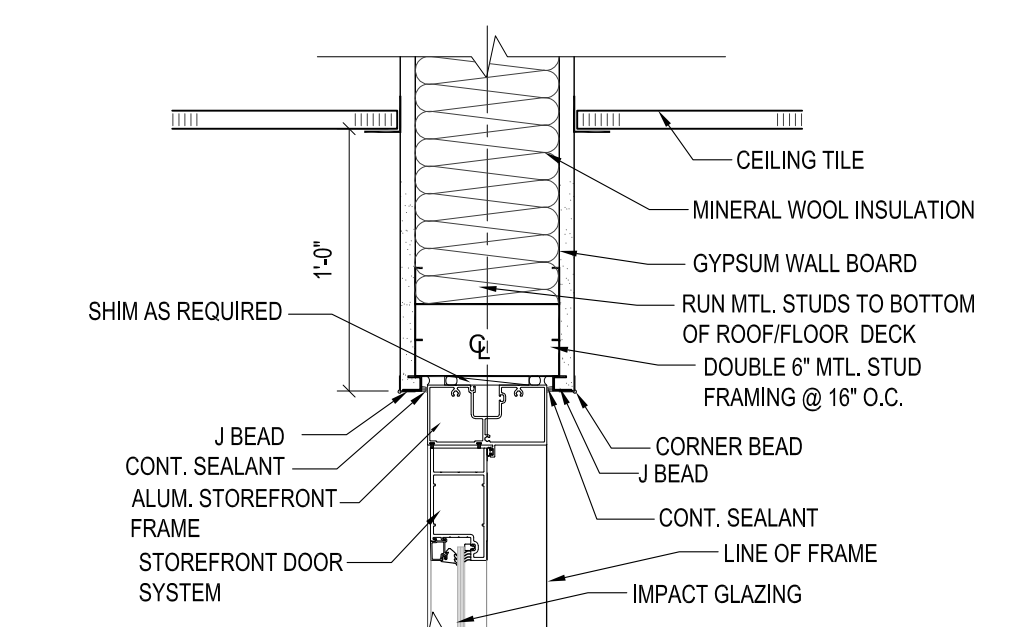


06 JAMB DETAIL-J3
SCALE: 1-1/2"=1'-0"

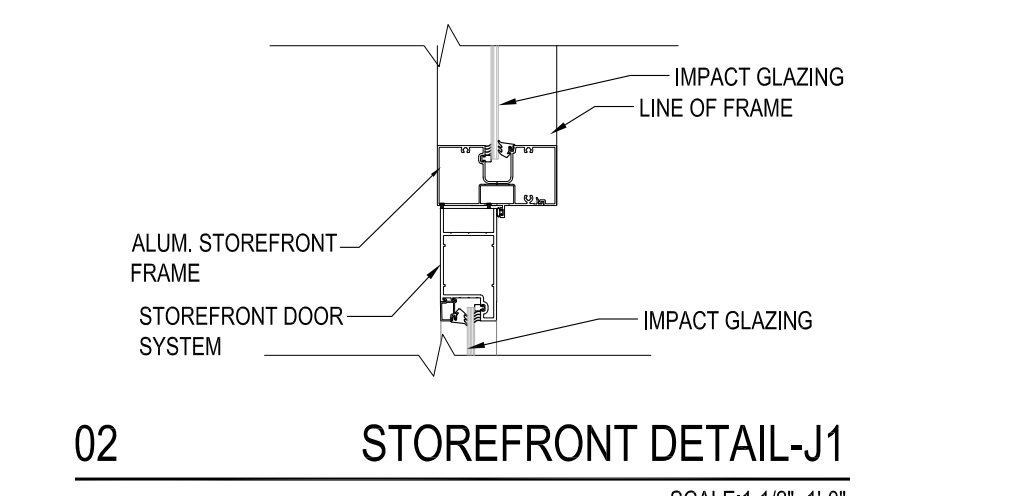


07 SILL DETAIL-S3
SCALE: 1-1/2"=1'-0"

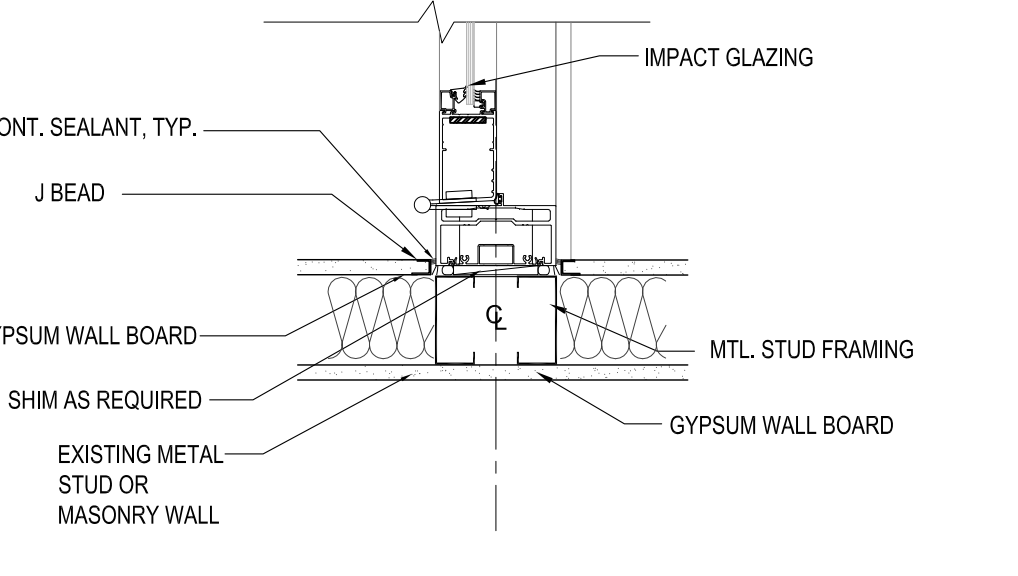
STOREFRONT - DOORS



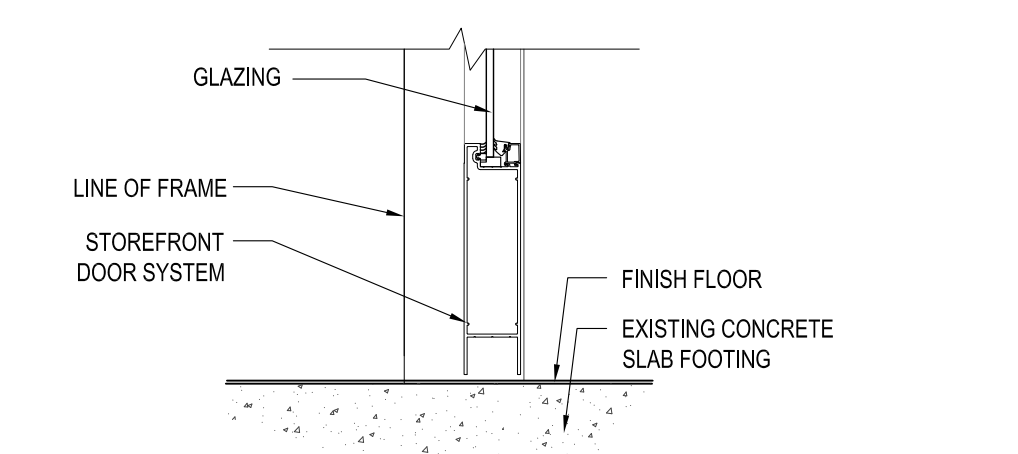
01 STOREFRONT DETAIL-H1
SCALE: 1-1/2"=1'-0"



02 STOREFRONT DETAIL-J1
SCALE: 1-1/2"=1'-0"



03 STOREFRONT DETAIL-J2
SCALE: 1-1/2"=1'-0"



04 STOREFRONT DETAIL-S1
SCALE: 1-1/2"=1'-0"

HARDWARE GROUP NO. 06 - EXTERIOR CARD ACCESS

Provide each PR door(s) with the following:

QTY	DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3EA	HINGE	5BB1 4.5 X 4.5 NRP	630	IVE
1EA	POWER TRANSFER	EPT10	689	VON
1EA	ELEC PANIC HARDWARE	RX-EL-9947-NL-OP-110MD	626	VON
1EA	RIM CYLINDER	1E62	626	BES
1EA	SURFACE CLOSER	4040XP CSUSH	689	LCN
1EA	PA MOUNTING PLATE	4040-18PA	689	LCN
1EA	POWER SUPPLY	PS914 900-2RS	LGR	VON

HURRICANE CODE COMPLIANT OPENING. BALANCE OF HARDWARE BY DOOR MANUFACTURER. CARD ACCESS SYSTEM AND CARD READER TO BE SUPPLIED BY DIVISION 28.

HARDWARE GROUP NO. 15 - CARD ACCESS

Provide each PR door(s) with the following:

QTY	DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3EA	HINGE	5BB1 4.5 X 4.5 NRP	652	IVE
1EA	STOREROOM LOCK	T581BDC DANE	626	FAL
1EA	PERMANENT CORE	1 C CORE	626	BES
1EA	ELECTRIC STRIKE	6211 FSE	630	VON
1EA	SURFACE CLOSER	4040XP REG OR PA AS REQ	689	LCN
1EA	WALL STOP	WS406/407CVX	630	IVE

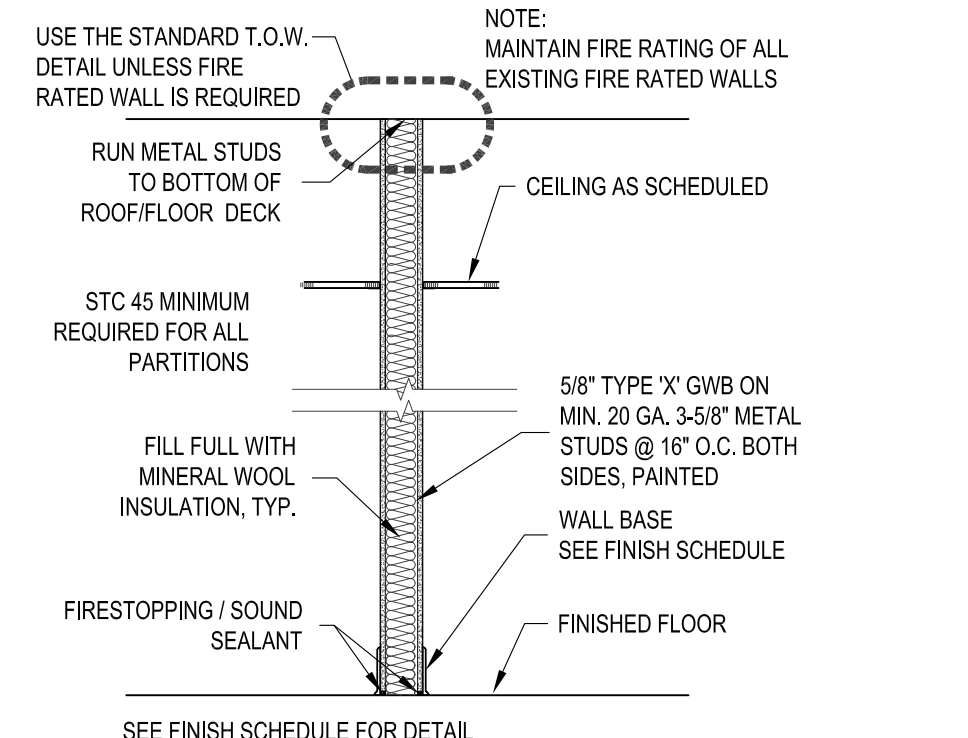
BALANCE OF HARDWARE BY DOOR MANUFACTURER. CARD ACCESS SYSTEM AND CARD READER TO BE SUPPLIED BY DIVISION 28.

HARDWARE GROUP NO. 17 - CARD ACCESS

Provide each SGL door(s) with the following:

QTY	DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3EA	HINGE	5BB1 4.5 X 4.5 NRP	652	IVE
1EA	PANIC TRANSFER	EPT10	689	VON
1EA	ELEC PANIC HARDWARE	QEL-99-L-06 24 VDC	626	VON
1EA	SURFACE CLOSER	4040XP EDA	689	LCN
1EA	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE
1EA	WALL STOP	WS406/407CVX	630	IVE
1EA	RIM CYLINDER	1E62	626	BES
3EA	SILENCER	SR64	GRY	IVE
1EA	POWER SUPPLY	PS902	LGR	VON

CARD ACCESS SYSTEM AND CARD READER TO BE SUPPLIED BY DIVISION 28.



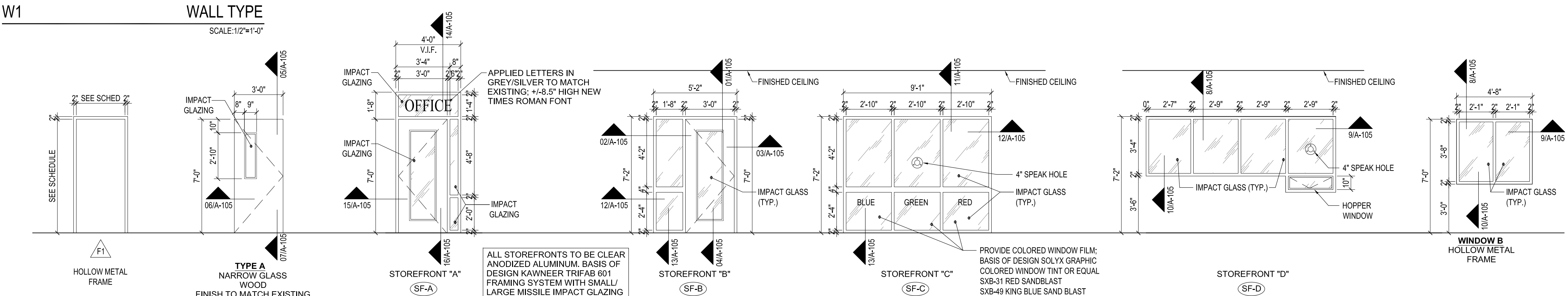
W1 WALL TYPE
SCALE: 1/2"=1'-0"

DOOR SCHEDULE

NUMBER	TYPE	DOOR SIZE			FRAME		HEAD	JAMB	SILL	HDW GROUP	NOTES
		WD	HGT	THK	MATL	MATL					
1-101	A	3'-0"	7'-0"	1 3/4"	SC	F1	H3	J3	S3	17	ELECTRIC STRIKE RELEASE; CARD READER
1-101D_1	SF-A	3'-0"	7'-0"	1 3/4"	ALUM	SF-A	ALUM	H5	J5	06	ELECTRIC STRIKE RELEASE; CARD READER
1-101D_2	SF-B	3'-0"	7'-0"	1 3/4"	ALUM	SF-B	ALUM	H1	J1/J2	15	ELECTRIC STRIKE RELEASE; CARD READER
1-102	A	3'-0"	7'-0"	1 3/4"	SC	F1	H3	J3	S3	17	ELECTRIC STRIKE RELEASE; CARD READER

ROOM FINISH LEGEND

CODE	ITEM
P1	ECO-FRIENDLY, LOW VOC PAINT; FIELD COLOR - MATCH EXISTING; EGG-SHELL FINISH
P2	ECO-FRIENDLY, LOW VOC PAINT; ACCENT COLOR - MATCH EXISTING; EGG-SHELL FINISH
P3	ECO-FRIENDLY, LOW VOC PAINT; DOOR FRAME COLOR - MATCH EXISTING BLUE
PLAM-1	PLASTIC LAMINATE VERTICAL SURFACES - WILSONART STANDARD LAMINATE RUGGED LINEN 4989-38 FINE VELVET FINISH
PLAM-2	PLASTIC LAMINATE COUNTERTOP SURFACES - WILSONART STANDARD FINISH KHAKI BROWN D50-60 MATTE FINISH
VB	VINYL BASE - 4" STANDARD BASE - MATCH EXISTING COLOR: DARK BLUE



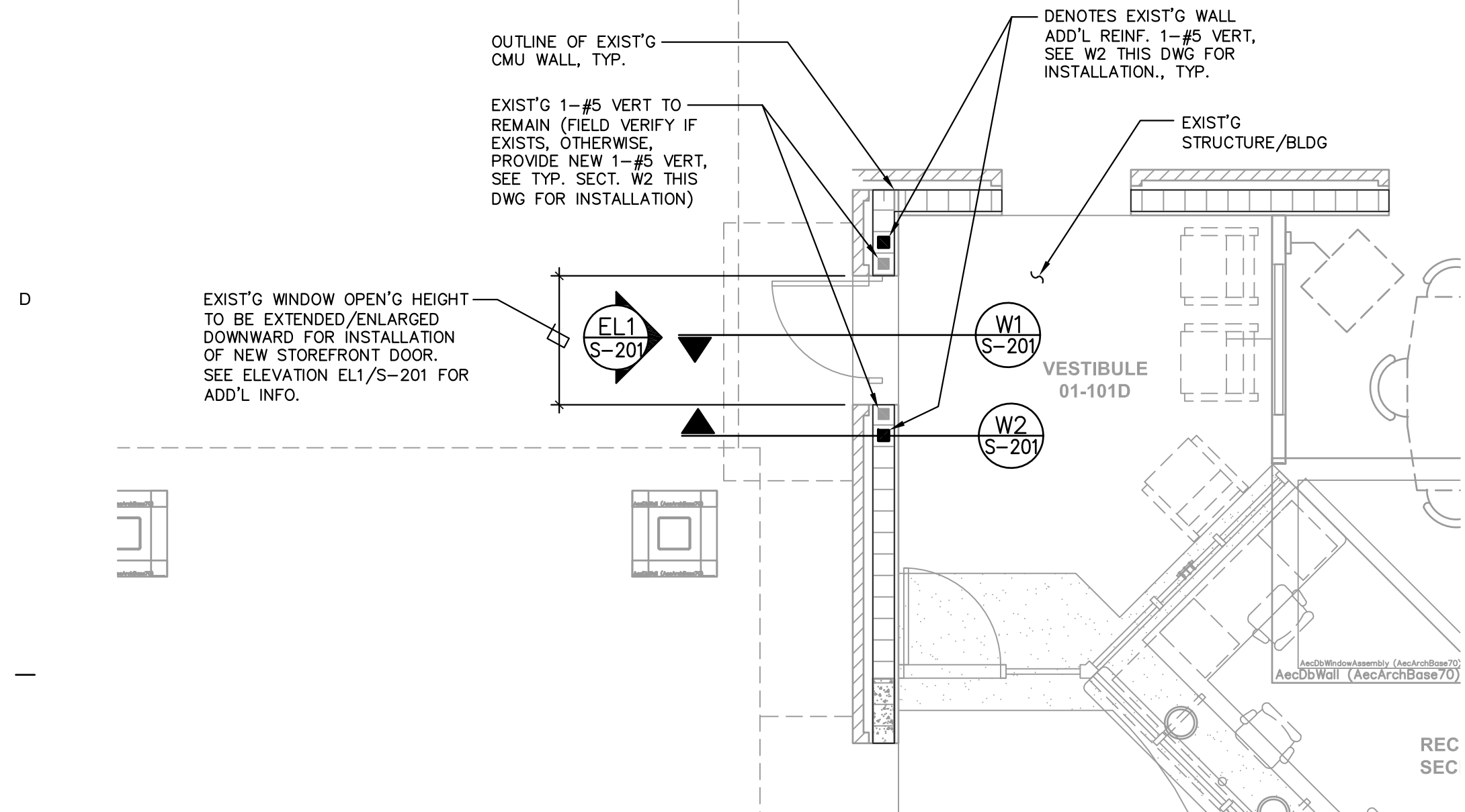
DOOR/WINDOW ELEVATIONS

SCALE: 1/4" = 1'-0"

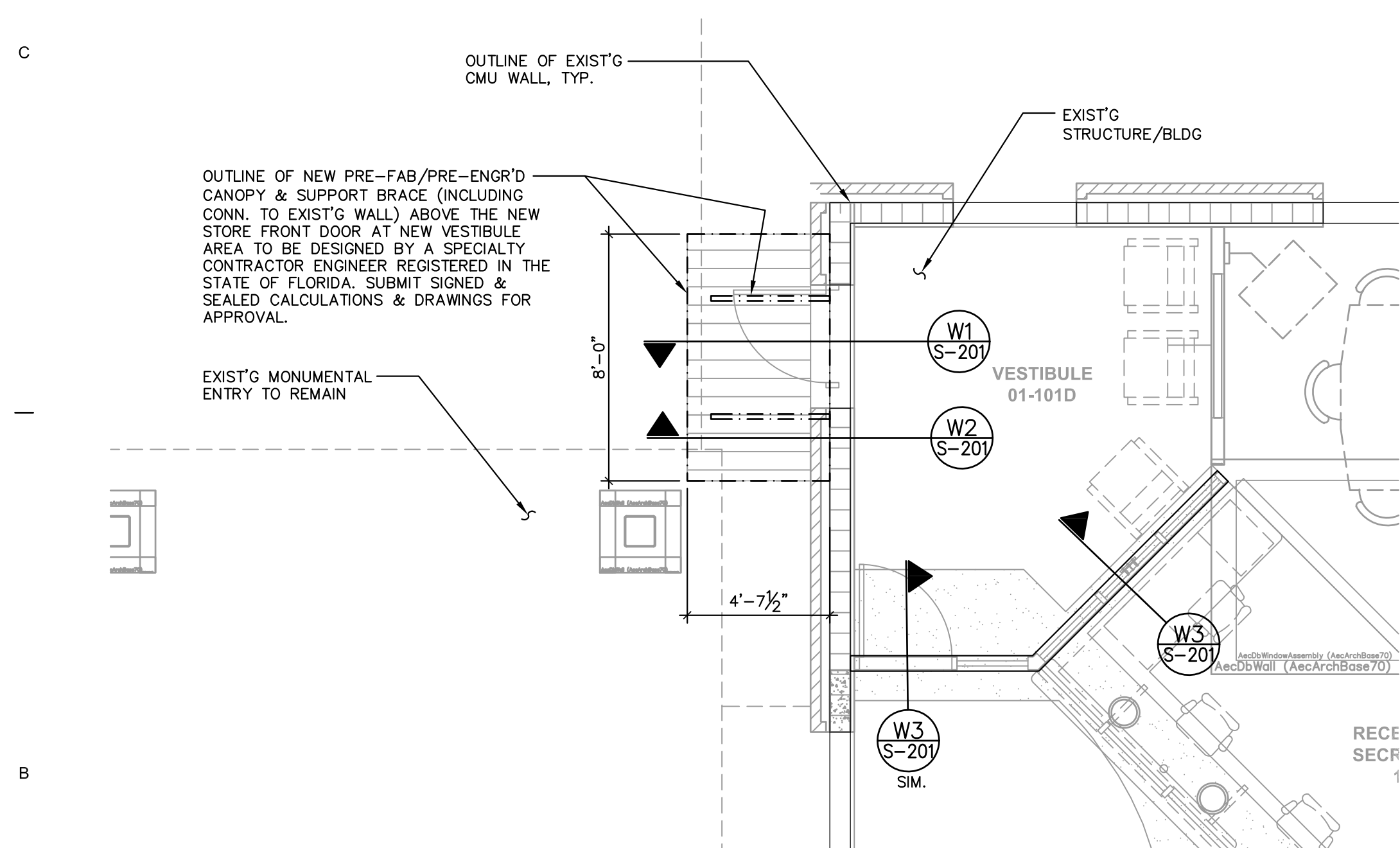
Revisions

No.	Date	Note

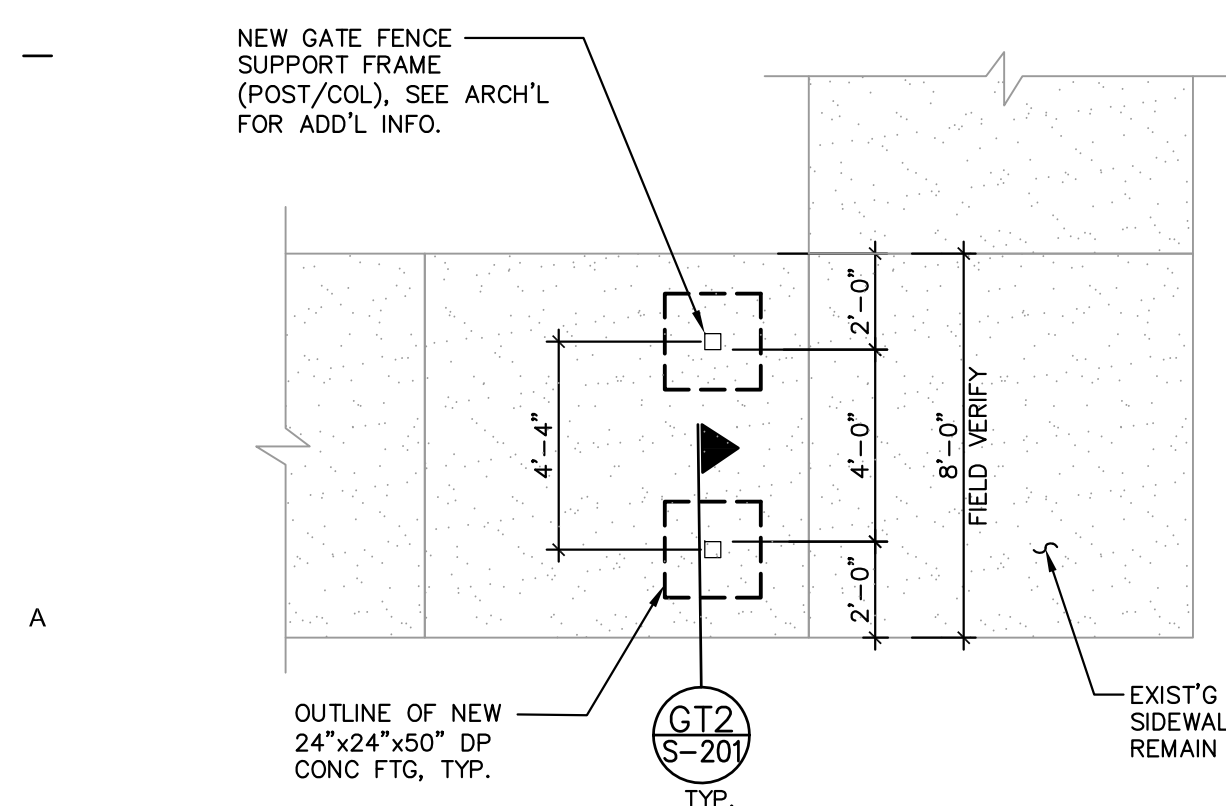
TO THE BEST OF MY KNOWLEDGE, THE PLANS AND SPECIFICATIONS COMPLY WITH THE MINIMUM BUILDING CODES.



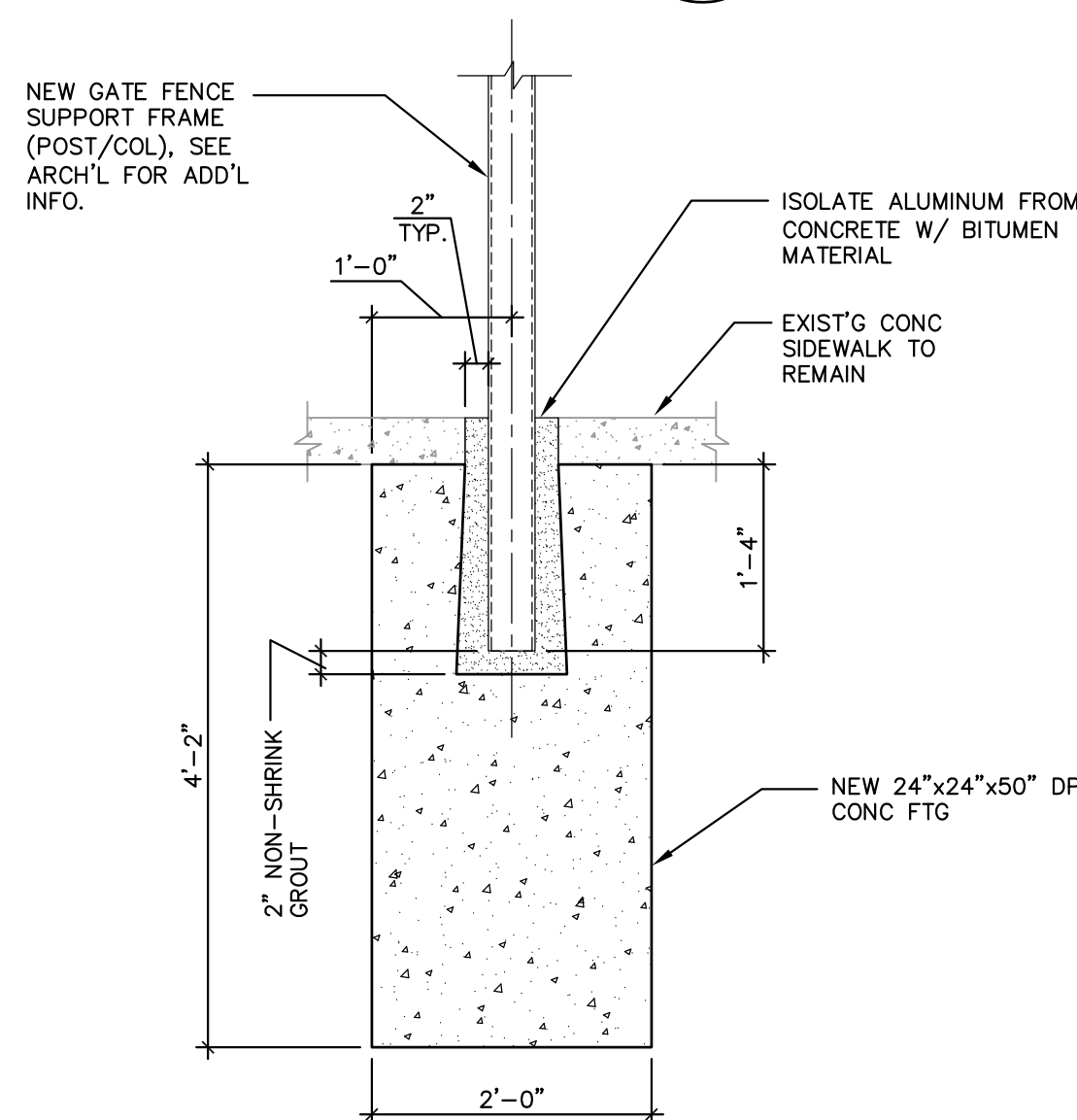
NEW FOUNDATION PLAN FOR NEW STOREFRONT DOOR AT NEW VESTIBULE AREA (RM. 01-101D)
SCALE: 1/4" = 1'-0"



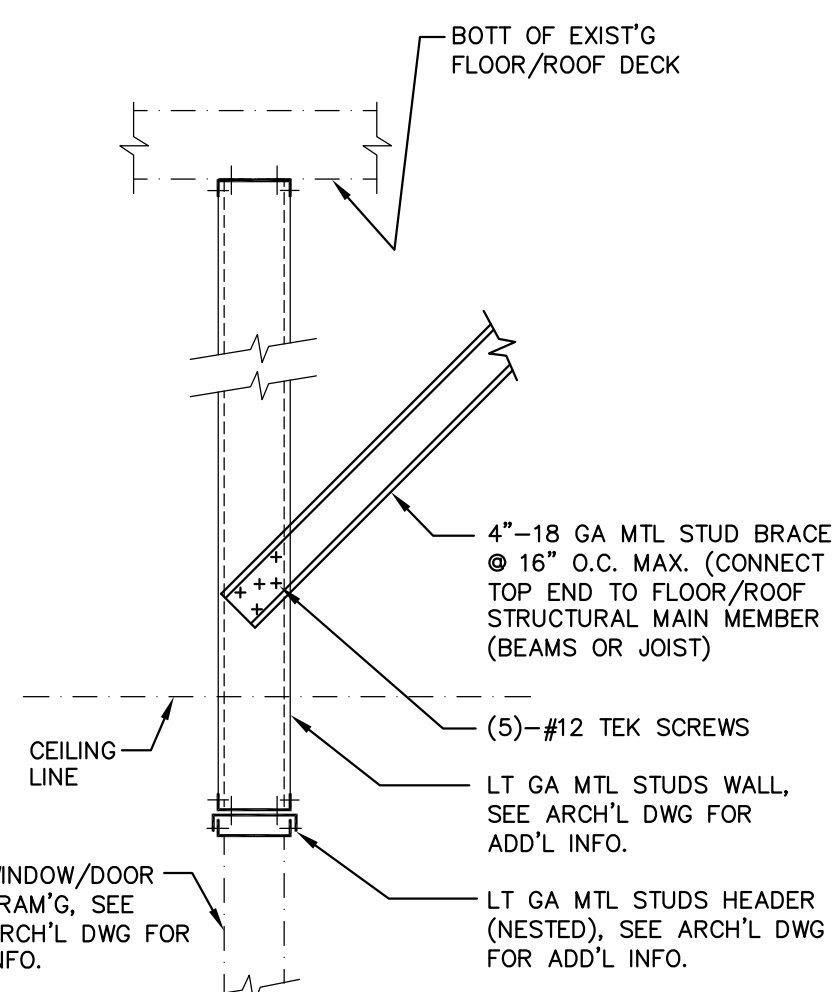
NEW PRE-FAB/PRE-ENGR'D CANOPY FRAM'G PLAN ABOVE NEW STOREFRONT DOOR AT NEW VESTIBULE AREA (RM. 01-101D)
SCALE: 1/4" = 1'-0"



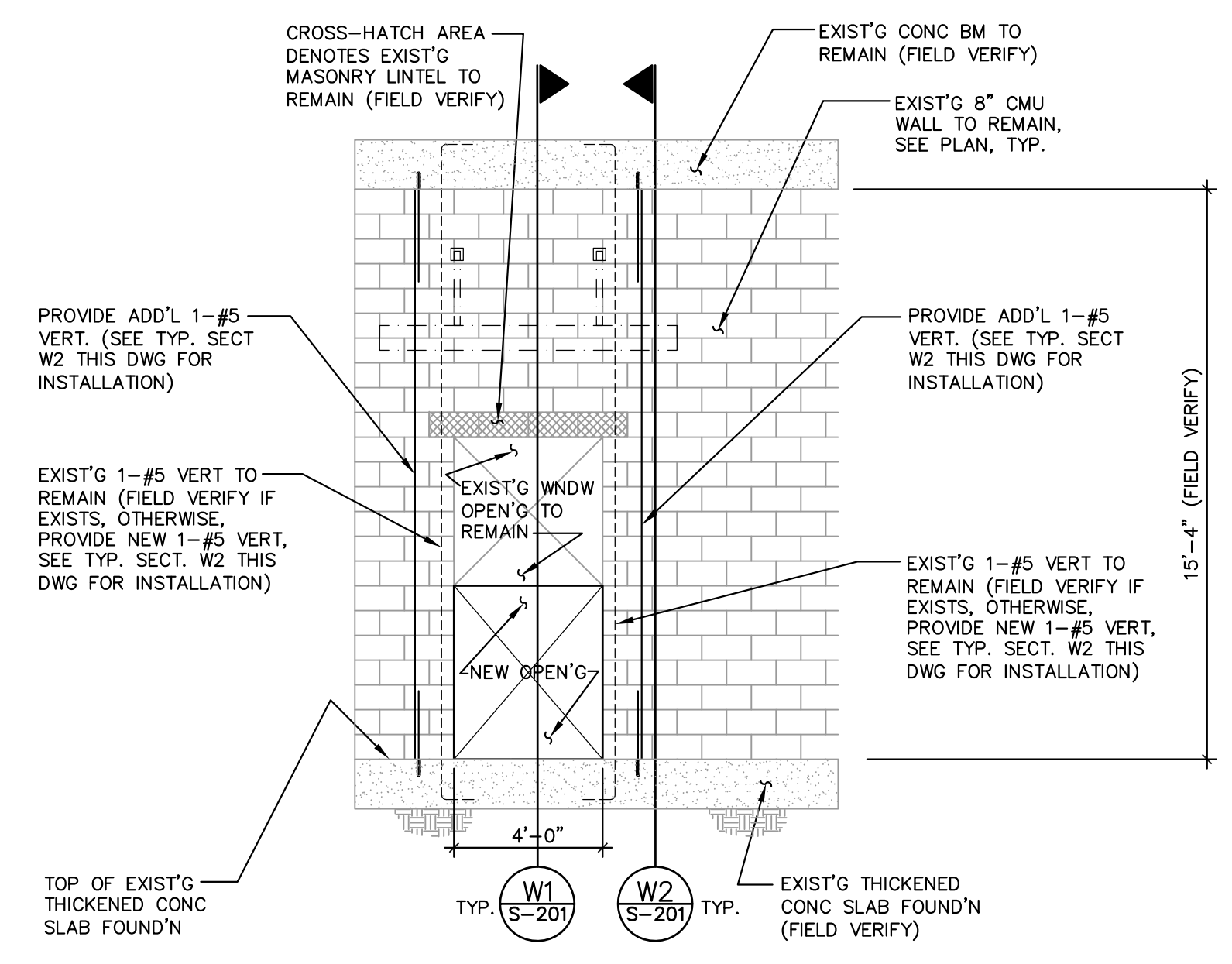
PLAN DETAIL @ NEW GATE
SCALE: 1/4" = 1'-0"



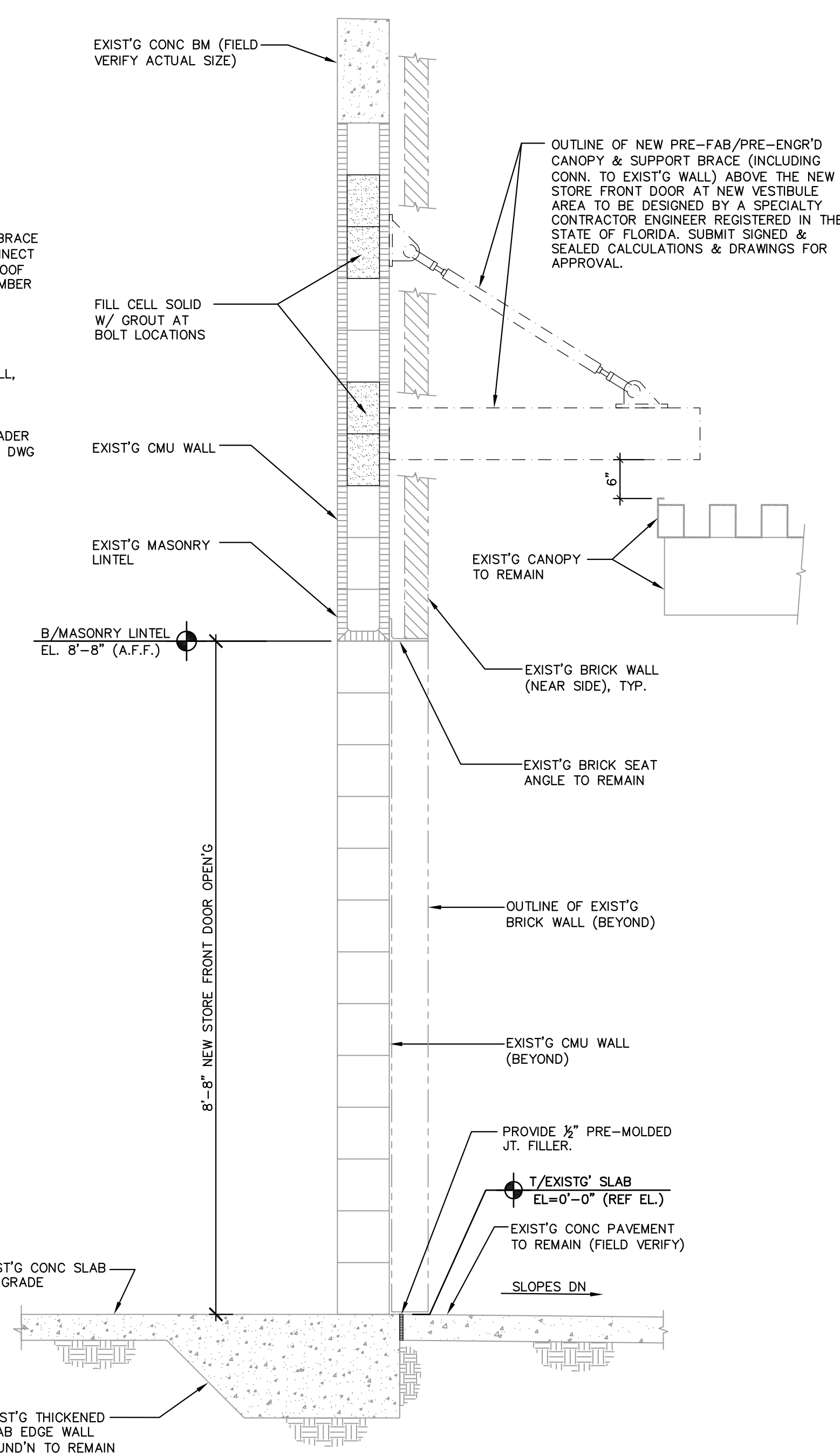
SECTION GT2
SCALE: 3/4" = 1'-0"



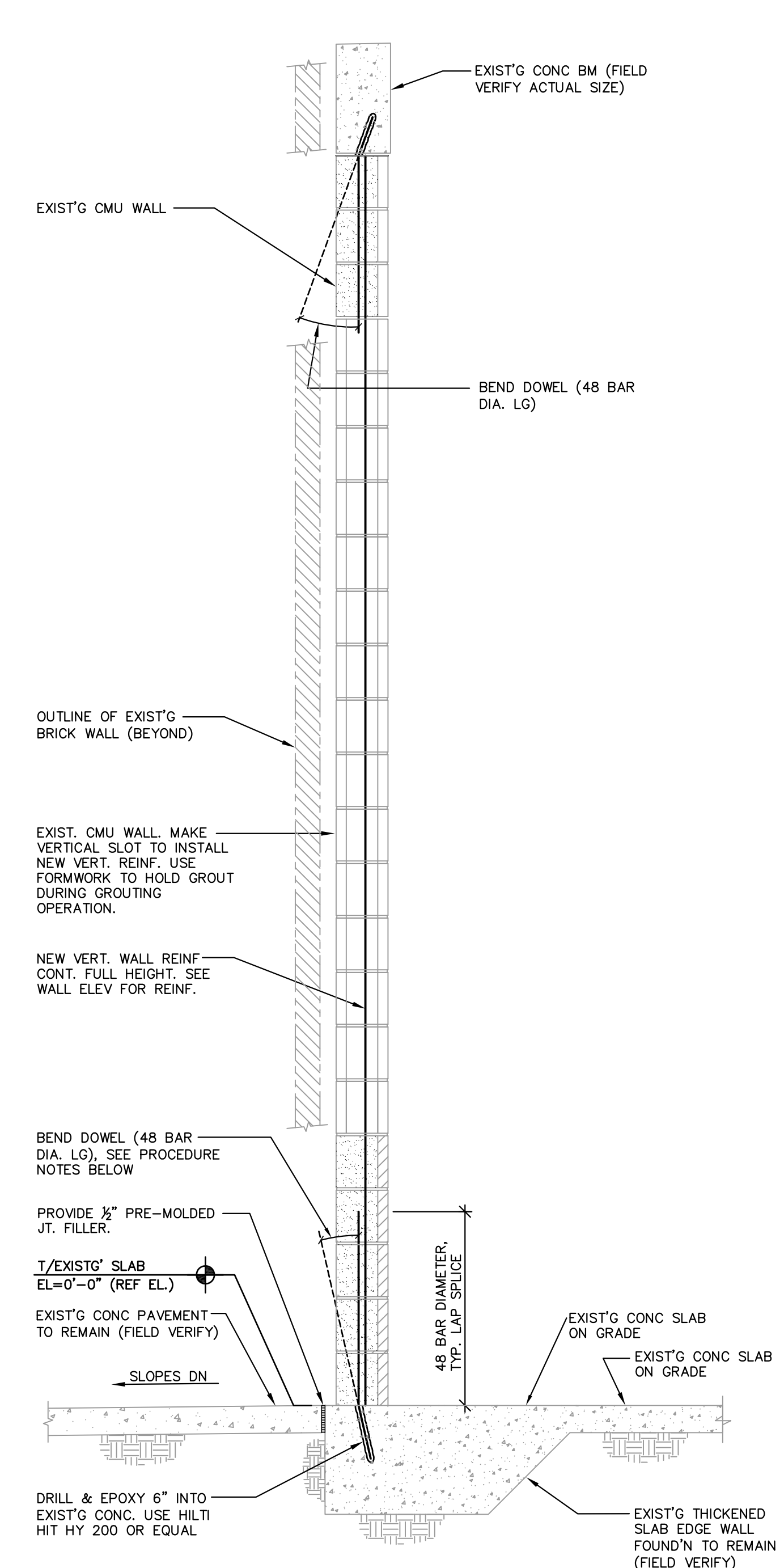
WALL SECTION W3
SCALE: 3/4" = 1'-0"



WALL ELEVATION EL1
SCALE: 1/4" = 1'-0"



WALL SECTION W1
SCALE: 3/4" = 1'-0"



WALL SECTION W2
SCALE: 3/4" = 1'-0"

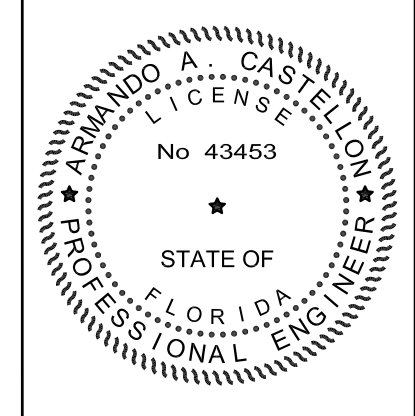
- SUGGESTED CONSTRUCTION PROCEDURE FOR CREATION OF NEW CMU WALL OPENING:**
1. LOCATE PROPOSED LOCATION OF NEW VERTICAL REINFORCING STEEL AND SAWCUT TOP AND BOTTOM END WITH JUST ENOUGH OPENING TO INSTALL NEW DOWELS.
 2. INSTALL NEW DOWELS.
 3. SAWCUT VERTICAL SLOTS FULL HEIGHT AT LOCATION OF NEW VERTICAL REINFORCING STEEL BARS. WIDTH OF SLOTS SHALL BE AS NARROW AS PRACTICABLE TO ERECT NEW BARS.
 4. ERECT NEW BARS.
 5. PROVIDE FORMWORKS AT FACE OF CMU WALL WHERE SLOTS & OPENINGS WERE MADE AND FILL CELLS WITH 3000 PSI GROUT WITH 8" TO 11" SLUMP.
 6. WHEN GROUT HAS REACHED ITS 75% COMPRESSIVE STRENGTH, DRY PACK THE TOP CELL WITH NON-SHRINKAGE, NON-METALIC GROUT WITH A MINIMUM COMPRESSIVE STRENGTH OF 5000 PSI.
 7. SAWCUT OUTLINE OF PROPOSED NEW NEW OPENING. CAREFULLY REMOVE MASONRY UNITS WITHIN ITS BOUNDS.

TO THE BEST OF OUR KNOWLEDGE, INFORMATION AND BELIEF, THESE STRUCTURAL PLANS CONFORM TO AND SATISFY THE FLORIDA BUILDING CODE, 2017 EDITION, ACT 316-14, AND LOCAL CODES AS APPLICABLE.

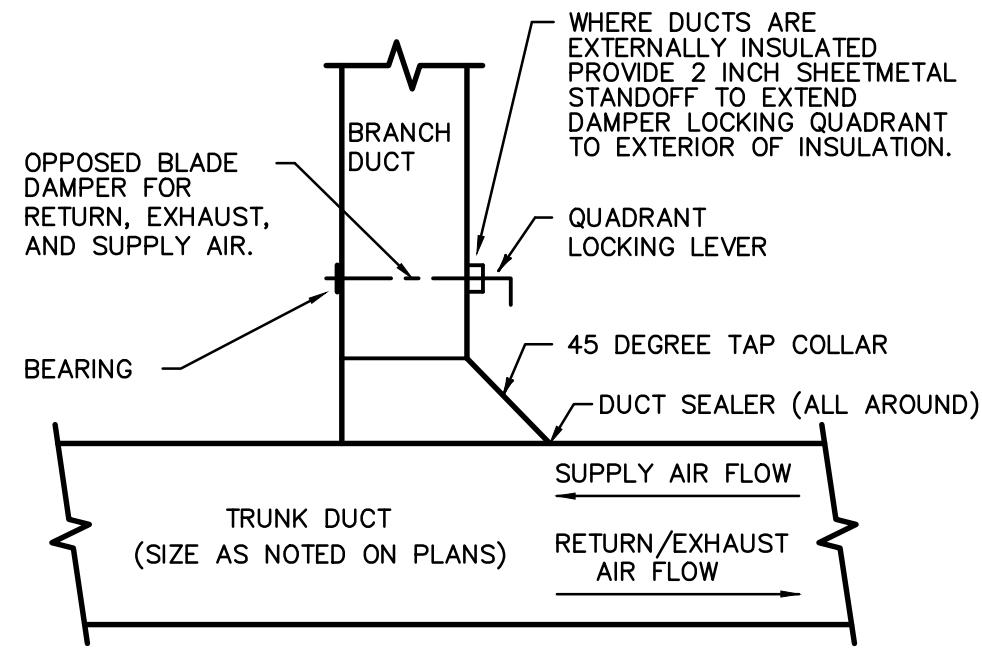
MASTER CONSULTING ENGINEERS, INC.
STRUCTURAL CONSULTANTS
4101 RAVENSWOOD RD., #307
FORT LAUDERDALE, FLORIDA 33312
954-210-7671, 813-287-3600
www.mceengineers.com www.mceeng.pro

Revisions		
No.	Date	Note

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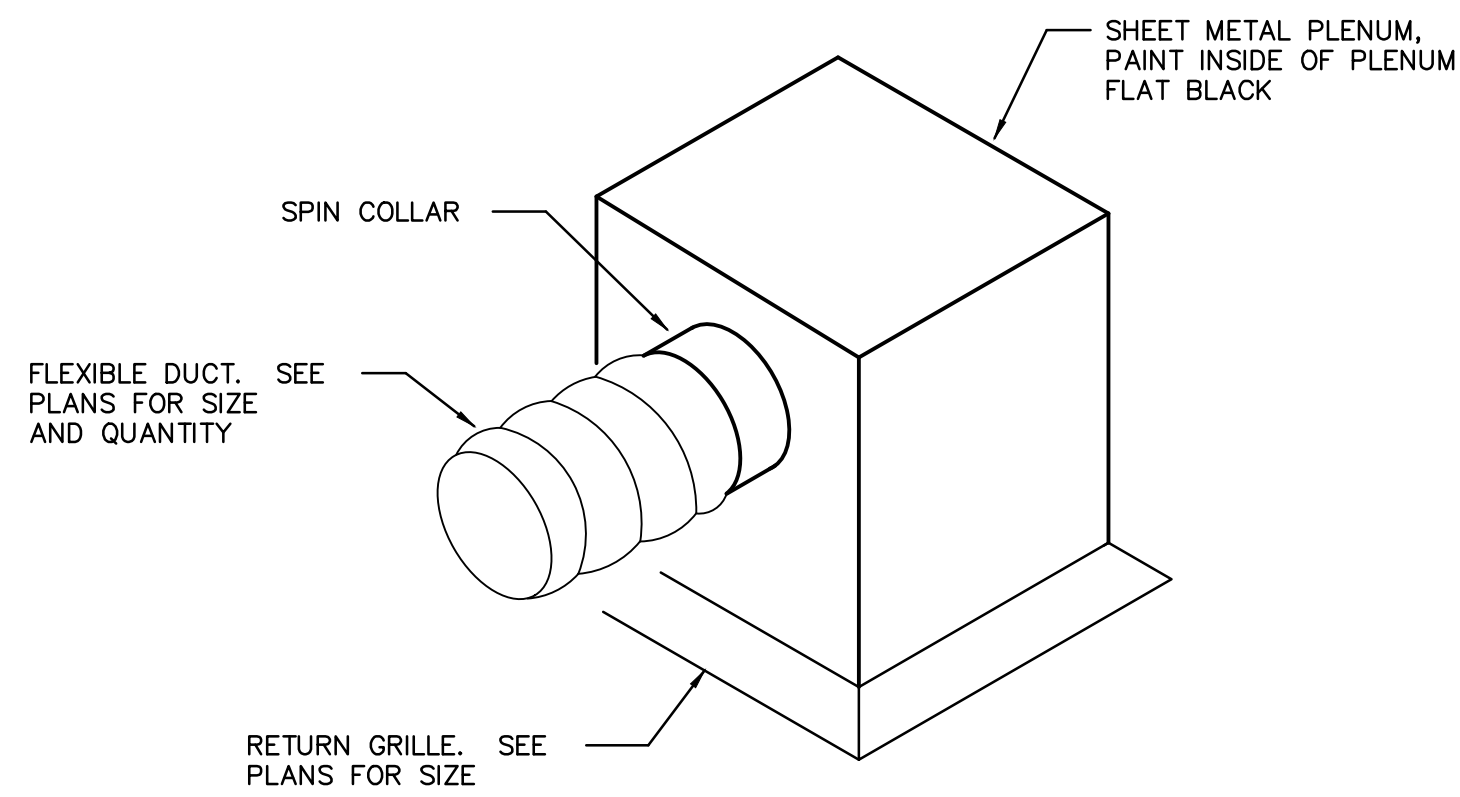
FOUNDATION & CANOPY FRAM'G PLANS, SECTIONS & DETAILS



BRANCH DUCT TAKE-OFF DETAIL

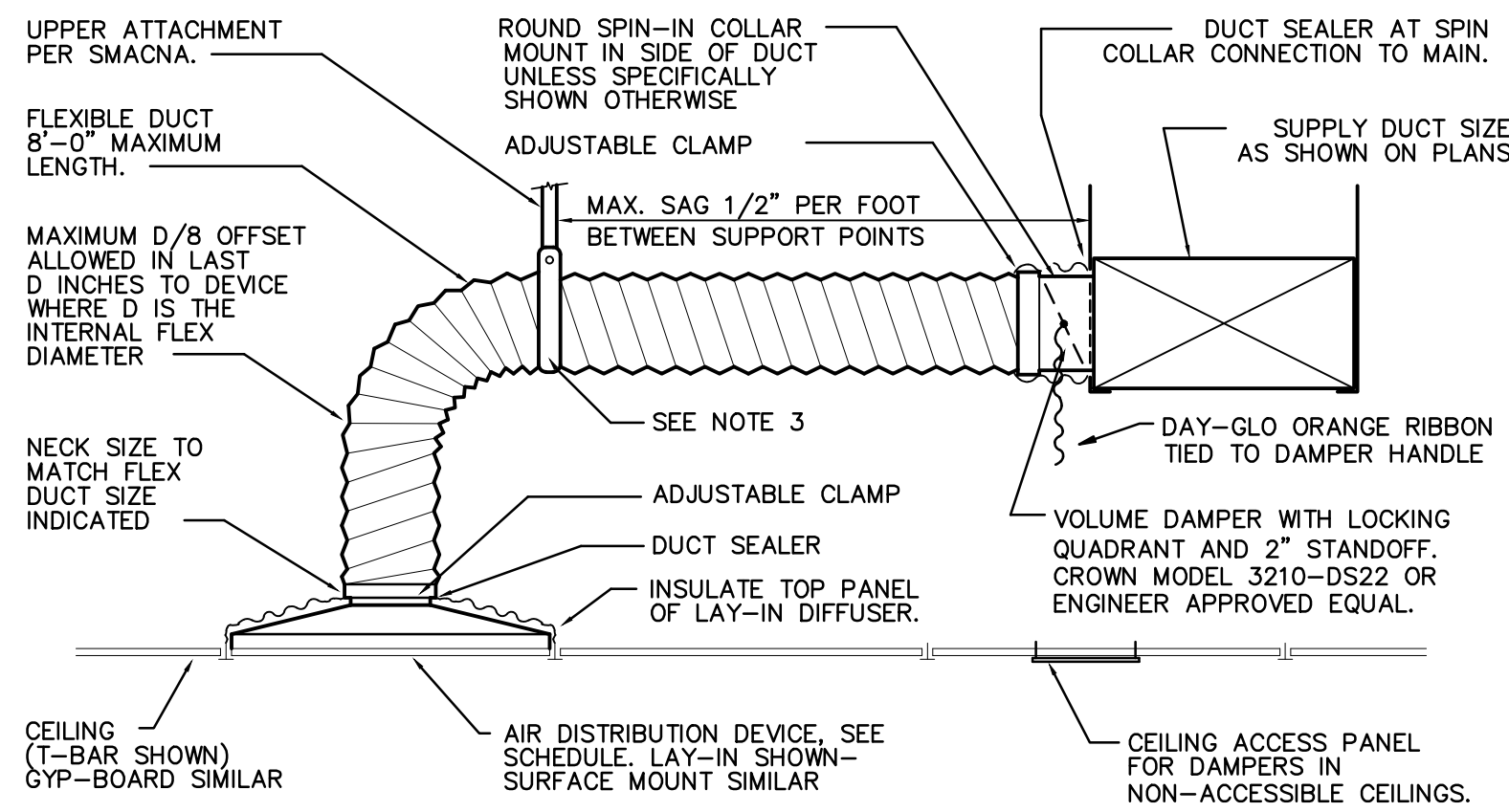
RECTANGULAR LOW PRESSURE

SCALE: NONE



RETURN GRILLE DETAIL

SCALE: NONE

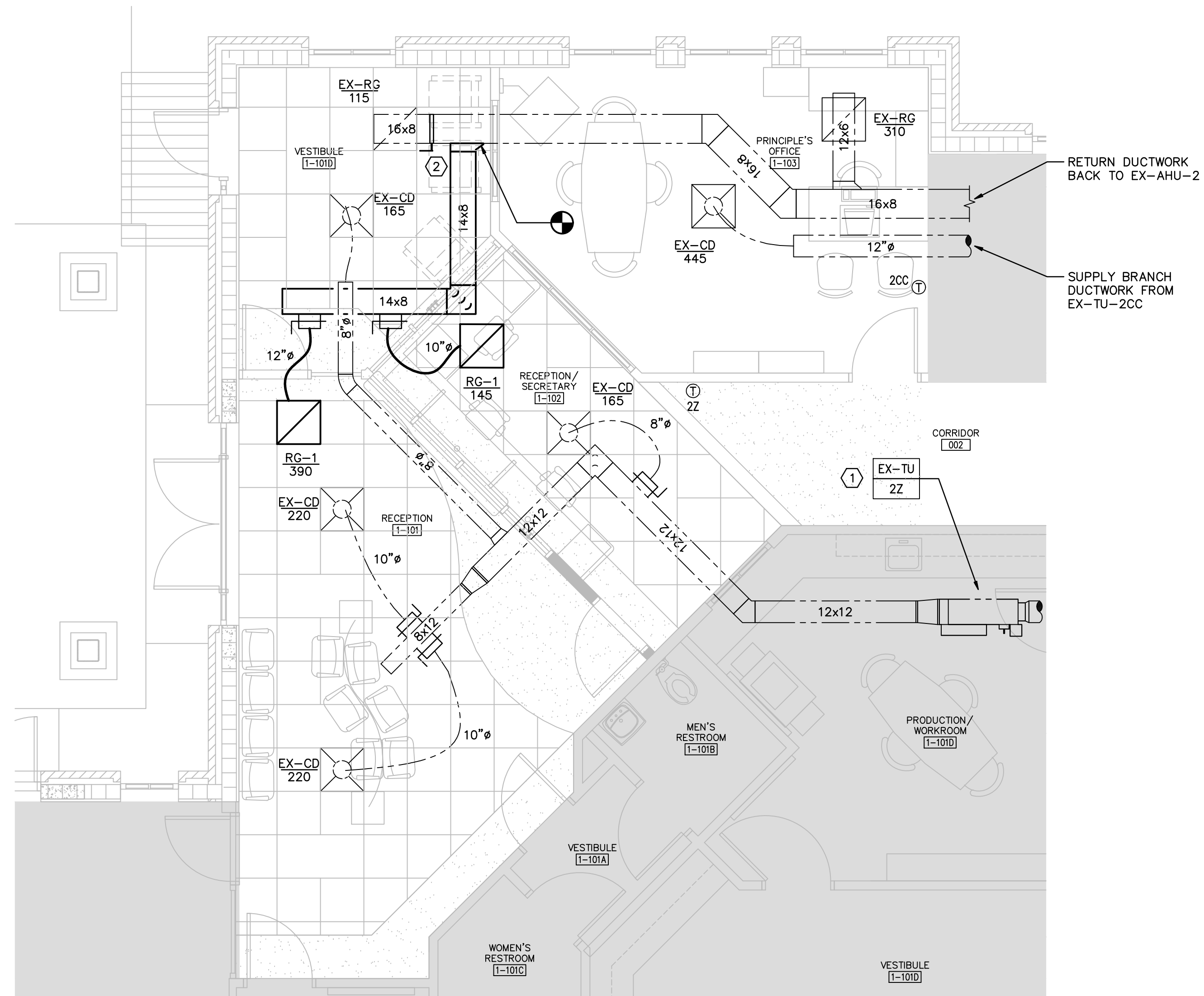


FLEXIBLE DUCT NOTES

1. FLEXIBLE DUCTS SHALL BE ONE-PIECE AND SHALL NOT BE SPLICED TOGETHER.
2. EXTEND FLEXIBLE DUCT INSULATION TO DUCT/DIFFUSER PANEL INSULATION AND SEAL WITH MASTIC.
3. MINIMUM 1-1/2" WIDE 22 GAUGE GALVANIZED STRAP HANGER WITH HEMMED EDGES PER SMACNA FIGURE 3-10.
4. FLEXIBLE AIR DUCT SHALL BE FULLY EXTENDED AND NOT COMPRESSED WITH ELBOW RADIUS NO LESS THAN R/D = 1.0.
5. WHEN AIRFLOW IS 75 CFM OR LESS, SPIN COLLAR SHALL BE PROVIDED LESS DAMPER AND A SEPERATE LOW LEAKAGE DAMPER INSTALLED ON OUTLET OF SPIN COLLAR

FLEXIBLE DUCT DETAIL

SCALE: NONE



1 FIRST FLOOR HVAC PLAN - NEW WORK

SCALE: 1/4" = 1'-0"

- GENERAL NOTES**
1. EXISTING DUCTWORK, AIR DEVICES, AND ASSOCIATED INSULATION SHALL BE PROTECTED FROM DAMAGE DURING CONSTRUCTION. CONTRACTOR SHALL REPLACE ANY INSULATION DAMAGED DURING CONSTRUCTION.
 2. CONTRACTOR SHALL TAKE PRE-CONSTRUCTION AIRFLOW READINGS AT ALL SUPPLY DIFFUSERS AND RETURN GRILLS WITHIN THE SCOPE OF WORK. READINGS SHALL BE PERFORMED AND SUBMITTED TO THE ENGINEER PRIOR TO ANY DEMOLITION.
 3. BALANCE ALL SUPPLY DIFFUSERS AND RETURN GRILLS TO AIR QUANTITIES (CFM) SHOWN.

- PLAN NOTES**
1. REBALANCE EXISTING TERMINAL UNIT TU-22 TO 770 CFM.
 2. FURNISH AND INSTALL NEW VOLUME DAMPER FOR BALANCING OF EXISTING RETURN GRILL.

Revisions		
No.	Date	Note

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ELECTRICAL SYMBOL LEGEND

	GROUND TYPE SINGLE RECEPTACLE 120V-20A. +18" AFF UNLESS NOTED OTHERWISE		EQUIPMENT SCHEDULE NOTATION
	GROUND TYPE DUPLEX RECEPTACLE 120V-20A. +18" AFF UNLESS NOTED OTHERWISE		T.V. ANTENNA OUTLET
	GROUND TYPE DUPLEX RECEPTACLE 120V-20A. MOUNT ABOVE COUNTER OR AT HEIGHT NOTED.		T.V. ORIGINATION OUTLET
	GROUND TYPE DUPLEX RECEPTACLE 120V-20A. WITH INTEGRAL GROUND FAULT INTERRUPT PROTECTION.		JUNCTION PULL BOX
	RECEPTACLE 120V-20A. MOUNT 18" AFF UNLESS OTHERWISE NOTED.		SECURITY JUNCTION BOX
	TAMPER RESISTANT GROUND TYPE DUPLEX RECEPTACLE 120V-20A. MOUNT 18" AFF UNLESS OTHERWISE NOTED.		VIDEO JUNCTION BOX
	GROUND TYPE DUPLEX RECEPTACLE 120V-20A. WITH BLUE FACE AND COVER. MOUNT 18" AFF UNLESS OTHERWISE NOTED.		CARD ACCESS JUNCTION BOX
	GROUND TYPE DOUBLE DUPLEX RECEPTACLE 120V-20A. MOUNT IN TWO GANG OUTLET BOX 18" AFF UNLESS OTHERWISE NOTED.		COMMUNICATIONS OUTLET
	TAMPER RESISTANT GROUND TYPE DOUBLE DUPLEX RECEPTACLE 120V-20A. MOUNT IN TWO GANG OUTLET BOX 18" AFF UNLESS OTHERWISE NOTED.		BELL
	GROUND TYPE DUPLEX RECEPTACLE 120V-20A. MOUNT IN FLUSH FLOOR BOX.		TELEPHONE OUTLET
	120V SPECIAL PURPOSE OUTLET (SUFFIX INDICATES AMPS)		FIRE ALARM HORN/STROBE
	3 WIRE 18 OR 4 WIRE 36 SPECIAL PURPOSE OUTLET (SUFFIX INDICATES AMPS)		FIRE ALARM STROBE LIGHT ONLY
	TRANSFORMER - SEE SCHEDULE FOR RATING		FIRE ALARM PULL STATION
	DISCONNECT SWITCH SEE SCHEDULE FOR RATING		COMBINATION FIXED TEMPERATURE AND RATE OF RISE HEAT DETECTOR
	120/208V PANELBOARD		CEILING MTD SMOKE DETECTOR (PHOTO ELECTRIC TYPE)
	277/480V PANELBOARD		DUCT MOUNTED SMOKE DETECTOR (PHOTO ELECTRIC TYPE)
	CELL BOOSTER ACCESS POINT		SMOKE DETECTOR REMOTE INDICATOR/RESET
	CELL BOOSTER ANTENNA		MAGNETIC DOOR HOLDER
	PATCH PANEL - (DEDICATED FOR CCTV)		POST INDICATING VALVE SWITCH
	NETWORK VIDEO RECORDER		TAMPER SWITCH
	POWER OVER ETHERNET		PRESSURE SWITCH
	WIRELESS ACCESS POINT		FLOW SWITCH
	SECURED ACCESS DOOR		CLOCK
	SECURITY - KEYPAD (ALARM COMMAND CENTER)		MICROPHONE OUTLET - WALL MOUNTED
	SECURITY - DOOR CONTACT		PUBLIC ADDRESS/INTERCOM SPEAKER-CEILING
	INDICATES 'TELECOM/POWER' POWER POLE		PUBLIC ADDRESS/INTERCOM SPEAKER-WALL
	CARD READER		PUSH BUTTON STATION (ONE OR MORE BUTTONS) *P* INDICATES PRIVACY TYPE *K* INDICATES KEY-OPERATED
	VIDEO INTERCOM		CAMERA - SINGLE HEAD VIEW
	LIGHT SWITCH WITH OCCUPANCY/VACANCY SENSOR - DUAL TECHNOLOGY		CAMERA - DOUBLE HEAD VIEW
	DIMMER SWITCH WITH OCCUPANCY/VACANCY SENSOR - DUAL TECHNOLOGY		CAMERA - TRIPLE HEAD VIEW
	EXIT LIGHT		CAMERA - FOUR HEAD VIEW
	LIGHTING FIXTURE		MOTION SENSOR
	EMERGENCY WALL PACK WITH BACKUP BATTERY		CAMERA INTERCOM

HEIGHTS AND LOCATIONS:

WALL BRACKET FIXTURES	7'-0" TO CENTER OF OUTLET
INTERCOM SPEAKERS	7'-0" TO CENTER
CLOCKS	7'-0" TO CENTER (IN GENERAL)
FIRE ALARM HORN/STROBES AND STROBES	6'-8" TO CENTER
PANELBOARDS	6'-0" TO TOP
LIGHTING SWITCHES	42" TO CENTER
FIRE ALARM PULL STATIONS	42" TO CENTER
WALL MOUNTED TELEPHONE	42" TO CENTER
INTERCOM CALL BACK	42" TO CENTER
RECEPTACLES	18" TO CENTER
BROADBAND TV OUTLETS	18" TO CENTER OR 6"-8" TO CENTER (MIP)
TELEPHONE OUTLETS	18" TO CENTER
OTHER DEVICES	18" TO CENTER
COORDINATE ALL DEVICE LOCATIONS WITH ARCHITECTURAL ELEVATIONS PRIOR TO ROUGH-IN.	

GENERAL ELECTRICAL NOTES

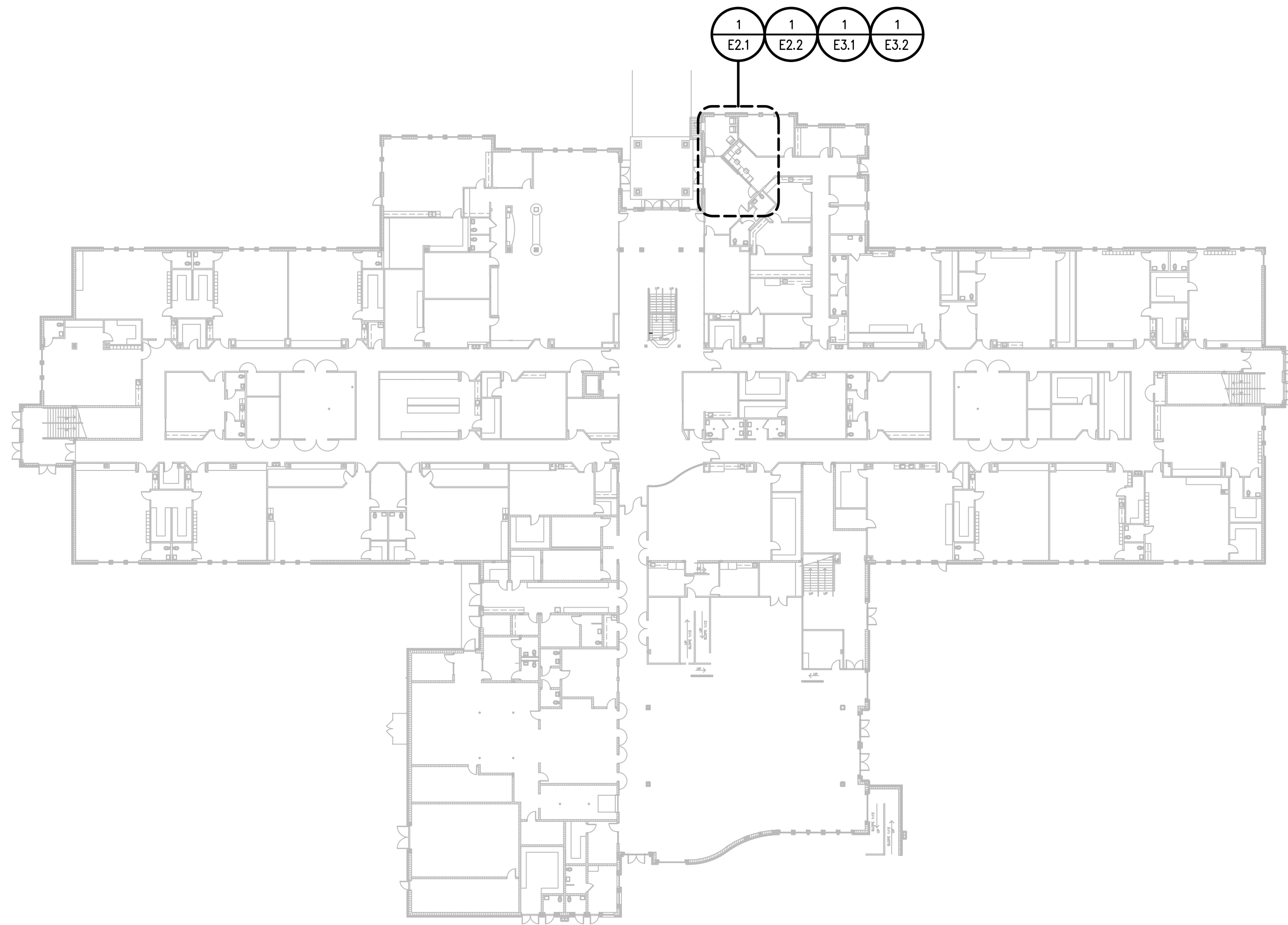
- ALL ELECTRICAL WORK SHALL COMPLY WITH NATIONAL ELECTRICAL CODE, THE NATIONAL FIRE CODES, THE AMERICANS WITH DISABILITIES ACT, AND THE FLORIDA BUILDING CODE.
- THE CONTRACTOR SHALL THOROUGHLY REVIEW THE PROJECT TO ENSURE THAT ALL WORK SHALL MEET OR EXCEED THE ABOVE REQUIREMENTS. ANY ALLEGED DISCREPANCIES SHALL BE BROUGHT TO THE ENGINEER'S ATTENTION PRIOR TO BID.
- THE CONTRACTOR IS DIRECTED TO OBTAIN COPIES OF ALL RELATED PLANS, SPECIFICATIONS, SHOP DRAWINGS AND ADDENDUM TO COORDINATE THE RELATED WORK AND SCHEDULING.
- THE CONTRACTOR IS REMINDED THAT ELECTRICAL SERVICE TO AND FOR MECHANICAL AND OTHER EQUIPMENT ARE BASED ON EQUIPMENT DESIGN DATA. THE VALUES MAY DIFFER DEPENDING UPON THE ACTUAL EQUIPMENT TO BE FURNISHED. ANY MODIFICATION TO THE ELECTRICAL, BASED UPON ACTUAL EQUIPMENT SELECTION, SHALL RESULT IN NO ADDITIONAL COST TO THE OWNER.
- THE CONTRACTOR SHALL THOROUGHLY REVIEW THE ARCHITECTURAL AND MECHANICAL PLANS TO ASSURE THAT ELECTRICAL SERVICE FOR ALL ITEMS AND/OR EQUIPMENT REQUIRING ELECTRICAL SERVICE IS INCLUDED. ANY ITEM AND/OR EQUIPMENT NOT PROVIDED WITH ELECTRICAL SERVICE, REQUIRING ELECTRICAL SERVICE, SHALL BE BROUGHT TO THE ENGINEER'S ATTENTION.
- MECHANICAL AND ELECTRICAL EQUIPMENT HAVE BEEN LOCATED AND ARRANGED TO MINIMIZE THE INTERFERENCES OF EQUIPMENT AND STRUCTURE. THE CONTRACTOR SHALL THOROUGHLY FAMILIARIZE HIMSELF WITH THE WORK TO BE PERFORMED BY OTHER TRADES AND THE PHYSICAL CHARACTERISTICS OF THE STRUCTURE IN ORDER TO SCHEDULE AND INSTALL EQUIPMENT AND TO MINIMIZE POSSIBLE INTERFERENCE. FAILURE TO PROPERLY COMMUNICATE AND SCHEDULE WORK WITH OTHER TRADES RESULTING IN ADDITIONAL WORK AND MATERIAL, SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR. THE MODIFICATIONS REQUIRED TO RESOLVE THE CONFLICT SHALL BE DECIDED BY THE ENGINEER.
- ALL PANELBOARDS SHALL BE PROVIDED WITH A TYPEWRITTEN SCHEDULE SHOWING CIRCUIT NUMBERS AND A COMPLETE DESCRIPTION OF EACH CIRCUIT.
- MINIMUM TRADE SIZE CONDUIT PERMITTED SHALL BE 1/2 INCH UNLESS NOTED OTHERWISE.
- ALL CONDUCTOR METAL SHALL BE COPPER WITH 600 VOLT INSULATION TYPE THHN. (MINIMUM SIZE SHALL BE #12AWG.) CONTRACTOR SHALL ADJUST WIRE AND CONDUIT SIZES IF OTHER INSULATION TYPES ARE USED.
- ALL LIGHT SWITCHES AND DUPLEX RECEPTACLES SHALL BE RATED FOR 20 AMPERE AT 125/277 VOLTS A/C. WIRING DEVICES SHALL BE MANUFACTURED BY HUBBELL OR APPROVED EQUAL. PROVIDE BARRIERS AT 277V SWITCHES WHERE REQUIRED BY N.E.C. ARTICLE 404-8(b).
- ALL ELECTRICAL WIRING DEVICES INDICATED TO BE INSTALLED IN MASONRY WALLS OR FLOORS SHALL BE FLUSH MOUNTED, INCLUDING BRANCH CIRCUIT PANELBOARDS, UNLESS OTHERWISE NOTED. THE CONDUITS TO ASSOCIATED ELECTRICAL EQUIPMENT SHALL BE CONCEALED IN WALLS OR FLOOR.
- ALL CONDUIT RUNS SHALL BE CONCEALED UNLESS SPECIFICALLY NOTED OTHERWISE.
- THE FIXTURE SCHEDULE IS FOR REFERENCE ONLY. MODEL NUMBERS LISTED MAY NOT INCLUDE ALL REQUIRED OPTIONS. REFER TO SPECIFICATIONS FOR ADDITIONAL INFORMATION. EQUAL FIXTURES OF OTHER MANUFACTURERS MAY BE SUBSTITUTED AS EQUAL. ALL SUBSTITUTIONS ARE SUBJECT TO APPROVAL AS EQUAL BY THE ENGINEER.
- ALL EXIT LIGHTS SHALL BE PROVIDED WITH UNIVERSAL MOUNTING BRACKETS. THE CONTRACTOR SHALL VERIFY ALL DIRECTIONAL ARROWS PRIOR TO ORDERING FIXTURES.
- THE CONTRACTOR SHALL FURNISH THE AIR CONDITIONING SUBCONTRACTOR AND THE CEILING SUBCONTRACTOR COPIES OF APPROVED LIGHT FIXTURE SHOP DRAWINGS.
- ALL RECESSED LIGHTING FIXTURES IN FIRE RATED CEILINGS SHALL BE TENTED TO COMPLY WITH THE APPLICABLE CEILING RATING. THE CONTRACTOR SHALL VERIFY REQUIREMENTS.
- THE CONTRACTOR SHALL COORDINATE WITH THE MECHANICAL SUBCONTRACTOR TO ENSURE THAT ALL NECESSARY CONDUITS FOR AIR CONDITIONING CONTROLS ARE INCLUDED. IT IS THE ELECTRICAL SUBCONTRACTOR'S RESPONSIBILITY TO ENSURE THAT ALL EQUIPMENT IS WIRED PROPERLY AND ALL CONTROLS ARE OPERATIONAL. THE ELECTRICAL SUBCONTRACTOR SHALL FURNISH ALL MATERIALS NOT SUPPLIED BY THE MECHANICAL SUBCONTRACTOR.
- COMMUNICATION CONDUITS ARE TO BE LONG RADIUS TYPE AND SHALL CONTAIN PULL WIRES. PROVIDE PLATES FOR ALL OUTLETS.
- ALL SPECIAL PURPOSE OUTLETS SHALL BE PROVIDED TO MATCH EQUIPMENT TO BE SUPPLIED.
- THE PLANS INDICATE THE DESIRED ARRANGEMENT AND GENERAL LOCATIONS OF LIGHT FIXTURES. THE ARCHITECTURAL PLANS INDICATE ADDITIONAL DATA AS TO THE FINAL FIXTURE PLACEMENT. THE CONTRACTOR SHALL VERIFY CEILING TYPES AND INSTALLATION REQUIREMENTS PRIOR TO ORDERING LIGHT FIXTURES.
- ALL PANELBOARDS, SWITCHES AND CIRCUIT BREAKERS SHALL BE SQUARE D, GE, SIEMENS, OR CUTLER HAMMER.
- ALL CONDUITS SHALL HAVE A SEPARATE GREEN GROUND CONDUCTOR INSTALLED FOR GROUNDING.
- ANY EXISTING UTILITIES LOCATED IN THE AREA OF CONSTRUCTION WHICH REQUIRE RELOCATION BY THE OWNER SHALL BE COORDINATED WITH THE OWNER'S REPRESENTATIVE A MINIMUM OF TEN DAYS IN ADVANCE.
- ALL DISCONNECT SWITCHES SHALL BE THE HEAVY DUTY TYPE WITH BUSSMAN TIME DELAY, DUAL ELEMENT AND CURRENT LIMITING FUSES.
- THE CONTRACTOR SHALL CHECK THE ARCHITECTURAL DRAWINGS FOR EXACT LOCATION AND/OR DIMENSIONS FOR INSTALLATION OF ALL ELECTRICAL ITEMS. ALL QUESTIONABLE LOCATIONS SHALL BE APPROVED BY OWNER'S REPRESENTATIVE PRIOR TO INSTALLATION.
- ALL EMPTY CONDUITS SHALL CONTAIN JET LINE #232 POLYOFIN 200 LB. TEST.
- ALL WORK SHOWN ON THE ELECTRICAL PLANS SHALL BE PERFORMED BY THE CONTRACTOR UNLESS NOTED OTHERWISE.
- ALL EXIT FIXTURES SHALL BE CONNECTED TO THE BUILDING EMERGENCY PANEL UNSWITCHED.
- ALL SURGE PROTECTED OUTLETS SHALL BE EQUAL TO HUBBELL #5352 IS.
- EQUIPMENT INSTALLED WITHIN CONCEALED SPACES SHALL HAVE REASONABLE ACCESS PANELS PROVIDED NEARBY FOR INSPECTION, TESTING AND SERVICE CONSIDERATIONS.
- ALL SECURITY SYSTEM WIRING AND DEVICE INSTALLATIONS SHALL BE DONE BY THE PALM BEACH COUNTY SCHOOL DISTRICT.
- THE FIRE ALARM MANUFACTURER SHALL PROVIDE CERTIFIED TECHNICIAN TO SUPERVISE THE INSTALLATION, FINAL CONNECTIONS AND TESTING OF THE FIRE ALARM SYSTEM. AT THE COMPLETION OF THE PROJECT, THE MANUFACTURER SHALL INSPECT THE SYSTEM AND CERTIFY THAT IT IS INSTALLED IN ACCORDANCE WITH NFPA 72. ALL FIRE ALARM COMPONENTS SHALL COMPLY WITH ADA REQUIREMENTS.
- REFER TO SPECIFICATIONS FOR MORE INFORMATION.

DRAWING INDEX

SHEET NO.	DESCRIPTION
E0.1	ELECTRICAL NOTES AND LEGEND
E1.1	ELECTRICAL PLAN - OVERALL
E2.1	LIGHTING PLAN - DEMOLITION
E2.2	LIGHTING PLAN - NEW WORK
E3.1	POWER AND SYSTEMS PLAN - DEMOLITION
E3.2	POWER AND SYSTEMS PLAN - NEW WORK
E4.1	ELECTRICAL RISERS AND SCHEDULES
E5.1	ELECTRICAL DETAILS

Revisions		
No.	Date	Note

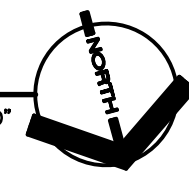
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1
E1.1

ELECTRICAL PLAN - OVERALL

SCALE: 1/32"=1'-0"



Comm. No: 16025.20
Date: 07/23/2020
Drawn: MM

Revisions		
No.	Date	Note

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Certification Number 6029
Kyle E. Lottice, P.E. # 85228
Charles C. Colburn, P.E. # 11936
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ELECTRICAL PLAN
- OVERALL

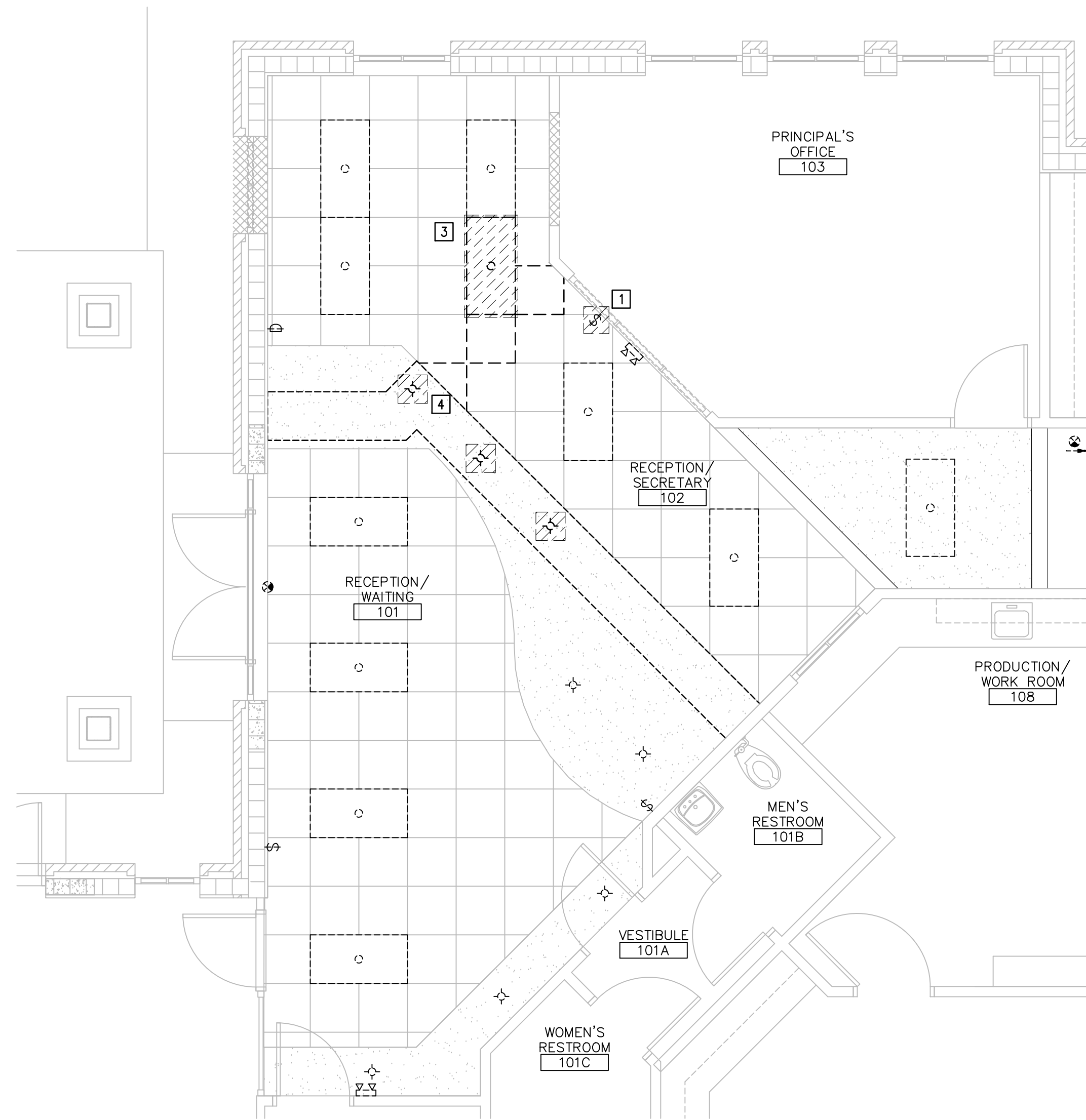
E1.1

JLRD No. 12004

Martin County School District
Citrus Grove Elementary School
Enhanced Security Project A2
2527 SW Citrus Blvd, Palm City, FL 34990
Permit Documents Submittal

JLRD
JOHNSON, LEVINSON
RAGAN, DAVILA, INC.
CONSULTING ENGINEERS
1450 Country Park Boulevard, Suite 100
West Palm Beach, Florida, 33411
(561) 689-2303 (561) 689-2302 Fax
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HARVARD JOLLY ARCHITECTURE
2047 Vista Parkway, Suite 100 West Palm Beach, FL 33411 | 561-478-4457 | www.HarvardJolly.com | AAC000119



1 LIGHTING PLAN - DEMOLITION 2
 E2.1 SCALE: 1/4" = 1'-0"

GENERAL NOTE

FIELD VERIFY ALL EXISTING CIRCUITS TO BE REUSED PRIOR TO ROUGH-IN.

- PLAN NOTES**
- 1 EXISTING WALL SWITCH TO BE RELOCATED, SEE NEW WORK PLAN.
 - 2 WALL SWITCHES TO REMAIN UNLESS NOTED OTHERWISE AND SHOWN FOR REFERENCE ONLY.
 - 3 FIXTURE TO BE DEMOLISHED. CIRCUITING TO BE REWORKED. SEE NEW WORK PLAN E2.2.
 - 4 EXISTING LIGHT FIXTURE TO BE RELOCATED, SEE NEW WORK PLAN.

- GENERAL DEMOLITION NOTES**
- A. ALL EXISTING ELECTRICAL EQUIPMENT/FIXTURES/DEVICES IN THE REMODELING AREAS SHALL BE ADDRESSED AS INDICATED BY THE DEMO. PLAN NOTES.
 - B. DISCONNECT AND REMOVE ALL CONDUIT, CONDUCTORS, BOXES, SUPPORTS, ETC. ASSOCIATED WITH ELECTRICAL EQUIPMENT/FIXTURE/DEVICES TO BE REMOVED, AS DESCRIBED IN DEMO. PLAN NOTES. REMOVE CONDUIT AND CONDUCTORS BACK TO SOURCE - FOR THOSE CIRCUITS THAT SERVE OTHER EQUIPMENT/FIXTURES/DEVICES THAT ARE TO REMAIN, REMOVE CONDUIT AND CONDUCTORS SERVING DEMOLISHED EQUIPMENT, BACK TO NEAREST JUNCTION POINT, AND SAFELY DEAD-END.
 - C. THE CONTRACTOR IS CAUTIONED THAT EXISTING SERVICES ARE ROUTED CONCEALED IN PARTITIONS AND IN OR UNDER FLOOR SLABS. PRIOR TO DEMOLITION OR ANY CUTTING, DRILLING, BORING, ETC., THE CONTRACTOR SHALL CONFIRM THE LOCATION OF ANY SUCH SERVICES. ANY DISRUPTION OR DAMAGE TO SERVICES THAT MUST REMAIN IN-FACT, SHALL BE REPAIRED IMMEDIATELY BY THE CONTRACTOR, AT NO EXPENSE TO THE OWNER, EXCEPT IN THE CASE OF MUTUALLY AGREED UPON UNFORESEEABLE CONDITIONS.

Martin County School District
 Citrus Grove Elementary School
 Enhanced Security Project A2
 2527 SW Citrus Blvd, Palm City, FL 34990
 Permit Documents Submittal

Comm. No: 16025.20
 Date: 07/23/2020
 Drawn: MM

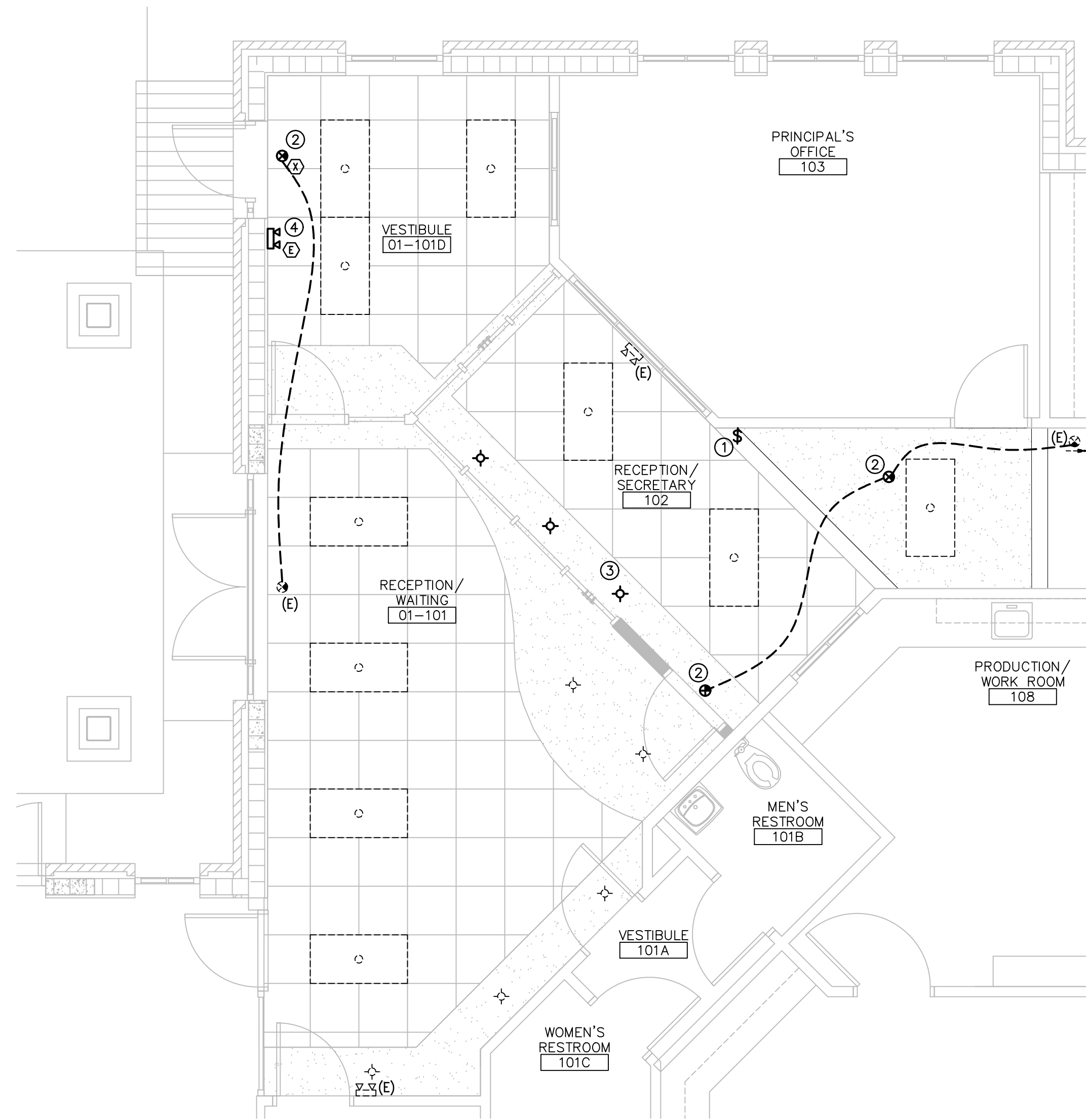
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Certification Number 6059
 Kyle E. Lottus, P.E. # 80228
 Charles C. Colburn, P.E. # 11996
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LIGHTING PLAN - DEMOLITION

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1
E2.2 LIGHTING PLAN - NEW WORK

SCALE: 1/4" = 1'-0"

LIGHTING FIXTURE SCHEDULE									
FIX. TYPE	MANUFACTURER	CATALOG NUMBER	LAMPS	TYPE OF FIXTURE	MOUNTING			VOLTS	NOTES
					REC	SUR	SUS		
E	ISOLITE	SEE NOTE 1	LED 6W	EMERGENCY BUGEYE		•		120-277	
	ABL								
	COMP								
X	ISOLITE	SEE NOTE 1	LED 2W	LED EXIT SIGN		•		120-277	
	ABL								
	COMP								

FIXTURE SCHEDULE NOTES:
 1. CONTRACTOR SHALL MATCH EXISTING EXIT LIGHT THAT IS INSTALLED IN THE PROJECT AREA.

GENERAL NOTE

FIELD VERIFY ALL EXISTING CIRCUITS TO BE REUSED PRIOR TO ROUGH-IN.

- NEW WORK NOTES**
- RELOCATED LIGHT SWITCH. INTERCEPT AND EXTEND CONDUIT AND CONDUCTORS AS NECESSARY TO MAINTAIN ORIGINAL CONTROL.
 - CONNECT TO NEAREST EXIT LIGHTING CIRCUIT UNSWITCHED USING 2#12, 1#12G, 3/4"C.
 - NEW LOCATION OF EXISTING LIGHT FIXTURE. REWORK CIRCUIT TO MAINTAIN ORIGINAL CONTROL.
 - CONNECT EMERGENCY BATTERY BACKUP FIXTURE TO THE LOCAL LIGHTING CIRCUIT, UNSWITCHED.

Martin County School District
 Citrus Grove Elementary School
 Enhanced Security Project A2
 2527 SW Citrus Blvd, Palm City, FL 34990
 Permit Documents Submittal

Comm. No: 16025.20
 Date: 07/23/2020
 Drawn: MM

Revisions		
No.	Date	Note

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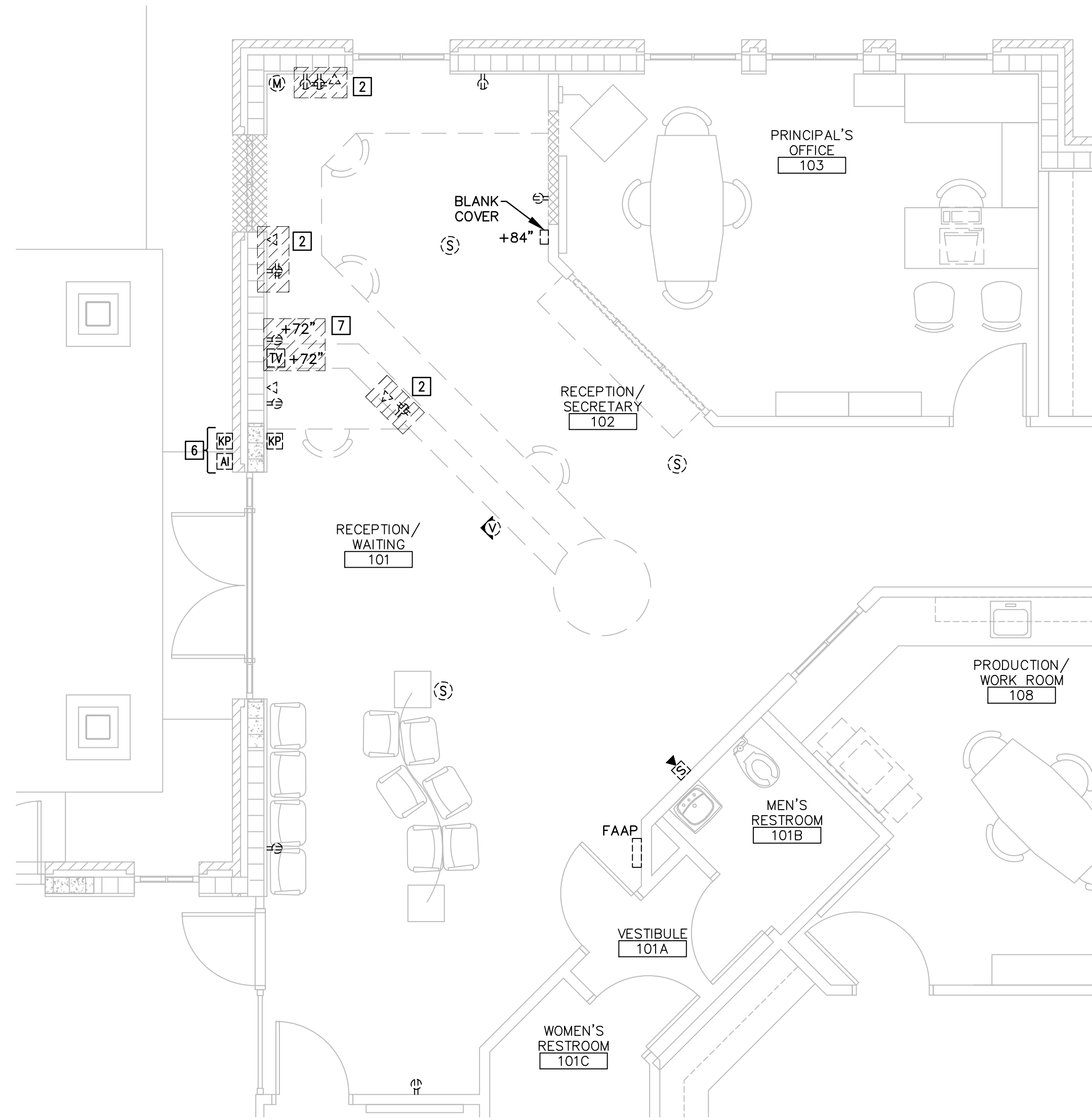
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 Charles C. Chubberson, P.E. # 11996
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LIGHTING PLAN - NEW WORK

E2.2

JLD No. 12004

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1
E3.1 **POWER AND SYSTEMS PLAN - DEMOLITION**
SCALE: 1/4" = 1'-0"

GENERAL NOTE
FIELD VERIFY ALL EXISTING CIRCUITS TO BE REUSED PRIOR TO ROUGH-IN.

- PLAN NOTES**
- DISCONNECT AND REMOVE POWER AND DATA TO ACCOMMODATE REMOVAL OF EXISTING COUNTERS.
 - CONTRACTOR TO VERIFY IF RECEPTACLE OR DATA PORT IS LOCATED IN AREA OF WALL TO BE DEMOLISHED AND PREPARE TO RELOCATE AS NECESSARY.
 - EXISTING DEVICE TO REMAIN.
 - EXISTING TO BE REMOVED. REMOVE CONDUIT AND WIRING BACK TO COMMON J-BOX OR LOCAL TERMINAL/CONTROL PANEL PANEL.
 - EXISTING DEVICES TO REMAIN UNLESS OTHERWISE NOTED.
 - EXISTING DEVICE TO BE RELOCATED.
 - EXISTING DEVICE TO BE RELOCATED. COORDINATE WITH OWNER/ ARCHITECT FOR NEW LOCATION.

GENERAL DEMOLITION NOTES

A. ALL EXISTING ELECTRICAL EQUIPMENT/FIXTURES/DEVICES IN THE REMODELING AREAS SHALL BE ADDRESSED AS INDICATED BY THE DEMO. PLAN NOTES.

B. DISCONNECT AND REMOVE ALL CONDUIT, CONDUCTORS, BOXES, SUPPORTS, ETC. ASSOCIATED WITH ELECTRICAL EQUIPMENT/FIXTURE/DEVICES TO BE REMOVED, AS DESCRIBED IN DEMO. PLAN NOTES. REMOVE CONDUIT AND CONDUCTORS BACK TO SOURCE - FOR THOSE CIRCUITS THAT SERVE OTHER EQUIPMENT/FIXTURES/DEVICES THAT ARE TO REMAIN, REMOVE CONDUIT AND CONDUCTORS SERVING DEMOLISHED EQUIPMENT, BACK TO NEAREST JUNCTION POINT, AND SAFELY DEAD-END.

C. THE CONTRACTOR IS CAUTIONED THAT EXISTING SERVICES ARE ROUTED CONCEALED IN PARTITIONS AND IN OR UNDER FLOOR SLABS. PRIOR TO DEMOLITION OR ANY CUTTING, DRILLING, BORING, ETC., THE CONTRACTOR SHALL CONFIRM THE LOCATION OF ANY SUCH SERVICES. ANY DISRUPTION OR DAMAGE TO SERVICES THAT MUST REMAIN IN-TACT, SHALL BE REPAIRED IMMEDIATELY BY THE CONTRACTOR, AT NO EXPENSE TO THE OWNER, EXCEPT IN THE CASE OF MUTUALLY AGREED UPON UNFORESEEABLE CONDITIONS.

Martin County School District
Citrus Grove Elementary School
Enhanced Security Project A2
2527 SW Citrus Blvd, Palm City, FL 34990
Permit Documents Submittal

Comm. No: 16025.20
Date: 07/23/2020
Drawn: MM

Revisions		
No.	Date	Note

TO THE BEST OF MY KNOWLEDGE, THE PLANS AND SPECIFICATIONS COMPLY WITH THE MINIMUM BUILDING CODES.

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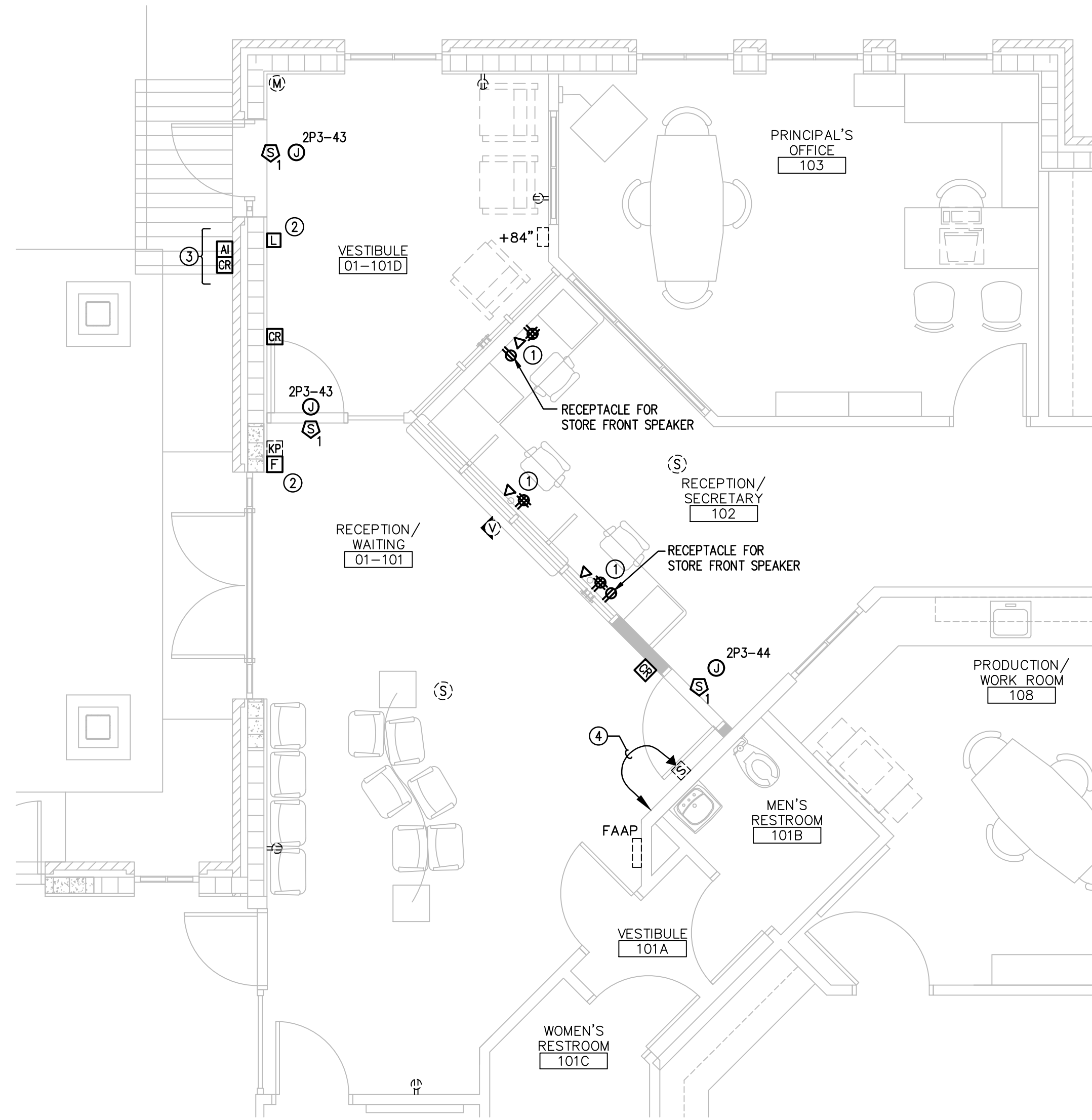
POWER AND SYSTEMS PLAN - DEMOLITION

E3.1
JLSD No. 12004

HARVARD JOLLY ARCHITECTURE
2047 Vista Parkway, Suite 100 West Palm Beach, FL 33411 | 561-478-4457 | www.harvardjolly.com | AAC000119

J L R D
JOHNSON, LEVINSON RAGAN, DAVILA, INC.
CONSULTING ENGINEERS
1490 Centrepark Boulevard, Suite 100
West Palm Beach, Florida, 33411
(561) 689-2303 (561) 689-2302 Fax
www.jlr.com

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1 POWER AND SYSTEMS PLAN - NEW WORK
 E3.2 SCALE: 1/4" = 1'-0"

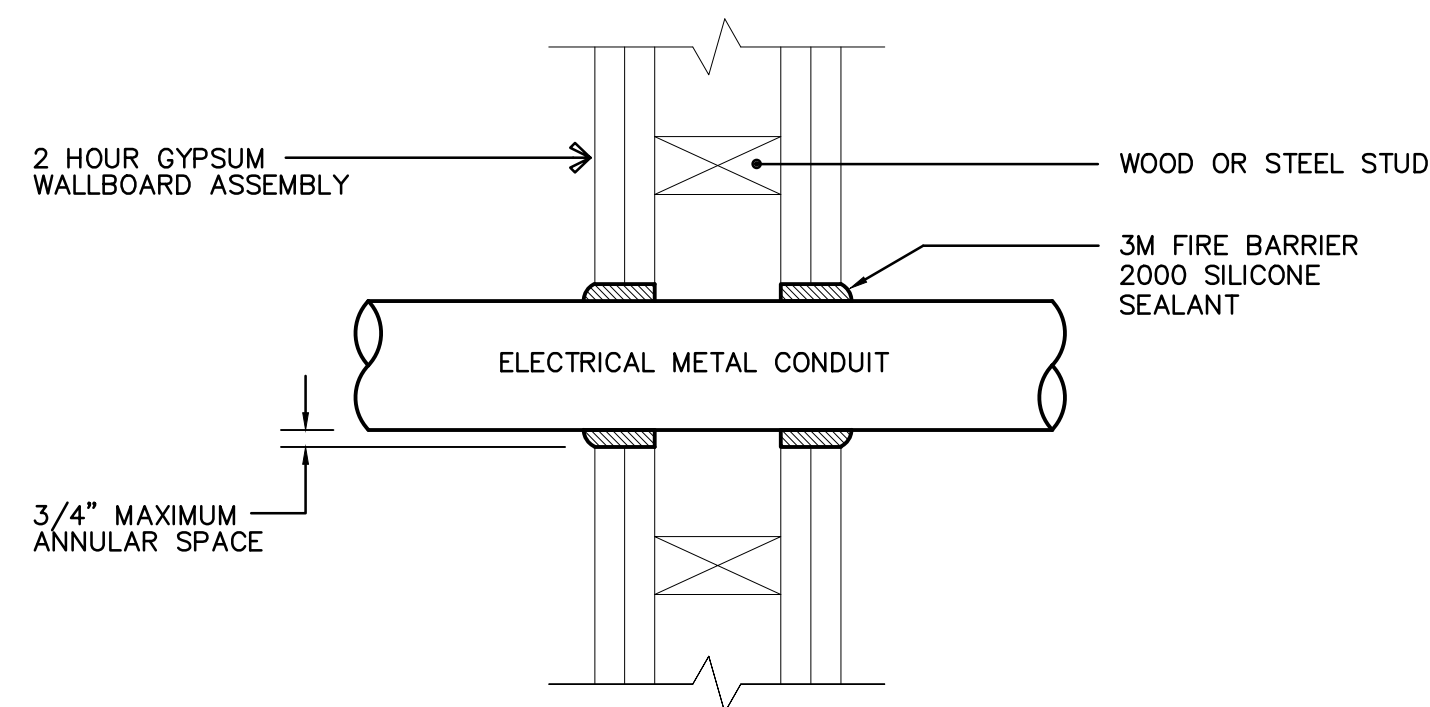
GENERAL NOTE
 FIELD VERIFY ALL EXISTING CIRCUITS TO BE REUSED PRIOR TO ROUGH-IN.

- PLAN NOTES**
- INTERCEPT AND EXTEND EXISTING POWER AND DATA FROM PREVIOUS COUNTER INSTALLATION AND ROUTE TO NEW MILLWORK. CONNECT NEW OUTLETS TO EXISTING 120V CIRCUIT AND CONNECT DATA AS NECESSARY.
 - CONNECT NEW FIRE ALARM DEVICE TO EXISTING FIRE ALARM SYSTEM. ADD NAC PANEL BATTERY CAPACITY AS REQUIRED.
 - INTERCEPT AND EXTEND EXISTING CONDUIT/CONDUCTORS FOR RELOCATED DEVICES TO LOCATION SHOWN.
 - RELOCATE EXISTING NOTIFICATION DEVICE TO ACCOMMODATE PROPOSED DOOR. EXTEND CONDUIT AND CONDUCTORS AS REQUIRED.

Revisions		
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CONDUIT PENETRATION THROUGH RATED GYPSUM WALL

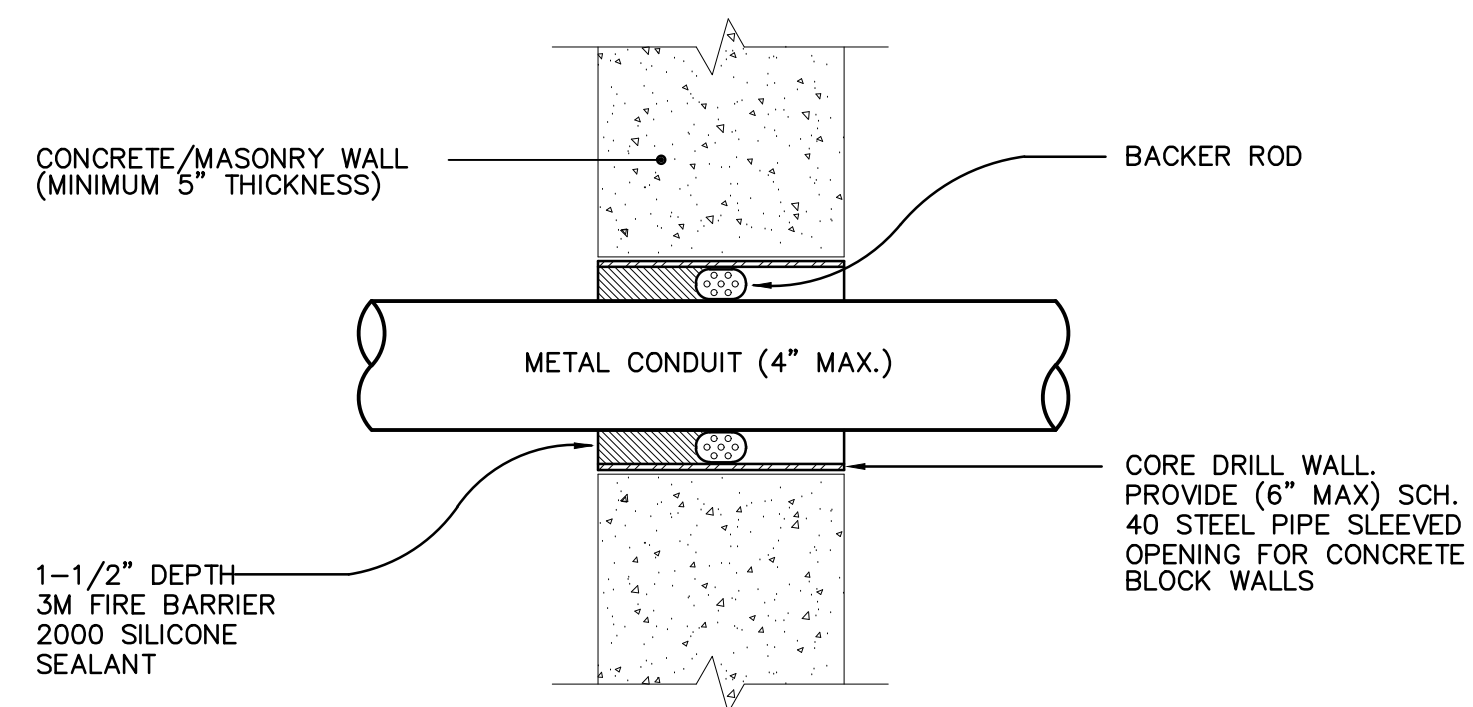
1
E5.1

(UL #W-L-1010)

SCALE: NONE

CONDUIT PENETRATION NOTES (GYPSUM):

1. MAXIMUM 3/4" ANNULAR SPACE.
2. INSTALL 3M FIRE BARRIER 2000 SILICONE SEALANT TO COMPLETELY FILL THE ANNULAR SPACE BETWEEN THE PIPE AND THE WALL ASSEMBLY. FILL TO THE FULL THICKNESS OF THE GYPSUM WALL (MINIMUM 1-1/4" SEALANT THICKNESS) PLUS AN ADDITIONAL 1/4" INCH CROWN AROUND THE PERIMETER OF THE CONDUIT.



CONDUIT PENETRATION THROUGH RATED CONCRETE/MASONRY WALL

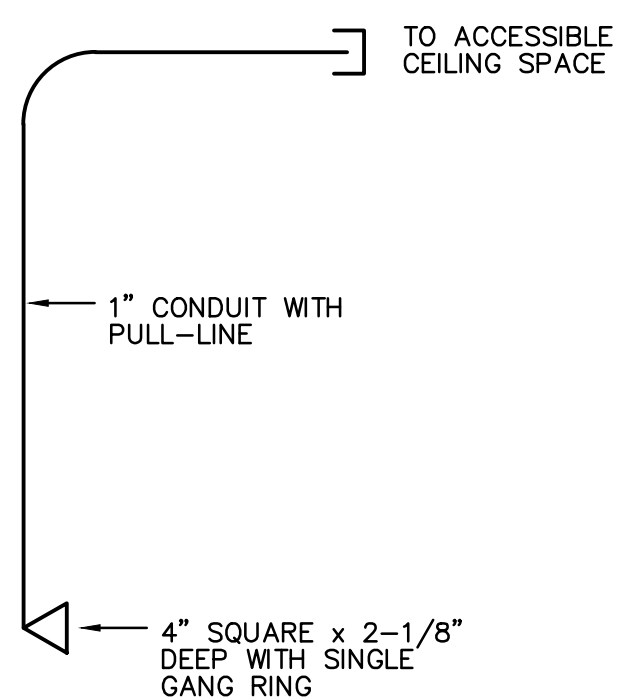
2
E5.1

(UL #C-AJ-1014)

SCALE: NONE

CONDUIT PENETRATION NOTES (CONCRETE/MASONRY):

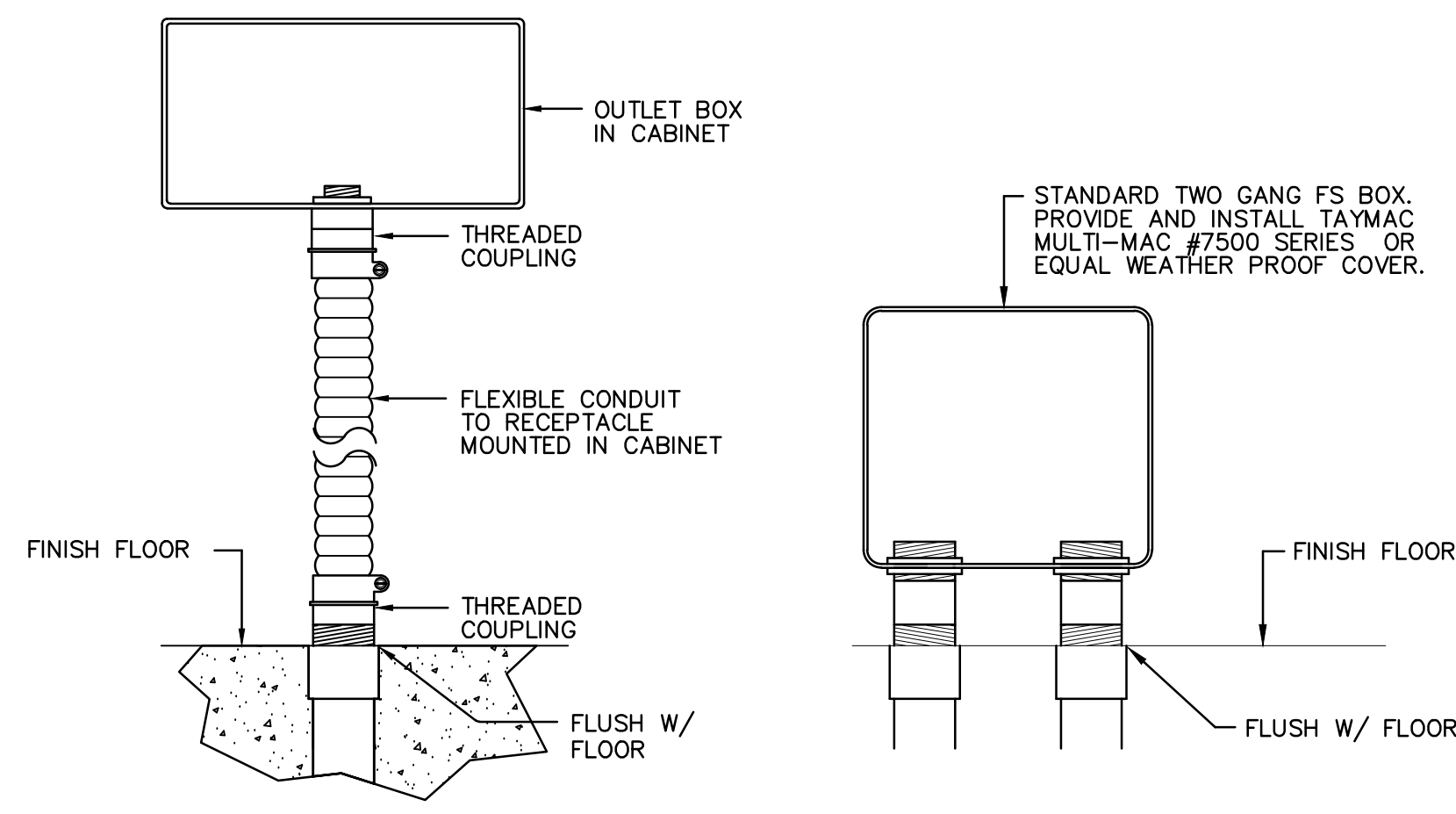
1. CORE DRILL FOR A MAXIMUM 6 INCH DIAMETER OPENING WITH MAXIMUM 6 INCH SCHEDULE 40 STEEL PIPE SLEEVED OPENING FOR CONCRETE BLOCK OR BRICK WALLS OR MAXIMUM 3/4 INCH ANNULAR SPACE.
2. INSTALL OPEN CELL POLYURETHANE BACKER ROD IN OPENING. RECESS 1-1/2 INCHES FROM WALL SURFACE.
3. INSTALL A MINIMUM OF 1-1/2 INCHES OF 3M FIRE BARRIER 2000 SILICONE SEALANT OVER BACKER ROD.



DATA OUTLET

3
E5.1

SCALE: NONE



OUTLET DETAILS

4
E5.1

SCALE: NONE

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No.	Date	Note

TO THE BEST OF MY KNOWLEDGE, THE PLANS AND SPECIFICATIONS COMPLY WITH THE MINIMUM BUILDING CODES.



ATTACHMENT B

INDIANTOWN MIDDLE SCHOOL

16303 SW Farm Road, Indiantown, FL 34956

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Electrical Risers & Schedules	E4.1
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**PROJECT MANUAL
SPECIFICATIONS**



OWNER:

**MARTIN COUNTY SCHOOL
DISTRICT**

Indiantown Middle School
Enhanced Security Project A2
16303 SW Farm Road, Indiantown, Florida 34956

HJ COMM. NO: 16025.19

DATE OF ISSUE: JULY 23, 2020

HARVARD JOLLY, INC.

2047 VISTA PARKWAY, SUITE 100
WEST PALM BEACH, FLORIDA 33411
561-478-4457

HARVARD • JOLLY
ARCHITECTURE

PROJECT MANUAL SPECIFICATIONS

Martin County School District

Indiantown Middle School

Enhanced Security Project A2

16303 SW Farm Road, Indiantown, Florida 34956

HJ PROJECT. NO: 16025.19

DATE OF ISSUE: JULY 23, 2020

ARCHITECT:

HARVARD JOLLY ARCHITECTURE

2047 Vista Parkway, Suite 100
West Palm Beach, Florida 33411
Phone: 561-478-4457

MECHANICAL/ELECTRICAL/PLUMBING/FIRE PROTECTION ENGINEERS:

JOHNSON, LEVINSON, RAGAN, DAVILA, INC.

1450 Centrepark Blvd., Suite 350
West Palm Beach, Florida 33401
Phone: 561-689-2303

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	NO SECTIONS IN THIS DIVISION	0
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DIVISION 14: CONVEYING EQUIPMENT

	NO SECTIONS IN THIS DIVISION	0
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	NO SECTIONS IN THIS DIVISION	0
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	NO SECTIONS IN THIS DIVISION	0
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NO SECTIONS IN THIS DIVISION.....	0
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DIVISION 33: UTILITIES

NO SECTIONS IN THIS DIVISION.....	0
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DIVISION

1

GENERAL CONDITIONS

SECTION 01 10 00 – SUMMARY

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. The provisions of the General Conditions, Supplementary Conditions, Drawings, Specifications, and the Sections included under Division 1, General Requirements and References are included as a part of this Section as though bound herein.

1.2 SUMMARY

- A. Section Includes:
 - 1. Project information.
 - 2. Work covered by Contract Documents.
 - 3. Access to site.
 - 4. Coordination with occupants.
 - 5. Work restrictions.
 - 6. Specification and drawing conventions.
 - 7. Miscellaneous provisions.

1.3 PROJECT INFORMATION

- A. Project Identification: Indiantown Middle School Enhanced Security Project A2.
 - 1. Project Location: 16303 SW Farm Road, Indiantown, Florida 34956.
- B. Owner: Martin County School District, 1939 SE Federal Highway, Stuart, Florida 34994
 - 1. Owner's Representative: Mark Sechrist; sechrim@martin.k12.fl.us; Phone: 772.219.1200 ext. 221
- C. Architect: Harvard Jolly Architecture.
- D. Architect's Consultants: The Architect has retained the following design professionals who have prepared designated portions of the Contract Documents:
 - 1. JLRD, Inc.
1450 Centrepark Blvd. Suite 350
West Palm Beach, Florida 33401
561-689-2303.

1.4 WORK COVERED BY CONTRACT DOCUMENTS

- A. The Work of Project is defined by the Contract Documents and consists of the following:

Martin County School District
Indiantown Middle School
Enhanced Security Project A2

1. Minor interior renovation that consists of relocating the Reception Area across the Lobby and converting the former Reception Area to a Conference Room. A new Vestibule will be installed at the Main Entry door with impact resistant storefront assemblies.

B. Type of Contract:

1. Project will be constructed under a single prime contract.

- C. In the event of conflicts between the Contractor Contract with the Owner and requirements as stipulated in Division 01 Requirements the Contractor /Owner Contract shall govern.

1.5 DOCUMENT PRIORITIES

- A. Anything shown on the drawings and not mentioned in the specifications or mentioned in the specifications and not shown on the drawings shall have the same effect as if shown or mentioned respectively in both.
- B. Detail drawings take precedence over general drawings. Any work shown on one drawing shall be construed to be shown in all drawings and the Contractor will coordinate the work and the drawings.
- C. If any portion of the Contract Documents shall be in conflict with any other portion, the various documents comprising the Contract Documents shall govern in the following order of precedence:
 1. The Owner-Contractor Agreement
 2. Modifications
 3. Addenda
 4. Supplementary Conditions
 5. General Conditions
 6. Specifications
 7. Drawings
 8. Between schedules and information given on Drawings, the schedules shall govern.
 9. Between figures given on Drawings and the scaled measurements, the figures shall govern.
 10. Between large-scale Drawings and small scale Drawings, the larger scale shall govern.
- D. Any such conflict or inconsistency between or in the drawings shall be submitted to the Design Consultant whose decision thereon shall be final and conclusive.

1.6 ACCESS TO SITE

- A. General: Contractor shall have limited use of Project site for construction operations as indicated on Drawings by the Contract limits and as indicated by requirements of this Section.
- B. Use of Site: Limit use of Project site to work in areas indicated. Do not disturb portions of Project site beyond areas in which the Work is indicated.

1. Driveways, Walkways and Entrances: Keep driveways parking areas and entrances serving premises clear and available to Owner, Owner's employees, and emergency vehicles at all times. Do not use these areas for parking or storage of materials.
 - a. Schedule deliveries to minimize use of driveways and entrances by construction operations.
 - b. Schedule deliveries to minimize space and time requirements for storage of materials and equipment on-site.
- C. Condition of Existing Building: Maintain portions of existing building affected by construction operations in a weathertight condition throughout construction period. Repair damage caused by construction operations.

1.7 COORDINATION WITH OCCUPANTS

- A. Full Owner Occupancy: Owner will occupy site and existing or adjacent building(s) during entire construction period. Cooperate with Owner during construction operations to minimize conflicts and facilitate Owner usage. Perform the Work so as not to interfere with Owner's day-to-day operations. Maintain existing exits unless otherwise indicated.
 1. Maintain access to existing walkways, corridors, and other adjacent occupied or used facilities. Do not close or obstruct walkways, corridors, or other occupied or used facilities without written permission from Owner and approval of authorities having jurisdiction.
 2. Notify Owner not less than 72 hours in advance of activities that will affect Owner's operations.

1.8 WORK RESTRICTIONS

- A. Work Restrictions, General: Comply with restrictions on construction operations.
- B. Comply with limitations on use of public streets and with other requirements of authorities having jurisdiction.
- C. On-Site Work Hours: Limit work to normal business working hours of 7:00 a.m. to 5:00 p.m., Monday through Friday, unless otherwise indicated.
- D. Existing Utility Interruptions: Do not interrupt utilities serving facilities occupied by Owner or others unless permitted under the following conditions and then only after providing temporary utility services according to requirements indicated:
 1. Notify and obtain written permission from the Architect not less than 72 hours in advance of proposed utility interruptions.
- E. Noise, Vibration, and Odors: Coordinate operations that may result in high levels of noise and vibration, odors, or other disruption to Owner occupancy with Owner.

1. Notify and obtain written permission from the Architect not less than 72 hours in advance of proposed disruptive operations.
- F. Controlled Substances: Use of tobacco products and other controlled substances on Project site is not permitted.
- G. Employee Identification: Provide identification tags for Contractor personnel working on Project site. Require personnel to use identification tags at all times.
- H. Employee Screening: Comply with requirements for drug and background screening of Contractor personnel working on Project site.
 1. Maintain list of approved screened personnel with Owner's representative.

1.9 SPECIFICATION AND DRAWING CONVENTIONS

- A. Division 01 General Requirements: Requirements of Sections in Division 01 apply to the Work of all Sections in the Specifications.
- B. Drawing Coordination: Requirements for materials and products identified on Drawings are described in detail in the Specifications. One or more of the following are used on Drawings to identify materials and products:
 1. Terminology: Materials and products are identified by the typical generic terms used in the individual Specifications Sections.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION (Not Applicable)

END OF SECTION 01 10 00

SECTION 01 25 13
PRODUCT SUBSTITUTION PROCEDURES

PART 1 GENERAL

1.1 SCOPE OF WORK

- A. Administrative and procedural requirements for consideration of request for substitution during the design and construction phases.
- B. Substitution Request Form.

1.2 REFERENCES

- A. Section 01 33 00 – Submittal Procedures.
- B. Section 01 42 00 – References.
- C. Section 01 45 00 – Quality Control.
- D. Section 01 78 00 – Closeout Submittals.

1.3 SUBMITTAL PROCEDURES

- A. Transmit each substitution request on company letterhead with completed Form 01 25 00 A. Form is as indicated in Para. 3.02.
 - 1. During bidding phase, substitution requests shall be directed to Project Architect.
 - 2. During construction phase substitution requests shall be directed to Contractor/CM.
- B. Substitution Form shall identify project, Contractor/CM and Architect during bidding phase plus Subcontractor or supplier during construction phase indicating Specification Section and Paragraph number of specified material and pertinent drawing and detail numbers, as appropriate.
- C. Include complete information as required in the Substitution Form. Incomplete information will result in automatic rejection of the substitution request.
- D. Apply contractor's stamp, signed or initialed certifying that review, approval, verification of products required, field dimensions, adjacent construction work, and coordination of information are in accordance with the requirements of the work and contract documents.
- E. Schedule submittals to expedite the project, and deliver to Architect or Contractor/CM at business address. Coordinate submission of related items.
- F. For each submittal for review, allow 15 days excluding delivery time to and from Architect or CM/Contractor.
 - 1. Identify variations from contract documents and product or system limitations, which may be detrimental to successful performance of the completed work.
 - 2. Provide space for Contractor/CM and Architect review stamps.
 - 3. When revised for resubmission, identify all changes made since previous submission.
 - 4. Distribute copies of reviewed submittals as appropriate. Instruct parties to promptly report any inability to comply with requirements.
 - 5. Submittals not requested will not be recognized or processed.

1.4 SUBSTITUTION REQUESTS

- A. Requests for substitutions shall be made not later than ten (10) calendar days prior to bid date by prospective bidders, or time set by Owner for receipt of GMP (Guaranteed Maximum Price) from CM. Requests received after the above dates may not be considered.

Martin County School District
Indiantown Middle School
Enhanced Security Project A2

PART 2 PRODUCTS

2.1 Not Used.

PART 3 EXECUTION

3.1 FORM EXECUTION

- A. Contractor/CM shall submit Product Substitution Request on Form 01 25 00A on following page with transmittal letter and self-addressed stamped envelope for Architect's use in returning response to substitution request.

3.2 SUBSTITUTION FORM 01 25 13A - PRODUCT SUBSTITUTION REQUEST

A. Specified Product _____

B. Sheet No./Specification Section and Paragraph _____

C. Contractor/CM has reviewed and approved proposed substitution?

Yes _____ No _____

D. Requested Product Substitution: _____

E. Does Product Meet or Exceed Specified Product Requirements? Yes ___ No ___
(If answer is no, explain.) _____

F. Does Product Substitution affect dimensions shown on Drawings? Yes ___ No ___
(If answer is no, explain.) _____

G. Reason for Requested
Substitution: _____

H. Cost Difference between Product Specified and Product Proposed:
Add \$ _____ Subtract \$ _____

I. Electrical Requirements equal to Specified Product: Yes ___ No ___ N/A ___
(If No or N/A,
explain): _____

J. Plumbing Requirements equal to Specified Product: Yes ___ No ___ N/A ___
(If No or N/A,
explain): _____

K. Mechanical Requirements equal to Specified Product: Yes ___ No ___ N/A ___
(If No or N/A,
explain): _____

L. Does the Product Substitution have any effect on other trades? Yes ___ No ___
(If yes, explain): _____

M. Contractor/CM agrees to pay for changes in building design, including engineering and
detailing costs, caused by requested product substitution. Yes ___ No ___

N. Signature of Bidder/Contractor/CM shall indicate function, appearance and quality of proposed
substitution is equivalent or superior to specified item.

O. Contractor/CM assumes responsibility for delay or claims arising from review and evaluation of
requested product substitution.

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P. Approval of proposed substitution shall have no effect on coordination and installation of work in accord with contract documents.

Submitted by:

For Use by the Architect and Owner:

Contractor/CM

_____ Received Too Late

Firm

_____ Not Accepted

_____ Approved As Noted

Submittal of Information in
Accord with this Section

_____ Approved For Bidding Only,
Final Approval Contingent Upon Address

Date

Architect

Date

Owner

Date

END OF SECTION

SECTION 01 29 00
PAYMENT PROCEDURES

PART 1 GENERAL

1.1 SCOPE OF WORK

- A. Procedures for preparation and submittal of Applications for Payment.
- B. Unit pricing shall be in conformance with 2007 Edition of AIA A201 General Conditions of the Contract and as amended by Owner on July 13, 2009. Copy is included in Division 1, Section 00 72 00 – General Conditions.

1.2 RELATED SECTIONS

- A. Section 01 22 00 – Unit Prices.
- B. Section 01 33 00 – Submittal Procedures.
- C. Section 01 78 00 – Closeout Submittals.

1.3 FORMAT

- A. Payment format shall in accord with AIA G702 - Application and Certificate for Payment and AIA G703 - Continuation Sheets.
- B. Contractor/CM's AIA G702/703 equivalent forms including continuation sheets may be substituted for AIA Payment Forms if preapproved by Owner's Project Manager.

1.4 PREPARATION OF APPLICATIONS

- A. Present handwritten pre-application draft payment forms to Owner for review before submitting applications for payment.
- B. After revising draft payment forms, prepare and submit six typewritten copies or on electronic media printout Pay Application as preapproved by Owner.
- C. Execute certification by signature of authorized officer.
- D. Use data from Owner preapproved Schedule of Values. Provide dollar value in each column for each line item for portion of work performed and for stored products.
- E. List each authorized Change Order as extension on AIA G703 - Continuation Sheet, listing Change Order number and dollar amount as for original item of Work.
- F. Prepare Application for Final Payment as specified in Section 01 78 00 – Closeout Submittals.

1.5 SUBMITTAL PROCEDURES

- A. Submit six copies of each Application for Payment.
- B. Submit an updated construction schedule with each Application for Payment.
- C. Payment Period: Submit at monthly intervals not later than the fifteenth of the month unless otherwise stipulated in the Agreement.
- D. Submit Release of Liens waivers with each Application for Payment.

1.6 SUBSTANTIATING DATA

- A. When Architect or Owner requires substantiating information, submit data justifying dollar amounts.
- B. Provide one copy of data with cover letter for each copy of submittal. Show application number and date, and line item by number and description.
- C. Include following data with application.
 - 1. Partial release of liens from major subcontractors and vendors.
 - 2. Affidavits attesting to off-site stored products.
 - 3. Construction progress schedule, revised and corrected to reflect project status at time of payment application.

1.7 PAYMENTS

- A. Payments may be made for materials stored off-site if preapproved by Owner's Project Manager and off-site facility is insured and bonded air conditioned warehouse, and only if project site doesn't allow storage or protection for equipment and supplies.
- B. Payments will normally be made to Contractor/CM by 10th of each month, if copies are preapproved by Owner's Project Manager and received by 25th of previous month, unless otherwise stipulated in Agreement.

PART 2 PRODUCTS (Not Used)

PART 3 EXECUTION (Not Used)

END OF SECTION

SECTION 01 31 00
PROJECT MANAGEMENT AND COORDINATION

PART 1 GENERAL

1.1 SCOPE OF WORK

- A. Project management, coordination of construction activities, interface with Owner's staff for existing facilities and project conditions related to project for new and existing facilities.
- B. Meetings for field engineering and project coordination, preconstruction, construction procedures, pay application and progress meetings, pre installation and project closeout meetings.
- C. Site mobilization, materials and equipment storage, site cleanup and demobilization.

1.2 RELATED SECTIONS

- A. Section 01 25 13 – Product Substitution Procedures.
- B. Section 01 29 00 – Payment Procedures.
- C. Section 01 33 00 – Submittal Procedures.
- D. Section 01 35 53 – Security.
- D. Section 01 42 00 – References.
- E. Section 01 45 00 – Quality Control.
- F. Section 01 66 00 – Project Storage and Handling Requirements.
- G. Section 01 78 00 – Closeout Submittals.
- H. Section 01 91 00 – Commissioning.

1.3 COORDINATION AND PROJECT CONDITIONS

- A. Coordinate scheduling, submittals, and to ensure efficient and orderly sequence of installation of interdependent construction elements, with provisions for accommodating Owner's occupancy of completed portions of project or existing building on site, and items to be furnished or installed by Owner.
- B. Verify utility requirements and characteristics of operating equipment are compatible with building utilities. Coordinate work of various sections having interdependent responsibilities for installing, connecting to, and placing in service, such equipment.
- C. Coordinate space requirements, supports and installation of mechanical and electrical work that is indicated diagrammatically on Drawings. Follow routing shown for pipes, ducts, and conduit, as closely as practicable; place runs parallel with line of building. Utilize spaces efficiently to maximize accessibility for other installations, for maintenance, and for repairs.
- D. In finished areas, except as otherwise indicated, conceal pipes, ducts, and wiring within the construction. Coordinate locations of fixtures and outlets with finish elements.
- E. In finished areas with exposed ceilings, piping and conduits shall either concealed or be run at right angles and be attached to underside of floor or deck above. Wiring shall not be exposed. Exposed ductwork shall be painted spiral duct.
- E. Coordinate completion and clean up of Work of separate sections in preparation for Substantial Completion and for portions of Work designated for Owner's partial occupancy.
- F. After Owner occupancy of premises, coordinate access to site for correction of defective Work and Work not in accord with Contract Documents, to minimize disruption of Owner's activities.

- G. Owner will not consider change orders for extra work required by Contractor due to his inadequate coordination.

1.4 FIELD ENGINEERING FOR PROJECT LAYOUT

- A. Employ Land Surveyor registered in State of Florida acceptable to Owner's Project Manager.
- B. Locate and protect survey control and reference points.
- C. Control datum for survey is that established by Owner's provided survey.
- D. Verify setbacks and easements; confirm drawing dimensions and elevations.
- E. Provide field engineering services. Establish elevations, lines, and levels, utilizing recognized engineering survey practices.
- F. Submit copy of site drawing and certificate signed by Land Surveyor that elevations and locations of Work are in accord with Contract Documents.

1.5 FLOOR SLAB VERIFICATION SURVEY

- A. Separate from Field Engineering noted above, Contractor/CM shall provide topographic survey of building floor slabs on grade to indicate that finish floor elevations and slab locations are per contract documents, water management and building department requirements.
- B. Survey shall be submitted upon completion of slabs on grade. Remaining work shall not proceed until Owner's Project Manager has reviewed survey information and verified that floor slabs are constructed at proper elevation and locations.
- C. Survey shall be prepared, signed and sealed by Florida licensed surveyor, other than the surveyor noted in Para. 1.04 Field Engineering.
- D. Surveyor shall be selected from one of Owner's annual surveying vendors. List may be obtained from Owner's Project Manager.

1.6 PRECONSTRUCTION MEETING

- A. Owner's Project Manager will schedule pre construction conference after Notice to Proceed.
- B. Attendance Required: Owner, Architect, and Contractor/CM.
- C. Agenda:
 - 1. Execution of Owner-Contractor Agreement, if not executed.
 - 2. Submission of executed bonds and insurance certificates.
 - 3. Distribution of Contract Documents.
 - 4. Submission of list of Subcontractors, list of Products, schedule of values, and progress schedule.
 - 5. Designation of personnel representing the parties in Contract, and Architect.
 - 6. Procedures and processing of field decisions, submittals, substitutions, applications for payments, proposal request, Change Orders and Contract closeout procedures.
 - 7. Scheduling.
 - 8. Scheduling activities of Geotechnical Engineer.
 - 9. Issuance of Notice to Proceed.
- D. Record minutes and distribute copies within two days after meeting to participants, with copies to Architect, Owner, participants, and those affected by decisions made.

1.7 SITE MOBILIZATION MEETING

- A. Owner will schedule meeting at Project site prior to Contractors start of work.

- B. Attendance Required: Owner, Architect, Special Consultants, and Contractor, Contractor's Superintendent, and major Subcontractors.
- C. Agenda:
 - 1. Use of premises by Owner and Contractor.
 - 2. Owner's requirements and partial occupancy.
 - 3. Construction facilities and controls provided by Owner.
 - 4. Temporary utilities provided by Owner.
 - 5. Survey and building layout.
 - 6. Security and housekeeping procedures.
 - 7. Schedules.
 - 8. Application for payment procedures.
 - 9. Procedures for testing.
 - 10. Procedures for maintaining record documents.
 - 11. Requirements for start-up of equipment.
 - 12. Inspection and acceptance of equipment put into service during construction period.
- D. Record minutes and distribute copies within two days after meeting to participants, with copies to Architect, Owner, participants, and those affected by decisions made.

1.8 PROGRESS MEETINGS

- A. Schedule and administer meetings throughout progress of work at weekly intervals. Less frequent meetings may be requested for projects or work stages if requested in writing to the Owner's Project Manager.
- B. Make arrangements for meetings, prepare agenda with copies for participants, and preside meetings.
- C. Attendance Required: Job superintendent, major Subcontractors and suppliers, Owner's Project Manager, Architect, as appropriate to agenda topics for each meeting.
- D. Agenda:
 - 1. Review minutes of previous meetings.
 - 2. Review previous Work progress.
 - 3. Field observations, problems, and decisions.
 - 4. Identification of problems that impede planned progress.
 - 5. Review of submittals schedule and status of submittals.
 - 6. Review of off-site fabrication and delivery schedules.
 - 7. Maintenance of progress schedule.
 - 8. Corrective measures to regain projected schedules.
 - 9. Planned progress schedule during succeeding work period.
 - 10. Coordination of projected progress.
 - 11. Maintenance of quality and work standards.
 - 12. Effect of proposed changes on progress schedule and coordination.
 - 13. Other business relating to work.
- E. Record minutes and distribute copies within two days after meeting to participants, with copies to Architect, Owner, participants, and those affected by decisions made.

1.9 PREINSTALLATION MEETINGS

- A. When required in individual specification section, convene pre-installation meeting at site prior to commencing work of section.
- B. Require attendance of parties directly affecting, or affected by, work of specific section.
- C. Notify Owner and Architect five working days in advance of meeting date.

- D. Prepare agenda and preside at meeting:
 - 1. Review conditions of installation, preparation and installation procedures.
 - 2. Review coordination with related work.
- E. Record minutes and distribute copies within two days after meeting to participants, with copies to Architect, Owner, participants, and those affected by decisions made.

PART 2 PRODUCTS

2.1 EQUIPMENT ELECTRICAL CHARACTERISTICS AND COMPONENTS

- A. Motors: Refer to Electrical Sections for specific motor types.
- B. Wiring Terminations: Provide terminal lugs to match branch circuit conductor quantities, sizes, and materials indicated. Size terminal lugs to NFPA 70, include lugs for terminal box.
- C. Cord and Plug: Provide minimum 6' cord and plug including grounding connector for connection to electric wiring system. Cord of longer length is specified in individual specification sections.

PART 3 EXECUTION

3.1 EXISTING BUILDING PROJECT PROCEDURES

- A. Materials: As specified in Product sections; match existing Products and work for patching and extending work.
- B. Employ skilled and experienced installer to perform alteration work.
- C. Close openings in exterior surfaces to protect existing work from weather and extremes of temperature and humidity.
- D. Remove, cut and patch Work in manner to minimize damage and to provide means of restoring Products and finishes to original or specified condition.
- E. Refinish existing visible surfaces to remain in renovated rooms and spaces, to specified condition for each material, with neat transition to adjacent finishes.
- F. Where new Work abuts or aligns with existing, provide smooth and even transition. Patch Work to match existing adjacent Work in texture and appearance.
- G. When finished surfaces are cut so that a smooth transition with new Work is not possible, terminate existing surface along a straight line at natural line of division and submit recommendation to Architect for review.
- H. Where change of plane of 1/4" or more occurs, submit recommendation for providing a smooth transition to Architect for review.
- I. Patch or replace portions of existing surfaces, which are damaged, lifted, discolored, or showing other imperfections.
- J. Work that penetrates fire or smoke rated partitions or floors shall be repaired to provide original fire or smoke rating.
- K. Finish surfaces as specified in individual Product Specification Sections.

END OF SECTION

SECTION 01 32 16
CONSTRUCTION PROJECT SCHEDULE

PART 1 GENERAL

1.1 SCOPE OF WORK

- A. Preparation of preliminary Construction Schedule, Contractor's/CM/GC final master Construction Schedule, hereinafter called the Construction Schedule, Short Interval Schedules (look ahead), and monthly updates.
- B. Scope of work and project completion are as indicated. Bidders shall include with their bid, a proposed project schedule indicating each item of work in CSI numbering format showing each work division in CPM (Critical Path Method) work sequencing. Schedule shall base critical path on Owner's providing pre purchase of long lead items, and assuming that those products and services are delivered to the Contractor/CM on time for meeting proposed project schedule.

1.2 SUBMITTALS

- A. Submit schedule in accord with Section 01 33 00 – Submittal Procedures.
- B. Preliminary Project Schedule:
 - 1. Purpose of preliminary schedule is to determine Bidder's intent as to how work can be prosecuted to allow project completion in specified time frame.
 - 2. Bidder's shall comply with "The Use of CPM in Construction – A Manual for General Contractors" published by Associated General Contractors of America, Inc. Schedules shall utilize nationally recognized scheduling format such as Primavera or Microsoft Project. Software version selected shall be compatible with Owner's Microsoft Word or Office software so that schedule can be reviewed and saved in Owner's computer system.
 - 3. Schedule shall be on 11" x17" paper indicating project activities, duration, start and finish dates of each activity, float or slack time, critical path, and total number of days for project.
 - 4. Include float or slack time in Schedule. Float is defined as amount of time between earliest start date and latest start date or days between earliest end date and latest end date.
 - 5. Construction schedule shall begin based on Owner's intent to issue Notice to Proceed Letter to Contractor/CM and be completed within "x" Calendar Days from NTP. Substantial Completion is "date", with "x" calendar days to Final Completion or "date".
 - 6. Preliminary Project Schedule shall be submitted with Bid Proposal. Failure to do so will be grounds for rejection of the Bid Proposal.

1.3 COORDINATION AND PROJECT CONDITIONS

- A. Bidders are responsible for verification of existing conditions to the extent that they are observable and can be inferred by visual inspection.
- B. Verify utility requirements and characteristics of operating equipment are compatible with building utilities. Coordinate work of various sections having interdependent responsibilities for installing, connecting to, and placing in service, such equipment.

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- C. Coordinate space requirements, supports and installation of mechanical and electrical work that is indicated diagrammatically on Drawings. Follow routing shown for pipes, ducts, and conduit, as closely as practicable; place runs parallel with line of building. Utilize spaces efficiently to maximize accessibility for other installations, for maintenance, and for repairs.
- D. In finished areas, except as otherwise indicated, conceal pipes, ducts, and wiring within the construction. Coordinate locations of fixtures and outlets with finish elements.
- E. In finished areas with exposed ceilings, piping and conduits shall either concealed or painted and be run at right angles, and attached to underside of floor or deck above. Wiring shall not be exposed. Exposed ductwork shall be painted.
- F. Coordinate scheduling to allow time for submittals, Owner's approval, Building Dept. review, permitting and inspections to ensure efficient and orderly sequence of installation of interdependent construction elements. Schedule shall provide for accommodating Owner's occupancy of other buildings on site, and items to be furnished or installed by Owner.
- G. Owner will not consider change orders for extra work required by Contractor due to his inadequate coordination.

PART 2 NOT USED

PART 3 NOT USED

END OF SECTION

SECTION 01 33 00
SUBMITTAL PROCEDURES

PART 1 GENERAL

1.1 SCOPE OF WORK

- A. Administrative and procedural requirements for processing of submittals during construction process. Submittals may include the following:
1. Proposed Products Lists.
 2. Proposed Vendor List.
 3. Product Data.
 4. Shop Drawings.
 5. Samples.
 6. Design Data.
 7. Field Test Reporting.
 8. Quality Control Reporting.
 9. Certificates.
 10. Manufacturer's Installation, Handling and Storage Instructions.
 11. Manufacturer's Field Reports.
 12. Erection Drawings.
 13. Closeout Documents
 14. Warranties.
 15. Scheduling of Work.
 16. Construction Progress Schedule.
 17. Submittals Schedule.
 18. Survey and Layout Data.
 19. Construction Progress Reporting.
 20. Periodic Work Observation.
 21. Photographic Documentation.
 22. Purchase Order Tracking.
 23. Operation and Maintenance Documentation.

1.2 RELATED SECTIONS

- A. Section 01 29 00 – Payment Procedures.
- B. Section 01 31 12 – Project Coordination.
- C. Section 01 42 00 – References.
- D. Section 01 45 00 – Quality Control.
- E. Section 01 66 00 – Product Storage and Handling Requirements.
- F. Section 01 78 00 – Closeout Submittals.

1.3 SUBMITTAL PROCEDURES

- A. Submittal Procedures shall be in conformance with AIA A201 General Conditions of the Contract and as amended by Owner on July 13, 2009. Copy is included in Division 1, Section 00 72 00 – General Conditions.
- B. Transmit each submittal with AIA Form G810-2001 or Owner's Standard Transmittal form.
- C. Sequentially number each transmittal forms. Revise submittals with original number and a sequential alphabetic suffix.

- D. Identify project, Contractor/CM, subcontractor or supplier pertinent drawing and detail number, and specification section number, as appropriate.
- E. Apply Contractor/CM's stamp, signed or initialed certifying that review, approval, verification of products required, field dimensions, adjacent construction work, and coordination of information are in accord with requirements of the work and contract documents.
- F. Schedule submittals to expedite the project and deliver to Engineer and Contractor/CM at business address. Coordinate submission of related items.
- G. For each submittal for review, allow 15 days excluding delivery time to and from the Contractor/CM.
- H. Identify variations from contract documents and product or system limitations, which may be detrimental to successful performance of the completed work.
- I. Provide space for Contractor/CM and Engineer review stamps.
- J. When revised for resubmission, identify all changes made since previous submission.
- K. Distribute copies of reviewed submittals as appropriate. Instruct parties to promptly report any inability to comply with requirements.
- L. Submittals not requested will not be recognized or processed.

1.4 PROPOSED PRODUCTS LIST

- A. Within 15 work days after date of Notice to Proceed, submit list of major products proposed for use, with name of manufacturer, trade name, and model number of each product.
- B. For products specified only by reference standards, give manufacturer, trade name, model or catalog designation, and reference standards.

1.5 PRODUCT DATA

- A. Product Data for Review:
 - 1. Submit to Engineer for review for purpose of checking for conformance with information given and design concept expressed in Contract Documents.
 - 2. After review, provide copies and distribute per Submittal Procedures article above and for record documents purposes described in Section 01 78 00 – Closeout Submittals.
- B. Product Data for Information:
 - 1. Submittal for Engineer's knowledge as contract administrator or for Owner.
- C. Product Data for Project Close-out:
 - 1. Submit for Owner's benefit during and after project completion.
- D. Submit number of copies required by Contractor/CM plus two copies for transmittal to Engineer and two copies for transmittal to Owner's Project Manager.
- E. Mark each copy to identify applicable products, models, options, and other data.
- G. Supplement manufacturers' standard data to provide information unique to project.
- H. Indicate product utility and electrical characteristics, utility connection requirements, and location of utility outlets for service for functional equipment and appliances.
- I. After review, distribute in accord with Submittal Procedures article above and provide copies for record documents described in Section 01 78 00 - Closeout Documents.

1.6 CONSTRUCTION SUBMITTALS

- A. Submit one copy of Building Permit, Site Permits, Environmental Permits, or other permits required for construction of work.
- B. Submit Payment Applications to Engineer for review for purpose of checking conformance with information given and design concept expressed in Contract Documents.

- C. Shop Drawings: Provide following information:
1. Fabrication and installation Drawings and details.
 2. Template placement diagrams.
 3. Manufacturer's installation instructions.
 4. Product patterns and colors.
 5. Coordination Drawings.
 6. Schedules.
 7. Product mix formulae.
 8. Product design or engineering calculations.
 9. Other information as required by project.
 10. After review, produce copies and distribute per Submittal Procedures article above and for record documents purposes described in Section 01 78 00 – Closeout Submittals.
 11. Submit to Engineer for purpose of checking conformance with information given and design concept and Owner's Project Manager.
- D. Project Closeout Documents:
1. Indicate special utility and electrical characteristics, utility connection requirements, and location of utility outlets for service for functional equipment and appliances.
 2. Submit number of copies required by Contractor, plus one copy for Engineer and two copies for Owner.
 3. Submit to Engineer for Owner's benefit during and after project completion.
 - a. Indicate special utility and electrical characteristics, utility connection requirements, and location of utility outlets for service for functional equipment and appliances.
 - b. Submit one copy and one reproducible copy required by Contractor/CM, plus one copy for Engineer and two copies for Owner.
- E. Product Samples
1. Submit to Engineer for purpose of checking conformance with information given and design concept expressed in the documents.
 2. After review, Engineer shall submit color board to Owner's Project Manager per Submittal Procedures.
 3. Sample finishes and colors shall be from full range of manufactures' standard colors, textures, and patterns for Engineer's selection and preparation of color board for Owner's approval.
 4. After review and approval by Owner, provide duplicates and distribute per Submittal Procedures.
 5. Submit samples to illustrate functional and aesthetic characteristics of the product, with integral parts and attachment devices. Coordinate sample submittals for interfacing work.
 6. Include identification on each sample, with full project information.
 - a. Submit number of samples specified in specification, one of which Engineer shall retain.
 - b. Reviewed samples may be used in work, if indicated.
- F. Product Design Data and Test Reports:
1. Submit to Engineer as contract administrator and for Owner's Project Manager for purpose of checking conformance with information given and completed work on project.
- G. Certificates:
1. When specified, submit certification by manufacturer, installation/application subcontractor, or contractor to Engineer, in quantities specified for Product Data.
 2. Indicate material or Product conforms to or exceeds specified requirements.
 3. Submit supporting reference date, affidavits, and certifications as appropriate.
 4. Certificates may be recent or previous test results on material or Product, but must be acceptable to Engineer.

H. Manufacturer's Instructions:

1. When specified, submit printed instructions for delivery, storage, assembly, installation, start-up, adjusting, and finishing, to Engineer for delivery to Owner in quantities specified for Product Data.
2. Indicate special procedures, perimeter conditions requiring special attention, and special environmental criteria required for application or installation.
3. Refer to Section 01 45 00 – Quality Control for quality assurance requirements.

J. Manufacturer's Field Reports:

1. Submit reports to Engineer and Owner's Project Manager.
2. Submit report within 30 days of observation to Engineer.
3. Submit for information for purpose of assessing conformance with information given and design concept expressed in Documents.

K. Erection Drawings:

1. Submit drawings to Engineer and Owner's Project Manager.
2. Submit for information for purpose of assessing conformance with information given and design concept expressed in Documents.
3. Data indicating inappropriate or unacceptable work is subject to rejection by Engineer or Owner.

PART 2 PRODUCTS (Not Used)

PART 3 EXECUTION (Not Used)

END OF SECTION

SECTION 01 35 53
SECURITY PROCEDURES

PART 1 – GENERAL

1.1 SCOPE OF WORK

- A. Development of site security program, project entry control procedures, personnel screening and identification in compliance with Florida Statute FS1012.465 – Jessica Lunsford Act for vendors, and Contractor/CM's.

1.2 RELATED SECTIONS

- A. Section 01 31 00 – Project Management and Coordination.
- B. Section 01 33 00 – Submittal Procedures.
- C. Section 01 56 00 – Temporary Barriers and Enclosures.

1.3 JESSICA LUNSFORD ACT

- A. Contractor/CM, his subcontractors, vendors and suppliers who are to be permitted access to school grounds while students are present, or have direct contact with students or have access to or control of school funds shall obtain Level 2 background screening in accord with Florida Statute FS1012.465 – Jessica Lunsford Act.
 - 1. Level 2 screening excludes personnel working on school district property where students are present who have criminal records that include sexual offender, sexual misconduct with developmentally disabled or mental health patients, terrorism, murder, kidnapping, lewd, lascivious or indecent acts or exposure, incest, child abuse or neglect.
 - 2. Persons screened as noted above with other types of criminal history may be allowed on school grounds provided under following conditions:
 - a. Contractor/CM, subcontractors, vendors and suppliers shall be under continuous direct supervision of school district employee or Level 2 screened and cleared employee as noted above.
 - b. Contractor/CM, subcontractors, vendors and suppliers may be allowed on a student occupied site if area of construction is isolated from students by continuous six foot high chain link fence separating work area and school.
 - c. Persons with current Level 2 clearance who are subsequently arrested for disqualifying offenses shall be disqualified from access to school sites and shall immediately surrender their Photo ID Badge to their employer who shall be responsible for returning badge to Martin County School District's Department of Human Resources within 48 hours of arrest or notice of arrest or criminal offense.
 - d. Persons failing to notify their employer and Martin County School District's Department of Human Resources within 48 hours of arrest will be charged with 3rd degree felony, punishable by up to five years imprisonment and \$1,000 fine.
 - e. Employers of persons having been arrested for disqualifying offenses who subsequently allows said employee to continue working on school property may also be charged with 3rd degree felony, punishable by up to five years imprisonment and \$1,000 fine.
- B. Contractor/CM, his subcontractors, vendors and suppliers working on school board sites shall be fingerprinted and obtain work badges.
 - 1. Contractor/CM, his subcontractors, vendors and suppliers have worked and obtained in other school districts must be screened to obtain new badges.

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2. Questions regarding fingerprinting or identification badge processing may be directed to District Personnel Department at (772)219-1200, Ext. 30296.
 3. Fingerprinting services are provided by private vendor through Florida Dept. of Education. DOE sponsored website will direct individuals to nearest fingerprinting location.
 4. Cost of fingerprinting is (Check with the School District) per person and shall be prepaid either by money order to (Check with the School District) or by credit card payment via Internet. Website is <http://www.flprints.com>. For information, telephone (877) 357-7456.
 5. Money orders shall be made out to 3M Cogent. Money order must be brought to appointment.
 6. Individuals shall register online prior to their appointment:
 - a. Navigate to https://www.cogentid.com/fl/index_fdoe.htm and select "register online".
 - b. For County select Martin County from pull-down box.
 - c. For CRI Literal select: FL931392Z Contractors & Vendors.
 - d. Fill out remaining information and submit.
 - e. Use Internet Explorer.
 7. Individuals being fingerprinted shall provide valid, government issued driver's license, identification card or passport.
 8. After fingerprinting and criminal background check is complete, individuals shall make appointment for photo ID's by making appointments at Martin County School District Personnel Department located in Building 20 at School District Administration Center, 500 E. Ocean Blvd., Stuart, FL 34994.
 9. Appointments for ID photo badges shall be made after completion of fingerprinting with Martin County School District Personnel Department by phone at (772) 219-1200, Ext. 30296
 10. Photo ID applicants shall have registration confirmation receipt with them when they arrive for appointment.
 11. Cost of Photo ID's is (Check with the School District). Payment may be made with company check, money order or personal check. Checks shall be made payable to Martin County School District.
- C. Non-Instructional Contractors with current Martin County School District ID Photo Badges shall update their badges to the State Uniform Badge required by Florida Statute 1012.467, effective July 1, 2014.
1. There is no cost for individuals with current Martin County School District ID Photo Badges to upgrade their badges.
 2. Badges from other individual School Districts are no longer accepted on school sites in Florida.
 3. New state wide badges are accepted in any School District regardless of where it was issued.
 4. Non-Instructional Contractors and their employees working on School sites shall apply for State-Wide Badges as noted above.
 5. Non-Instructional Contractors shall submit lists of their badged employees via email to Eileen Loreti at the Martin County School District Personnel Department at loretie@martin.k12.fl.us.

1.4 SECURITY PROGRAM

- A. Protect new work, existing facilities and grounds from damage, theft, vandalism, and unauthorized entry.
- B. Initiate security program in coordination with Owner's existing security system at time of project mobilization to ensure safety of students, faculty and visitors to the unaffected portions of the school facilities.

- C. No student contact is permitted between the Contractor's personnel and students. Any breach of this requirement will result in the immediate removal of the personnel from the job site upon direction by the Owner.
- D. Smoking is not allowed on School Board property. Any breach of this restriction will result in immediate removal of personnel from the site upon direction by Owner's Project Manager.
- E. Maintain security program throughout construction period until Owner's project acceptance.

1.5 ENTRY CONTROL

- A. Restrict entrance of persons and vehicles into Project site and existing facilities as indicated by Owner approved security plan.
 - 1. Allow entrance only to authorized persons with proper identification.
 - 2. Maintain log of workers and visitors, make available to Owner on request.
 - 3. Coordinate access of Owner's personnel to site in coordination with Owner's security forces.

1.6 PERSONNEL IDENTIFICATION

- A. Contractor/CM on-site staff, subcontractors and vendors on site shall wear identification badges at all times on site.
- B. Identification badges shall be current at time of project and shall be reverified and reissued yearly if project extends past original badge expiration date.

1.7 SUBMITTALS

- A. Comply with Section 01 33 00 – Submittal Procedures.
- B. Provide list of personnel proposed to be used on project for fingerprinting and background checks (only required for existing school projects).
- C. Contractor/CM shall submit initial list of accredited persons and provide monthly updated lists to Owner.
- D. Provide security plan to Owner indicating how construction site is to be secured and separated from existing school and its operations including normal and emergency egress and exiting from the operational portion of school and for new additions and existing portion under construction.

PART 2 PRODUCTS

- 2.1 Not Used.

PART 3 EXECUTION

- 3.1 Not Used.

END OF SECTION

SECTION 01 42 00
REFERENCE STANDARDS

PART 1 GENERAL

1.1 REFERENCE STANDARDS

- A. Reference and design standards referenced in Florida Building Code and Florida Fire Prevention Code, 6th Editions are applicable.
- B. Documents listed shall be standard references currently in effect at time of project building permitting.
- C. American Society of Testing Materials (ASTM):
 - 1. See individual product specification sections for applicable ASTM standards.
- D. American National Standards Institute (ANSI)/Underwriters Laboratories (UL):
 - 1. See individual product specification sections for applicable ANSI standards.
- E. Underwriters Laboratories (UL) – Fire Resistance Directory.
- F. Warnock-Hersey – Product Directory.
- G. Building Industry Consulting Services International (BICSI):
 - 1. BICSI-568-2001: Installing Commercial Building Telecommunications Cabling.
 - 2. BICSI Telecommunications Distribution Methods Manual (TDMM).
 - 3. BICSI Telecommunications Cabling Installation Manual (TCIM).
 - 4. BICSI Outside Plant Design Reference Manual, 5th Edition.
- H. FCC (Federal Communications Commission) Rules.
- I. National Electrical Code (NEC):
 - 1. NFPA 70 National Electrical Code, 2008 Edition.
- J. National Fire Protection Association (NFPA):
 - 1. NFPA 101: Life Safety Code - National Fire Protection Association (NFPA).
 - 2. NFPA 70: National Electrical Code - National Fire Protection Association (NFPA).
- K. Occupational Health and Safety (OSHA): State and Federal Requirements.
- L. Telecommunications Industry Association (TIA)/Electronics Industry Association (EIA):
 - 1. TIA/EIA-568-B.1 and addenda: Commercial Building. Telecommunications Cabling Standard - Part 1: General Requirements.
 - 2. TIA/EIA-568-B.2 and addenda: Commercial Building Telecommunications Cabling Standard - Part 2: Balanced Twisted-Pair.
 - 3. TIA/EIA-568-B.2-1: Transmission Performance Specifications for 4-Pair 100 Ohm Category 6 Cabling.
 - 4. TIA/EIA-568-B.3 and addenda: Commercial Building Telecommunications Cabling Standard - Part 3: Optical Fiber Cabling and Components Standard.
 - 5. TIA/EIA-568-B.3-1: Additional Transmission Performance Specifications for 50/125 ohm Optical Fiber Cables.
 - 6. TIA/EIA-569-A and Addenda: Commercial Building Standard for Telecommunications Pathways and Spaces, CSA T530.
 - 7. TIA/EIA-606-A and Addenda: Administration Standard for Telecommunications Infrastructure of Commercial Buildings, CSA T528.
 - 8. ANSI-J-STD-607-A and Addenda: Commercial Building Grounding (Earthing) and Bonding Requirements for Telecommunications, CSA T530.
 - 9. TIA/EIA-526-7 and Addenda: Measurement of Optical Power Loss of Installed Single-Mode Fiber Cable Plant.
 - 10. TIA/EIA-526-14A and Addenda: Optical Power Loss Measurements of Installed Multimode Fiber Cable Plant.

11. TIA/EIA-758: Customer Owned Outside Plant Telecommunications Cabling Standard.
- M. International Electrical Code (IEC):
 1. TR3 61000-5-2 - Ed. 1.0 and amendments: Electromagnetic compatibility (EMC) - Part 5: Installation and mitigation guidelines – Section 2: Earthing and Cabling”.
 2. ISO/IEC 11801: 2000 Edition, 1.2 and amendments: Information Technology – Generic cabling for customer premises.
- N. International Standards Organization (ISO/IEC): 11801: 2000 Ed. 1.2 and amendments: Information technology - Generic cabling for customer premises.
- O. NACE (National Association of Corrosion Engineers) - Industrial Maintenance Painting.
- P. NPCA (National Paint and Coatings Association) - Guide to U.S. Government Paint Specifications.
- Q. PDCA (Painting and Decorating Contractors of America) - Painting - Architectural Specifications Manual.
- R. SSPC (Steel Structures Painting Council) - Steel Structures Painting Manual.
 1. SSPC-SP 1 – Solvent Cleaning.
 2. SSPC-SP 2 – Hand Tool Cleaning.
 3. SSPC-SP 3 – Power Tool Cleaning.
 4. SSPC-SP 13 – Nace No 6 Surface Preparation for Concrete.
- S. WDMA (Window and Door Manufacturer’s Association) I.S. 1-A-2004.

1.2 DEFINITIONS

- A. Communication Definitions:
 1. ITS: Information Transport System: Copper cabling or optical fiber for transmission of information on School District property. Transmission includes data, video, voice, fire alarm, security, access control, and other low-voltage networks. Information Transport System is not limited to School District-owned cabling, but includes copper and optical fiber, and equipment owned by outside providers carrying School District’s information. Pathways are not limited by School District’s ownership, but include those owned by third parties. Information Transport System may be referred to as “the network” within project documents.
 2. ICP: Inside Cable Plant: Part of Information Transport System running within buildings. ICP elements include workstation outlet assembly, cabling to the workstation from network rooms, backbone cabling within building, backbone cabling running between physically contiguous buildings, network racks and hardware (routers, switches, hubs, firewalls, etc.), patch panels, punch blocks, fiber distribution panels, patch cords, and cross-connect cables/wires.
 3. OCP: Outside Cable Plant: Part of Information Transport System running between buildings, from building to definable exterior point, between definable exterior points, or from non-School District source to School District building or definable exterior point. OCP includes termination punch blocks, fiber distribution panels, interior splices for outside to inside optical fiber transition, and other initial device into which outside cable attaches. OCP does not include backbone cable running between physically contiguous buildings unless cabling enters OSP pathway element (e.g. OSP conduits, maintenance holes, etc.). OCP includes underground cabling and aerial cabling.
 4. Cable: An assembly of one or more insulated conductors or optical fibers, within an enveloping sheath.
 5. DP: Dead pairs: Unused copper pairs terminating within splice case, but without being splices to outgoing cable.

6. GP: Grounding electrode: Conductor (rod, pipe or plate or group of conductors) in direct contact with earth for purpose of providing low-impedance connection to earth.
 7. GEC: Grounding electrode conductor: Conductor used to connect grounding electrode to equipment grounding conductor, or to grounded conductor of circuit at service equipment, or at source of separately derived system.
 8. Handbox: Rectangular or square underground pathway element similar to small maintenance hole, which cannot be fully entered, that allows for pulling point or splice point in power, security or communications pathway.
 9. Handhole: A round underground pathway element similar to a handbox, which cannot be fully entered, that allows for a pulling point in a pathway.
 10. Identifier: An item of information that links a specific element of the Information Transport System infrastructure with its corresponding record.
 11. Infrastructure (Information Transport System): A collection of those Information Transport System components, excluding equipment, that together provides the basic support for the distribution of all information within a building or campus.
 12. Linkage: A connection between a record and an identifier or between records.
 13. Maintenance (man) holes: Underground pathway element large enough for person to fully enter work, used to provide access to underground cable to pull, splice, and maintain.
 14. Media (Information Transport System): Wire, cable, or conductors used for Information Transport System.
 15. OB: Outlet box: Metallic or nonmetallic box used to hold Information Transport System outlets/connectors or transition devices.
 16. Outlet (Connector) (Information Transport System): Connecting device in work area on which horizontal cable or outlet cable terminates.
 17. Pathway: Facility for the placement of Information Transport System cable.
 18. Record: Collection of detailed information related to specific element of Information Transport System infrastructure.
 19. Report: Presentation of collection of information from various records.
 20. Space (Information Transport System): Area used for housing installation and termination of Information Transport System equipment and cable, e.g., equipment rooms, network rooms, work areas, and maintenance holes/handboxes/handholes.
 21. Splice: Joining of conductors in splice closure, meant to be permanent.
 22. Splice box: Box, located in pathway run, intended to house cable splice.
 23. Splice closure: Device used to protect splice.
 24. Termination position: Discrete element of termination hardware where information Transport System conductors are terminated.
 25. Work Area (work station): Building space where occupants interact with Information Transport System terminal equipment.
- B. Painting Definitions:
1. ASTM D16 - Definitions of Terms Relating to Paint, Varnish, Lacquer, and Related Products for interpretation of terms used herein.

1.3 ABBREVIATIONS AND ACRONYMS

- A. Abbreviations noted in Florida Building Code, Chapter 2 are applicable.
- B. General Abbreviations:
1. AC: Above Counter/Air Conditioning.
 2. ACR: Attenuation-to-Crosstalk Ratio.
 3. ADA: Americans with Disabilities Act.

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4. AFF: Above finished floor.
5. AFG: Above finished grade.
6. ANSI: American National Standards Institute.
7. ARCH: Architect or Architectural.
8. ASTM: American Society for Testing and Materials (ASTM International).
9. AWG: American Wire Gauge.
10. BD: Building distributor (replacing main-cross connect and MDF as “building service” room identifiers).
11. BICSI®: Building Industry Consulting Service International, Inc.
12. BTU: British Thermal Unit.
13. CAT6: Category 6 cable.
14. CATV: Community Antenna Television (cable television).
15. CD: Campus distributor (replacing main-cross connect and MDF as “campus-wide service” room identifiers). Also, compact disk for storage of audio or video information.
16. CO: Communications Outlet.
17. COAX: Coaxial Cable.
18. CP: Communications Panel.
19. dB: Decibel.
20. EMS: Energy Management System or Emergency Management System.
21. EMT: Electrical metallic tubing.
22. ENT: Electrical nonmetallic tubing.
23. EDPM: Ethylene-polypropylene-diene membrane.
24. EF: Entrance Facility.
25. EIA: Electronic Industries Alliance.
26. ELFEXT: Equal Level Far-End Crosstalk.
27. EMC: Electromagnetic Compatibility.
28. EMI: Electromagnetic Interference.
29. ER: Equipment Room. Replacing “TR”
30. FMC: Flexible metallic conduit.
31. FCC: Federal Communications Commission.
32. FD: Floor distributor (replacing network room, intermediate and horizontal cross-connect, and telecommunications as “building service” room identifiers). Also, Floor Drain as part of building plumbing system.
33. FDDI: Fiber Distribution Data Interface.
34. FEXT: Far-End Crosstalk.
35. FO: Fiber Optic.
36. Freq: Frequency.
37. GE: Grounding equalizer (replacing TBBIBC).
38. Gnd: Ground.
39. HB: Handbox. Also, hose bibb for water supply part of plumbing system.
40. HC: Horizontal Cross-Connect (replaced by floor distributor “FD”).
41. HH: Handhole.
42. HVAC: Heating, Ventilation, and Air Conditioning.
43. Hz: Hertz.
44. IC: Intermediate Cross-Connect (replaced by building distributor “BD”).
45. IDC: Insulation Displacement Connectors.
46. IDF: Intermediate Distribution Frame (replaced by “BD” or “FD”).
47. IEEE: Institute of Electrical and Electronics Engineers.
48. IMC: Intermediate metal conduit.
49. IN: Inches.

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50. ISO: International Organization for Standardization.
51. ISP: Inside Cable Plant.
52. JB: Junction Box.
53. LBS: Pounds.
54. LED: Light Emitting Diode.
55. LFMC: Liquidtight flexible metal conduit.
56. LFNC: Liquidtight flexible nonmetallic conduit.
57. Mbps: Megabits per second.
58. MC: Main Cross-Connect (replaced by campus distributor “CD”).
59. MDF: Main Distribution Frame (replaced by “CD” or “BD”).
60. MER: Main Equipment Room.
61. MH: Maintenance Hole.
62. MHz: Megahertz.
63. NBR: Acrylonitrile-butadiene rubber.
64. NEC: National Electrical Code, NFPA 70.
65. NEMA: National Electrical Manufacturers Association.
66. NESC: National Electric Safety Code, C2-1997.
67. NFPA: National Fire Protection Association.
68. NIC: Not in Contract.
69. NR: Network Room.
70. #: Number.
71. OFCI: Owner Furnished Contractor Installed.
72. OFOI: Owner Furnished Owner Installed.
73. OSHA: Occupational Safety and Health Administration.
74. OCP: Outside Cable Plant.
75. OTDR: Optical Time Domain Reflectometer.
76. PR: Pair.
77. PVC: Polyvinyl Chloride.
78. RCDD®: Registered Communications Distribution Designer.
79. RFI: Radio Frequency Interference.
80. RGC or GRC: Rigid Galvanized Conduit.
81. RH: Relative Humidity.
82. RNC: Rigid nonmetallic conduit.
83. SCS: Structured Cabling System.
84. SS: Stainless Steel.
85. SM: Single Mode.
86. TIA/EIA: Telecommunications Industry Association/Electronic Industry Association.
87. TBB: Telecommunication Bonding Backbone.
88. TBBIBC: Telecommunication Bonding Backbone Interconnecting Bonding Conductor (replaced by grounding equalizer “GE”).
89. TE: Telephone Equipment (Wall Mounted Equipment Rack).
90. TEL: Telephone.
91. TGB: Telecommunications Grounding Buss bar.
92. TMGB: Telecommunications Main Grounding Buss bar.
93. TR: Telecommunications Room. (Replaced with Main-MDF or Intermediate-IDF Distribution Frame Locations).
94. TYP: Typical.
95. UL: Underwriters Laboratory.
96. UPS: Uninterruptible Power Supply.
97. UTP: Unshielded Twisted Pair.

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- 98. V: Volt.
- 99. WAO: Work Area Outlet.

1.4 UNITS OF MEASURE

- A. Weights and Measures shall be as identified by Weights and Measures Division, NIST, U. S. Department of Commerce, 100 Bureau Dr., Stop 2600, Gaithersburg, MD 20899-2600.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION

SECTION 01 45 00
QUALITY CONTROL

PART 1 GENERAL

1.1 SCOPE OF WORK

- A. Quality assurance procedures to control labor and product installation including tolerances, adherence to references and standards.
- B. Construction of mockups and field samples to set standard of quality for product installation.
- C. Independent inspecting and testing laboratory services for quality control and adherence to contract documents.
- D. Manufacturers' field services for quality control and adherence to contract documents.
- E. Work shall be in conformance with 2007 Edition of AIA A201 General Conditions of the Contract and as amended by Owner on July 13, 2009. Copy is included in Division 1, Section 00 72 00 – General Conditions.

1.2 RELATED SECTIONS

- A. Section 01 22 00 – Unit Prices.
- B. Section 01 29 00 – Payment Procedures.
- C. Section 01 31 00 – Project Management and Coordination.
- D. Section 01 33 00 – Submittal Procedures.
- E. Section 01 42 00 – References.
- F. Section 01 66 00 – Product Storage and Handling Requirements.
- G. Section 01 78 00 – Closeout Submittals.
- H. Section 01 91 00 – Commissioning.
- I. Section 23 05 93 – Testing, Adjusting and Balancing of HVAC.
- J. Section 23 08 00 – Commissioning of HVAC.

1.3 COORDINATION AND PROJECT CONDITIONS

- A. Coordinate scheduling, submittals, and work to ensure efficient and orderly sequence of installation of interdependent construction elements, with provisions for accommodating items installed later.
- B. Verify utility requirements and characteristics of operating equipment are compatible with building utilities. Coordinate work of various sections having interdependent responsibilities for installing, connecting to, and placing in service, such equipment.
- C. Coordinate space requirements, supports and installation of mechanical and electrical work that is indicated diagrammatically on Drawings. Follow routing shown for pipes, ducts, and conduit, as closely as practicable; place runs parallel or perpendicular with line of building. Conduits and piping shall be spaced neatly, consistently and uniformly when in groupings. Utilize spaces efficiently to maximize accessibility for other installations, for maintenance, and for repairs.
- D. In finished areas, except as otherwise indicated, conceal pipes, ducts, and wiring within the construction. Coordinate locations of fixtures and outlets with finish elements.
- E. Coordinate completion and clean up of Work of separate sections in preparation for Substantial Completion and for portions of Work designated for Owner's partial occupancy.

- F. After Owner occupancy of premises, coordinate access to site for correction of defective Work and Work not in accordance with Contract Documents, to minimize disruption of Owner's activities.
- G. Owner will not consider change orders for extra work required by Contractor/CM due to improper or untimely coordination.

1.4 FIELD ENGINEERING

- A. Employ a Land Surveyor registered in the State of Florida, acceptable to Architect and Owner for construction layout.
- B. Contractor/CM shall locate and protect survey control and reference points.
- C. Control datum for survey is that established by Owner provided survey.
- D. Verify setbacks and easements; confirm drawing dimensions and elevations.
- E. Provide field engineering services. Establish elevations, lines, and levels, utilizing recognized engineering survey practices.
- F. Upon completion of project, surveyor noted above, shall prepare and submit copy of site drawing and certificate signed by Land Surveyor that elevations and locations of Work are in accord with Contract Documents.

1.5 QUALITY ASSURANCE

- A. Monitor quality control over suppliers, manufacturers, products, services, site conditions, and workmanship, to produce work of specified quality.
- B. Comply fully with manufacturers' instructions, including each step in sequence.
- C. Should manufacturers' instructions conflict with contract documents, request clarification from Architect before proceeding, and document any instructions or directions that may invalidate warranty.
- D. Comply with specified standards as a minimum quality for work except when more stringent tolerances, codes, or specified requirements indicate higher standards or more precise workmanship.
- E. Perform work by persons qualified to produce workmanship of specified quality.
- F. Verify that field measurements are as indicated on shop drawings or as instructed by manufacturer.
- G. Secure products in place with positive anchorage devices designed and sized to withstand stresses, vibration, physical distortion or disfigurement.
- H. Schedule work so no absorbent materials are installed and no concealed areas are closed up until building is dried-in and permanent doors and windows are installed to prevent development of mold or entrapment of mold or moisture inside concealed spaces or moisture absorption into interior materials.
- I. See Section 01 31 00 – Project Management and Coordination for services of Florida licensed land surveyor to verify locations and elevation of floor slabs after floor slab placement and before continuation of construction activities.

1.6 TOLERANCES:

- A. Monitor fabrication and installation tolerance control of products to produce acceptable work. Do not permit tolerances to accumulate.
- B. Comply with manufacturers' tolerances. Should manufacturers' tolerances conflict with contract documents, most stringent tolerance shall prevail.
- C. Adjust products to appropriate dimensions; position before securing products in place.

1.7 REFERENCES AND STANDARDS:

- A. Comply with Section 01 42 00 – References for reference standards, definitions, abbreviations and acronyms applicable to project.
- B. Workmanship shall comply with requirements of standards specified by product or trade association, or other consensus standards of specified products, except when applicable code requirements are more stringent.
- C. Use current reference standard(s) in effect at time of contract execution.
- D. Obtain copies of standards where required by product specification sections.
- E. Contractual relationships, duties, nor responsibilities of parties in Contract nor those of Architect shall be altered from contract documents by mention or inference otherwise in reference documents.

1.8 MOCKUPS AND FIELD STANDARDS:

- A. Comply with Section 01 43 39 – Mockups general requirements and individual product sections for specific requirements. Construct mockups as indicated for review by Architect and Owner's Project Manager.
- B. Assemble and erect specified items with required attachment and anchorage devices, flashings, seals, and finishes.
- C. Accepted mock-ups shall be basis of work quality standard for work.
- D. Where Architect accepts mockups as quality standard of work required, maintain mockups until work is complete.
- E. Upon Architect's approval mockups and work samples may be incorporated in completed work. Otherwise, remove mock-up and clear area.

1.9 TESTING SERVICES:

- A. Owner will appoint and pay for services specified for independent firm to perform testing.
- B. Independent firm will perform tests and other specified services as outlined in individual specification sections and as required by Owner.
- C. Testing and quality control may occur on or off project site.
- D. Independent firm shall submit reports to Owner and Architect and Contractor/CM, indicating observations and results of tests and compliance or non-compliance with contract documents.
- E. Cooperate with independent firm; furnish samples of materials, design mix, equipment, tools, storage, safe access, and assistance by incidental labor as requested.
 - a. Notify Owner, Architect and independent firm 24 hours prior to expected time for operations requiring services.
 - b. Make arrangements with independent firm and pay for additional samples and tests required for Contractor's use.
 - c. Testing does not relieve Contractor to perform work per contract requirements.
 - d. As directed by Architect, independent testing firm shall re-test as result of non-conformance with requirements. Contractor shall pay for re-testing cost by deducting testing charges from the Contract Sum/Price.

1.10 BUILDING INSPECTION SERVICES:

- A. Owner will employ in-house Building Official, or hire independent Building Official and Construction Inspectors as required to perform Document review and approval, and on-site building inspections in accord with Florida Building Code, Section 423 State Requirements for Educational Facilities and other applicable codes.
- B. Building Official and Inspectors will perform code interpretation, document review, project inspections, and other services specified and required in individual specification sections, and shall be paid by Owner.
- C. Inspections firm will conduct inspections and observations of work, indicate compliance or non-compliance with applicable codes and contract documents, and will submit reports to Architect, Contractor/CM and Owner.
- D. Cooperate with inspection firm; provide safe access and assistance by incidental labor as requested.
- E. Notify Owner and Architect and inspection firm 24 hours prior to expected time for operations requiring services.
- F. Inspection of work does not relieve Contractor of performing work in accord with contract requirements.

1.11 MANUFACTURERS' FIELD SERVICES:

- A. Where specified, require material or product suppliers or manufacturers to provide qualified staff personnel to observe site conditions, conditions of surfaces and installation, quality of workmanship, start-up of equipment, test, adjust and balance of equipment and as applicable, and to initiate instructions when necessary.
- B. Submit qualifications of observer to the Architect 30 days in advance of required observations, the observer is subject to Owner's approval.
- C. Report observations and site decisions or instructions given to applicators or installers that are supplemental or contrary to manufacturers' written instructions.
- D. Comply with Section 01 33 00 – Submittal Procedures.

1.12 COMMISSIONING

- A. Comply with Section 01 91 00 – Commissioning for training of Owner's personnel in operation and maintenance of equipment identified in this Section.

PART 2 PRODUCTS (Not Used)

PART 3 EXECUTION

3.1 EXAMINATION:

- A. Verify that existing site conditions and substrate surfaces are acceptable for subsequent work, beginning new work means acceptance of existing conditions.
- B. Verify that existing substrate is capable of structural support or attachment of new work.
- C. Examine and verify specific conditions described in individual specification sections. Immediately notify AE or Owner's Project Manager of conditions that would prevent meeting contractual requirements.
- D. Verify that utility services are available, of correct characteristics, and in correct locations.

3.2 PREPARATION:

- A. Clean substrate surfaces prior to applying next material or substance.
- B. Seal cracks or openings of substrate prior to applying next material or substance in manner approved by product manufacturer.
- C. Apply manufacturer's required or recommended substrate primer, sealer, or conditioner prior to applying any new material or substance in contact or bond.

3.3 CLEANING AND WASTE MANAGEMENT

- A. Comply with Section 01 74 00 – Cleaning and Waste Management.

END OF SECTION

SECTION 01 66 00
PRODUCT STORAGE AND HANDLING REQUIREMENTS

PART 1 GENERAL

1.1 SCOPE OF WORK

- A. Packaging and transportation, delivery and receiving, product handling, storage, conditions and location, maintenance, protection, repair and replacement of products damaged while handling or in storage.

1.2 RELATED DOCUMENTS

- A. Section 01 31 00 – Project Management and Coordination.
- B. Section 01 33 00 – Submittal Procedures.
- C. Section 01 35 53 – Security Procedures.
- D. Section 01 45 00 – Quality Control.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION

3.1 TRANSPORTATION AND HANDLING

- A. Packaging and Transportation:
 - 1. Supplier shall package finished products in boxes or crates to provide protection during shipment, handling and storage at site.
 - 2. Products shall be protected against exposure to outside storage against damage due to weather conditions.
 - 3. Protect products sensitive to damage against impact, abrasion, puncture and other damage during handling and transport to project.

3.2 DELIVERY AND RECEIVING

- A. Arrange deliveries of products in accord with project schedule to allow installation and project completion per approved project schedule.
- B. Prior to project commencement, Contractor's personnel shall meet with Owner's Project Manager and School staff for renovation and new construction to delineate areas for materials storage lay-down areas.
- C. Restrict access of persons to storage areas in accord with Section 01 35 33 – Security Procedures.
- D. Material deliveries to Owner occupied sites shall be coordinated with Owner's Project Manager to ensure availability of personnel and handling equipment for safe and secure unloading and storage of equipment.
- E. Deliver products in undamaged, dry condition, in original unopened containers or packaging with identifying labels intact and legible.
- F. Clearly mark partial deliveries of component parts of equipment to identify equipment and contents, to permit easy accumulation of parts, and to facilitate assembly.
- G. Upon delivery, Contractor/CM shall inspect shipments for following items:
 - 1. Products received match reviewed submittals and Contract Documents.

2. Correct quantities.
 3. Accessories and installation hardware are included.
 4. Containers and packages are intact and labels are legible.
 5. Products are adequately protected for conditions and are undamaged.
- H. Product Handling:
1. Provide equipment and personnel to handle products to prevent product damage.
 2. Handle products to avoid bending, flexing or overstressing.
 3. Lift large or heavy components by using designated lifting points in accord with manufacturers written directions.

3.3 STORAGE AND PROTECTION

- A. General Requirements:
1. Store products immediately upon delivery in accord with manufacturers written directions.
 2. Arrange for storage location to allow access, maintenance and inspection of products.
 3. Stored products shall not conflict with work conditions. construction is contiguous to or within existing school, Provide demising walls to physically separate new or renovation work from existing on-going school operations.
- B. Enclosed Storage:
1. Store products subject to damage by weather in weathertight enclosure.
 2. Maintain temperature and humidity within ranges stated in manufacturer's instructions.
 4. Provide temperature and humidity control within ranges stated in manufacturer's instructions.
 5. Store unpacked or loose products on shelves, in bins, or in neat groups of like items.
- C. Exterior Storage:
1. Provide platforms, blocking or skids to support fabricated products above ground, and sloped to allow drainage.
 2. Protect products to avoid soiling or staining.
 3. Provide product cover to prevent water or condensation on product while allowing ventilation.
 4. Store loose granular materials on clean, solid surfaces such as pavement or on rigid sheet materials to prevent mixing with foreign matter.
 5. Provide for surface drainage to prevent humidity, mold or algae growth.
- D. Maintenance of Storage:
1. Periodically inspect stored products on scheduled basis.
 2. Verify storage facilities and environmental conditions are in compliance with manufacturer's written requirements.
 3. Verify that product surfaces exposed to weather are undamaged, stolen, or have otherwise been adversely affected.
- E. Maintenance of Equipment Storage:
1. Stored mechanical and electrical equipment shall comply with manufacturer's written service instructions for each item, with notice of instructions attached to each item of equipment.
 2. Stored equipment shall be serviced on regular basis, maintaining log of services, and submitted to Architect in accord with Section 01 78 00 – Submittal Procedures as part of Project Record Documents.
- F. Storage of Owner's Salvaged Furnishings and Equipment:
1. Contractor/CM shall provide temporary storage facilities for items to be salvaged and reinstalled.

3.4 PROTECTION OF FINISHED WORK

- A. Protect finished surfaces, including doors, door jambs, soffits of openings used as passageways, through which equipment and materials are handled.
- B. Protect finished floor surfaces in traffic areas prior to allowing equipment or materials to be moved.
- C. Keep finished surfaces clean, unmarked, and suitably protected until Owner's project acceptance.

3.5 REPAIRS AND REPLACEMENTS

- A. Promptly replace or repair damaged equipment or building surfaces caused by moving equipment at no additional cost to Owner.
- B. Additional time required to repair or replace damaged equipment or building surfaces shall not be grounds for Contract time extension or Contractor's additional expense, unless Owner specifically authorizes time extension or additional costs.

END OF SECTION

SECTION 01 74 00
CLEANING AND WASTE MANAGEMENT

PART 1 GENERAL

1.1 SCOPE OF WORK

- A. Administrative and procedural requirements for waste management and cleaning during construction and final cleaning at Substantial Completion.
- B. Development and implementation of Waste Management Plan to indicate following procedures:
 - 1. Limiting amount of project waste through planning, scheduling, and project management.
 - 2. Recycling demolished structures and construction and waste materials, and reuse of recycled or salvaged materials whenever possible.
 - 3. Procedures to reduce construction noise, fumes, vibration, dust or other airborne contaminants.
 - 4. Adherence to Federal, State and local environmental and anti-pollution regulations and ordinances.
 - 5. Waste materials shall be suitably disposed off site in approved landfill sites.
 - 6. Development of contamination containment plan to include procedures for addressing volatile and hazardous materials or their waste products, cleaning materials and residue.
- C. Cleaning and Protection:
 - 1. Development of daily and periodic construction cleaning and protection of products stored on site or erected in project, and shall include sequence and frequency policy and schedule for project duration.
 - 2. Development of evacuation, fire and life safety plan, staff training procedures in handling and disposal of materials deleterious to human contact or exposure.
 - 3. Final cleaning leaving project ready for Owner's acceptance.

1.2 RELATED SECTIONS

- A. Section 01 31 00 – Project Management and Coordination.
- B. Section 01 33 00 – Submittal Procedures.
- C. Section 01 42 00 – References.
- D. Section 01 66 00 – Product Storage and Handling Requirements.
- E. Section 01 78 00 – Closeout Submittals.

1.3 SUBMITTALS

- A. Comply with Section 01 33 00 – Submittal Procedures.
- B. Submit MSDS sheets for products requiring special care or handling in storage, application or cleanup.
- C. Submit Waste Management and Cleaning Plans identifying and providing operational procedures for each item noted in Scope of Work.

1.4 COORDINATION

- A. Coordinate scheduling and implementation of Waste Management and Cleaning Plans with each trade on site.

- B. Ensure enforcement to promote efficient and orderly sequence of installation of interdependent construction elements, with intent to reduce waste maximize efficient and safe work environment.
- C. Coordinate periodic and final clean up of Work of each trade in preparation for Substantial Completion and for portions of Work designated for Owner's partial occupancy.

1.5 QUALITY ASSURANCE

- A. Monitor each trade, product suppliers, product deliveries, waste generation, site conditions, and workmanship, to minimize waste and maximize recycled materials and reuse of retained materials.

PART 2 PRODUCTS

NOT USED (See individual product specifications for cleaning products recommended by manufacture.)

PART 3 EXECUTION

NOT USED (See individual product specifications for written cleaning procedures and instructions recommended by manufacture.)

END OF SECTION

SECTION 01 78 00
CLOSEOUT SUBMITTALS

PART 1 GENERAL

1.1 SCOPE OF WORK

- A. Closeout procedures.
- B. Final cleaning.
- C. Adjusting.
- D. Project record documents.
- E. Operation and maintenance data.
- F. Spare parts and maintenance Products.
- G. Warranties and bonds.
- H. Maintenance service.
- I. Training.

1.2 RELATED SECTIONS

- A. Section 01 29 00 – Payment Procedures.
- B. Section 01 33 00 – Submittal Procedures.
- C. Section 01 91 00 – Commissioning.
- D. Section 27 60 00 – Integrated Audio System.

1.3 CLOSEOUT PROCEDURES

- A. Submit written certification that contract documents were reviewed, work inspected, and that work is complete in accord with contract documents and ready for Owner's Project Manager and AE's review.
- B. Provide submittals to AE and Owner's Project Manager that are required by building and fire authorities.
 - 1. Submit final application for payment identifying total adjusted contract sum, previous payments, and sum remaining due.
 - 2. Owner may opt to occupy all or portions of completed facilities upon substantial completion of those portions of work.
 - 3. Contractor/CM shall provide punch list to AE identifying items remaining to be completed.
 - 4. AE shall inspect project to determine completion of punch list and project compliance with Contract Documents.

1.4 FINAL CLEANING

- A. Execute final cleaning prior to final project assessment.
- B. Clean interior and exterior surfaces exposed to view; remove temporary labels, stains and foreign substances.
- C. Clean equipment and fixtures to sanitary condition with cleaning materials per manufacturer's written recommendations.
- D. Remove waste and surplus materials, rubbish, and construction facilities from the site.

1.5 ADJUSTING

- A. Adjust operating products and equipment to ensure smooth and unhindered operation.

1.6 PROJECT RECORD DOCUMENTS

- A. Maintain on site one set of record documents, recording accurate field revisions to contract documents to include:
 - 1. Drawings/specifications and addenda.
 - 2. Change orders and other modifications to work.
 - 3. Reviewed shop drawings, product data, and samples.
 - 4. Manufacturer's instruction for assembly, installation, and adjusting.
- B. Ensure entries are complete and accurate, enabling ready access and reference by Owner's Project Manager.
- C. Store record documents separate from documents used for construction.
- D. Record information concurrent with construction progress.
- E. Specifications shall be legibly marked and recorded for each product used indicating the following:
 - 1. Manufacturer's name, product model and number.
 - 2. Product substitutions or alternates utilized.
 - 3. Changes made by addenda and modifications.
- F. Record drawings and shop drawings shall be legibly marked with each item recorded to indicate actual construction as follows:
 - 1. Measured depths of foundations in relation to finish first floor datum.
 - 2. Measured horizontal and vertical locations of underground utilities and appurtenances, referenced to permanent surface improvements.
 - 3. Measured locations of internal utilities and appurtenances concealed in construction, referenced to visible and accessible features of the work.
 - 4. Field changes of dimension and details.
 - 5. Details not on original contract drawings.
- H. Upon project completion, transfer project record drawing information to Autocad (2010 or later format) files and provide four copies of CD's to Architect for review and transmitted to Owner, prior to claim for final Application for Payment.
 - 1. Contractor/CM shall also submit two hard copies of record drawings and project manual maintained during project to Owner's Project Manager.
 - 2. Owner will be responsible for making prints from CD's and for their distribution to Owner's user groups.

1.7 OPERATION AND MAINTENANCE DATA

- A. Submit documentation as noted in individual product specifications and as noted herein.

1.8 SPARE PARTS AND MAINTENANCE PRODUCTS

- 1. Provide spare parts, maintenance, and extra products in quantities specified in specification.
- 2. Deliver to Owner; obtain receipt prior to final payment.

1.9 WARRANTIES

- A. Submit documentation as noted in individual product specifications and as noted herein.
- B. Provide duplicate notarized copies.
- C. Execute and assemble transferable warranty documents from subcontractors, suppliers, and manufacturers.
- D. Provide Table of Contents and assemble in D-side 3-ring white binders with typed title sheet of contents inside durable plastic front cover.
- E. Submit prior to final application for payment.
- F. For items of work delayed beyond date of substantial completion, provide updated submittal within ten days after acceptance, listing date of acceptance as start of warranty period.

1.10 MAINTENANCE SERVICE

- A. Furnish service and maintenance of components indicated in specification sections for one-year from date of project substantial completion.
- B. Examine, clean, adjust, and lubricate system components as required for reliable operation.
- C. Include systematic examination, adjustment, and lubrication of components repairing or replacing parts as required with parts produced by the manufacturer of the original component.
- D. Owner shall approve in writing of transfers or reassignments of maintenance service tasks.

1.11 ASBESTOS CERTIFICATION

- A. Provide notarized letter from Contractor/CM certifying that “to the best of his/her knowledge no asbestos containing building materials were used as a building material in the project”, per FS 255.40.

1.12 PROJECT CLOSE-OUT PROCEDURES

- A. Items are to be submitted to the School District’s Construction Manager’s Office once the request for final payment has been submitted.
 - 1. ____ 4 Copies: AIA Application For Payment, Signed and Sealed, Noted as Final Payment.
 - 2. ____ Consent of Surety to make final payment.
 - 3. ____ Release of Lien from all Sub-Contractors or Laborers who have filled an Intent to Lien.
 - 4. ____ Warranty/Guarantee from Construction Manager for one-year from the date of Substantial Completion.
 - 5. ____ Warranty/Guarantee from each Sub-Contractor for one-year from the date of Substantial Completion.
 - 6. ____ Copy of the approval by the Architect-Engineer and the transmittal to the end user of manuals, shop drawings, as-builds, brochures, warranties, list of sub-contractors with phone numbers, addresses and contact persons.
 - 7. ____ Verification that all applicable district personnel have been trained in the operation of their new equipment (per system: HVAC, controls, etc.)

8. ____ Executed Roof Warranty in the name of the Martin County School District.
9. ____ 4 Copies: OEF Form 209, Certificate of Final Inspection.
10. ____ 4 Copies: Completed Punch-list.
11. ____ SREF 4.2(3)(e) Architect's Certificate of Specification of Asbestos Containing Materials.
12. ____ SREF 4.2(3)(e) Contract's Certificate of Asbestos Use.
13. ____ SREF 4.2(3)(d) Threshold inspector's statement that building complies with Threshold Plan.
14. ____ 4 Copies: OEF Form 110B, Certificate of Occupancy.
15. ____ OEF Form 564 for new construction or additions to existing schools only (Return to Director's Secretary)
16. ____ Inspection Log Book

PART 2 PRODUCTS

2.1 APPROVED PRODUCTS

- A. Use only cleaning and maintenance products approved for use in Florida Educational Facilities.

PART 3 EXECUTION

- 3.1 Not used.

END OF SECTION

SECTION 01 91 00
COMMISSIONING

PART 1 GENERAL

1.1 SCOPE OF WORK

- A. Administrative and procedural requirements for commissioning facilities and facility systems.
- B. Demonstration and training.
- C. Starting systems.
- D. Demonstration and instructions.

1.2 RELATED SECTIONS

- A. Section 01 31 00 – Project Coordination.
- B. Section 01 78 00 – Closeout Documents.
- C. Section 23 05 93 – Testing, Adjusting, and Balancing HVAC.
- D. Section 23 08 00 – Commissioning of HVAC.

1.3 STARTING SYSTEMS

- A. Coordinate schedule for start-up of various equipment and systems.
- B. Notify Architect and Owner seven days prior to startup of each item.
- C. Verify that each piece of equipment or system has been checked for proper lubrication, drive rotation, belt tension, control sequence, or other conditions which may cause damage.
- D. Verify that tests, meter readings, and specified electrical characteristics agree with those required by the equipment or system manufacturer.
- E. Verify wiring and support components for equipment are complete and tested. Execute startup under supervision of responsible Contractors' personnel in accordance with manufacturers' instructions.
- F. When specified in individual specification sections, require manufacturer to provide authorized representative to be present at site to inspect, check and approve equipment or system installation prior to startup, and to supervise placing equipment or system in operation.
- G. Submit written reports per section 01 78 00 - Execution and Closeout Documents that equipment or system is installed and functioning correctly.

1.4 DEMONSTRATION AND INSTRUCTIONS

- A. Demonstrate operation and maintenance of Products to Owner's personnel two weeks prior to date of Substantial Completion.
- B. Demonstration of equipment shall be performed by qualified manufacturers' representative who is knowledgeable about the Project and equipment.
- C. For equipment or systems requiring seasonal operation, perform demonstration for other season within six months.
- D. Utilize operation and maintenance manuals as basis for instruction. Review contents of manual with Owners' personnel in detail to explain all aspects of operation and maintenance.
- E. Demonstrate start-up, operation, control, adjustment, trouble-shooting, servicing, maintenance, and shutdown of each item of equipment at agreed-upon times, at equipment location.
- F. Prepare and insert additional data in operations and maintenance manuals when need for additional data becomes apparent during instruction.

- G. Amount of time required for instruction in each piece of equipment and system is indicated in individual equipment and system specification sections.

1.5 TESTING, ADJUSTING, AND BALANCING

- A. Contractor/CM shall employ, and pay for commissioning services other than TAB firm to perform testing, adjusting and balancing of other systems as indicated or require for fully functional systems
- B. Independent TAB firm shall perform services specified in section 23 05 93 – Testing, Adjusting, and Balancing for HVAC system(s).
- C. The Contractor/CM shall submit reports to Architect indicating observations, results of tests and compliance or non-compliance with specified requirements and with requirements of contract documents.

PART 2 PRODUCTS

- 2.1 Not Used.

PART 3 EXECUTION

3.1 LIST OF EQUIPMENT TO BE COMMISSIONED:

- A. Communications System
- B. Fire Alarm System
- C. Intercom System
- D. Kitchen Equipment
- E. HVAC Equipment.
- F. Gymnasium Equipment including bleachers, scoreboards, basketball backstops, sound system, playcourt surface, equipment with floor inserts
- G. Lighting Systems
- H. Stage, Auditorium, Gym and Instructional Spaces Sound Reinforcement Systems
- I. Irrigation System
- J. Fire Protection System
- K. Movable Interior Partitions
- L. Emergency Generator

3.2 EQUIPMENT COMMISSIONING REQUIREMENTS

- A. Comply with individual specification sections for equipment start-up, operation and training.

END OF SECTION

SECTION 01 91 01
COMMISSIONING OF HVAC

PART 1 GENERAL

1.1 SCOPE OF WORK

- A. Independent commissioning of heating, ventilation, and air conditioning in accord with project documents and include:
 - 1. Evaluate proposed HVAC and electrical systems design and control system documents.
 - 2. Review and document HVAC and Electrical control interface systems interface.
 - 3. Coordinate start-up of HVAC and Electrical systems.
 - 4. Coordinate and review operation, training procedures, demonstration and instructions for HVAC equipment use by Owner.
 - 5. Review, evaluate, and document HVAC equipment operation and performance.
- B. Work with TAB contractor for testing, adjusting, and balancing to ensure HVAC system performance is maximized for operational efficiency.
- C. Coordinate HVAC Commissioning scheduling and activities with GC/CM.
- D. Commissioned Systems Include:
 - 1. HVAC components and equipment.
 - 2. HVAC interaction of cooling, heating, and comfort delivery systems.
 - 3. Building Automation System (BAS): control hardware and software, sequences of operation, and integration of factory controls with BAS.
 - 4. Plumbing: Domestic hot water systems.
 - 5. Lighting Control System with interface with daylighting.

1.2 RELATED SECTIONS

- A. Section 01 31 00 – Project Coordination.
- B. Section 01 33 00 – Submittal Procedures.
- C. Section 01 42 00 – References.
- D. Section 01 45 00 – Quality Control.
- E. Section 01 78 00 – Closeout Submittals.
- F. Section 01 91 00 – Commissioning
- G. Section 23 05 93 – Testing, Adjusting and Balancing For HVAC.

1.3 REFERENCES

- A. See Section 01 42 00 – References for additional reference standards, definitions, abbreviations and acronyms.
- B. American Society of Heating, Refrigeration and Air Conditioning Engineers (ASHRAE):
 - 1. ASHRAE Guideline 0-2005 with Amendments a, b, c & d - The Commissioning Process.
 - 2. ASHRAE Guideline 1.1-2007, The HVAC Commissioning Process.
 - 3. ASHRAE 110-95 – An Introduction to Laboratory Fume Hood Performance Testing.
- C. NEBB Whole Building Systems Commissioning of New Construction, 2009 (3rd Edition).
- D. American National Standards Institute/American Industrial Hygiene Association/American Society of Safety Engineers (ANSI/AIHA/ASSE):
 - 1. ANSI/AIHA/ASSE Z9.5-2012 – American National Standard for Laboratory Ventilation.

1.4 DEFINITIONS

A. Definition of terms used are as follows:

1. Acceptance Phase: Phase of construction after initial start-up and check-out when functional performance testing, operational training, and operating and maintenance documentation development and review occurs.
2. Basis of Design: Documentation of primary thought processes and assumptions for design decisions made to meet Owner's Project Requirements as reflected in construction documents (drawings and specifications). Basis of design describes intent of project, systems, components, conditions, and methods chosen to meet Owner's Project Requirements. Design professionals (Architect and Engineer) are responsible for interpretation of the basis of design.
3. Commissioning Provider: Independent entity, not otherwise associated with design team or Contractor/CM, who directs and coordinates day-to-day commissioning activities. Commissioning Provider does not have construction oversight or design role.
4. Commissioning Plan: Overall plan providing structure, schedule, and coordination planning for commissioning process.
5. Commissioning Team: Group responsible for accomplishing commissioning process.
6. Data Logging: Monitoring flows, currents, status, and pressures of equipment using stand-alone recording equipment, separate from control system. Additional monitoring may be provided through capabilities of control system.
7. Deferred Functional Performance Tests: Functional tests performed after date of substantial completion due to partial occupancy, equipment and seasonal testing requirements, design or other site conditions precluding testing of system or piece of equipment during normal commissioning sequence.
8. Owner's Project Requirements: Documents prepared by Owner providing explanation of concepts, criteria, and work scope critical to Owner's expectations.
9. Factory Testing: Testing of equipment at factory (or on-site) by factory personnel in Owner's representative and commissioning agent's presence.
10. Functional Performance Tests: Tests of dynamic function and operation of equipment and systems using manual (direct observation) or monitoring methods. Functional testing is dynamic testing of systems (rather than just components) under full operation. Systems are tested under various modes, such as during low cooling or heating loads, high loads, component failures, unoccupied modes, varying outside air temperatures, fire alarm modes, and power failure. Systems are run through control system's sequences of operation and components are verified to respond properly. Commissioning Provider develops Functional Performance Test procedures in sequential written form, coordinates, oversees and documents actual testing performed by GC/CM. Functional Performance Tests are performed after Test and Balance, pre-functional checklists and start-up is complete.
11. Indirect Indicators: Indicators of response or condition, such as reading from control system screen reporting damper to be 100% closed.
12. Manual Tests: Using hand-held instruments, immediate control system read-outs or direct observation to verify performance (contrasted to analyzing monitored data taken over time to make observations).
13. Monitoring: Recording of parameters (flow, current, status, or pressure) of equipment operation using data loggers or trending capabilities of control systems.

14. Over-written Value: Writing over sensor value in control system to determine response of system (e.g., changing outside air temperature value from 50°F to 75°F to verify economizer operation). See “Simulated Signal.
15. Owner-contracted Tests: Tests paid by Owner outside GC/CM’s contract and for which Commissioning Provider does not oversee. Tests shall not be repeated during functional testing if properly documented.
16. Phased Commissioning: Commissioning completed in phases (by floors, for example) due to size of structure or other scheduling issues, to minimize total construction time.
17. Pre-functional Checklists: Lists of items to inspect and elementary component tests to conduct to verify proper installation of equipment, provided by GC/CM to Commissioning Authority who shall review and approve scope of tests. Pre-functional checklists are primarily static inspections and procedures to prepare equipment or system for initial operation (e.g., belt tension, oil levels, labels affixed, gauges in place, sensors calibrated). Some pre-functional checklist items may entail simple testing of function of components, piece of equipment or systems. Pre-functional refers to testing to be accomplished prior to formal functional testing of installed equipment. Pre-functional checklists augment and may be combined with manufacturer’s start-up checklist. GC/CM shall execute checklists.
18. Sampling: Functional Performance Testing of fraction of total number of identical or near identical pieces of equipment. Sampling population is at discretion of commissioning firm and is subject to modification based upon sampling results (i.e. will be expanded if initial results warrant).
19. Simulated Condition: Condition created for purpose of testing response of system (e.g., blowing hair dryer on space sensor to determine response of variable volume terminal unit).
20. Simulated Signal: Disconnecting sensor and using signal generator to send amperage, resistance or pressure to transducer and control system to simulate sensor value.
21. Start-up: Initial starting or activating of dynamic equipment, including executing pre-functional checklists.
22. Test, Adjust, and Balance: Process of measuring actual flows of air and hydronic systems, adjusting flows to required values, and documenting results.
23. Trending: Monitoring of equipment performance over time, using data logging equipment or building control system.

1.5 QUALITY ASSURANCE

- A. Supervision, coordination, and documentation of commissioning process shall be responsibility of Commissioning Provider.
- B. Commissioning Provider shall become familiar with Owner's Project Requirements, Basis of Design documentation, project documents, and shall assume responsibility for overall system commissioning effort.
- C. Acceptable Commissioning Firms:
 1. OCI Associates, Inc., 181 Melody Lane, Ft. Pierce, FL 34905; Tel: 772-465-1165; Fax: 772-466-1134; Website: www.ociassociates.com
 2. Johnson, Levinson, Ragan, Davila, Inc., 1450 Centrepark Blvd., Suite 350, West Palm Beach, FL 33401; Tel: 561-689-2303; Fax: 561-689-2302; Website: www.jlrdinc.com.
 3. TLC Engineering, 874 Dixon Blvd., Cocoa, FL 32922; Tel: 321-636-0274; Fax: 321-639-8986; Website: www.tlc-eng.com.

1.6 COORDINATION:

- A. Commissioning Provider will be hired by Owner. Commissioning Provider shall direct and coordinate activities of commissioning team.
- B. Commissioning team shall consist of Commissioning Provider, Owner, GC/CM, and associated subcontractors.
- C. Scheduling: Commissioning Provider shall schedule commissioning activities of and shall coordinate schedule with GC/CM. Commissioning Provider shall generally provide not less than two (2) weeks notice to GC/CM of commissioning activities, except where retesting is required or commissioning activities have been delayed by no fault of commissioning firm.

1.7 COMMISSIONING PROCESS:

- A. Commissioning Provider shall develop and coordinate execution of commissioning plan; observe and document installation, check-out, start-up, and equipment and system testing to establish that equipment and systems are functioning in accord with project requirements, and to assist in developing correct and complete documentation of construction effort.
- B. Commissioning Provider shall not be responsible for design concept, design criteria, compliance with codes, design, construction scheduling, cost estimating, construction management, or construction supervision.
- C. Commissioning Provider may assist design team with problem-solving, or GC/CM with correction of non-conformance items or deficiencies.
- D. Commissioning Provider is not responsible for providing tools required to start, check-out and perform functional tests of equipment and systems, except for specified testing with supplemental portable data-loggers, which shall be supplied and installed by Commissioning Provider.
- E. Work Required during Construction Phase:
 - 1. Ensure compliance with construction documents, and achieve following objectives:
 - 2. Review the engineer of records basis of design as well as the project design documents and make comments pertaining to the execution of commissioning.
 - 3. Develop commissioning plan and distribute to GC/CM, Owner and Engineer.
 - 4. Coordinate commissioning activities during construction with GC/CM and ensure that commissioning activities are included in master project schedule.
 - 5. Review submittals applicable to systems being commissioned, including GC/CM proposed detailed start-up procedures, concurrent with Engineer's reviews and provide review comments to Engineer and Owner.
 - 6. Commissioning provider's review shall be for compliance with commissioning needs, and to aid in development of functional testing procedures and only secondarily to review for compliance with equipment specifications. Design professional remains responsible for interpretation of compliance with contract requirements.
 - 7. Request and review additional information as required to perform assigned commissioning tasks, including review of operations and maintenance materials, and GC/CM's start-up and check-out procedures.
 - 8. Develop specific Functional Performance Test procedures and forms to document proper operation of equipment and system.
 - 9. Submit proposed functional tests to Engineer for review and general conformance to requirements of contract documents and provide copy of proposed functional

- performance test procedures to GC/CM who shall review proposed tests for feasibility, safety, equipment and warranty protection.
10. Required performance testing includes control system trending, stand-alone data logger monitoring, or manual logging of system operation to demonstrate proper operation. Functional Performance Test forms shall include following information:
 - a. Date.
 - b. Project name.
 - c. System and equipment or component name(s).
 - d. Equipment location and identification number.
 - e. Test identification number, and reference to pre-function checklist and start-up documentation identification numbers for each piece of equipment.
 - f. Participating parties.
 - g. Reference to specification describing specific sequence of operations or parameters being tested or verified.
 - h. Formulae used in calculations.
 - i. Required pre-test field measurements.
 - j. Instructions for setting up test.
 - k. Special cautions or alarm limits.
 - l. Specific step-by-step procedures to execute test, in clear, sequential, and repeatable format.
 - m. Acceptance criteria of proper performance with provisions for clearly indicating whether or not proper performance of each part of test was achieved.
 - n. Section for comments.
 - o. Signature and date block for Commissioning Provider and participating parties.
 11. Review GC/CM start-up and pre-functional testing reports and provide on-site observation of start-up and pre-functional testing as specified herein.
 12. Review proposed testing, adjusting, and balancing execution plan for completeness and requirements of commissioning process and provide comments to GC/CM, Engineer, and Owner.
 13. Perform site visits, monthly until pre-functional testing of equipment and systems begins, and then weekly throughout Project, to review component and system installations. Concurrently, schedule and conduct commissioning planning and coordination meetings to review construction progress and to assist in resolving discrepancies or issues relating to commissioning process.
- F. Acceptance Phase: Demonstrate that performance of equipment and systems installed during construction phase meets requirements of construction documents. Notify Owner and Engineer of deficiencies in results or procedures. Commissioning activity shall achieve following objectives:
1. Coordinate, witness, and approve functional tests of equipment and systems performed by GC/CM. Review functional test reports and analyze trend logs, data logger reports, and other monitoring data to evaluate equipment and system performance.
 2. Document performance of functional testing and provide comparison to required performance, as defined by project documents.
 3. Coordinate retesting as necessary until satisfactory performance is demonstrated.
 4. Maintain master deficiency and resolution log, separate testing record log, and provide written progress reports and test results with recommended corrective actions for observed deficiencies.
 5. Compile and submit commissioning report to Owner and Engineer documenting results

- of the Start-Up, Pre-Functional Performance Testing, and Functional Performance Testing.
6. Review GC/CM's proposed training of Owner's operating personnel and provide comments to Engineer and Owner.
 7. Coordinate and attend GC/CM provided training sessions. Verify approved training has been properly completed.
- G. Warranty period: assist Owner in identifying defects in installed equipment or system operation to accomplish following objectives:
1. Review equipment warranties to ensure that Owner's responsibilities are clearly defined.
 2. Verify that warranty items have been corrected properly.
 3. Coordinate and supervise required seasonal or deferred testing and deficiency corrections, as specified or required by commissioning plan.
 4. Return to site, approximately 10 months into warranty period and review with Owner building operation and condition of outstanding issues related to original and seasonal commissioning.
 5. Assist Owner in reviewing failure and repair records of equipment during warranty period and in evaluation of GC/CM's corrective actions. Identify areas that may come under warranty or under original construction contract.
 6. Interview Owner and identify problems or concerns regarding operating building as originally intended and shall make suggestions for improvements.
 7. Assist the Owner in developing reports, documents, and requests for services to remedy outstanding problems.

PART 2 PRODUCTS

- 2.1 Not Used.

PART 3 EXECUTION

3.1 REPORTING:

- A. Provide final commissioning report to Owner with following reports:
1. Copies of periodic commissioning reports.
 2. Copies of Pre-Functional Performance Test reports.
 3. Copies of Functional Performance Test reports.
 4. Copies of the Training Report.

3.2 SYSTEMS TO BE COMMISSIONED:

- A. As defined previously herein under item 1.1, F.

3.3 START-UP, PREFUNCTIONAL CHECKLISTS, AND INITIAL CHECK-OUT:

- A. GC/CM shall be responsible for initial check-out and pre-functional testing of installed equipment and systems.
- B. Commissioning Provider shall monitor activities of parties responsible for executing required start-up, and pre-functional testing, as identified in commissioning plan.
- C. Commissioning Provider shall review GC/CM furnished documentation of start-up, initial check-out, and pre-functional test procedures for equipment and systems to ensure that there

is written documentation that each manufacturer-recommended procedure has been completed.

- D. Observe first pre-functional test procedures for each type and size equipment to ensure that approved procedures are being followed.
 - 1. For lower-level components of equipment, (e.g., variable volume terminal units, sensors, controllers), observe sampling of pre-functional and start-up procedures.
 - 2. In no case, shall number of units witnessed be less than 20% of total number of identical or very similar units.

3.4 FUNCTIONAL PERFORMANCE TESTING:

- A. Functional Performance Testing of equipment or systems shall be conducted only after pre-functional testing and start-up has been satisfactorily completed. Schedule functional tests with GC/CM. Direct, witness, and document Functional Performance Testing of equipment and systems to be commissioned. GC/CM shall be responsible for execution of Functional Performance Tests.
- B. Functional Performance Testing shall demonstrate that each item of equipment and each system is operating according to requirements of construction documents as defined by A/E. Each item of equipment and system undergoing Functional Performance Testing shall be operated through all modes of operation where there is required system response. Verify each action required in sequences of operation has been accomplished according to requirements, or A/E shall revise sequences as deemed appropriate.
- C. Functional Performance Testing shall proceed from components to subsystems to systems. When proper performance of interacting individual systems has been achieved, interface or coordinated responses between systems shall be tested.
- D. Proper and accurate operation of control system shall be proven by functional testing and approved by Commissioning Provider before it may be used for testing, adjusting and balancing activities or to verify performance of other components or systems. If authorized by Commissioning Provider, portions of control system may be tested and approved before functional testing of the entire system is completed.
- E. Air and water balancing shall be completed and corrected as necessary before Functional Performance Testing of air-related or water-related equipment or systems.
- F. Test Methods:
 - 1. Functional Performance Testing and verification shall be achieved by manual testing (direct manipulation of equipment and observation of its response and performance) or by monitoring performance using control system's trend log capabilities.
 - 2. Functional Performance Test procedures shall specify which methods shall be used for each test. Determine which method is most appropriate for tests that do not have method specified.
 - 3. Commissioning Provider may substitute specified methods or require additional method to be executed, other than that specified, if required to demonstrate proper operation of equipment or system being tested.
 - 4. Develop Functional Performance Testing plans that define allowable sampling procedures and that specify procedures to be followed in case of observed discrepancies or failures in sample chosen for functional testing.
 - 5. AHU operation (leaving air temperature, VFD speed) shall be trend logged with VAV box and air valve flow rates, as well as space temperatures to demonstrate modulation of system components with changing loads, as well as occupied/non-occupied status and

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control strategies such as optimum static pressure reset and temperature set-up/set-back.

6. Sampling: Multiple identical pieces of non-life-safety or otherwise non-critical equipment may be functionally tested using sampling strategy, as defined in functional test procedures.
 - a. Significant application differences and significant sequence of operation differences in otherwise identical equipment invalidates their common identity.
 - b. Small size or capacity difference, alone, does not constitute difference.
 - c. The following equipment may be sample tested: Reheat coils, terminal boxes, occupancy sensors, and lighting controls.
7. If 10% or 3 or more identical pieces of equipment (size alone does not constitute a difference) fail to perform to requirements of project documents (mechanically or substantively) due to manufacturing defects or application error not allowing it to meet performance specifications, identical units may be considered unacceptable by Commissioning Provider. In such case, GC/CM shall provide Commissioning Provider with the following:
 - a. Within 1 week of notification from Commissioning Provider, GC/CM or manufacturer's representative shall examine other identical units making record of findings. Findings shall be provided to Commissioning Provider within 2 weeks of original notice.
 - b. Within 2 weeks of original notification, GC/CM shall provide signed and dated, written explanation of problem, cause of failures, and proposed solution, including full equipment submittals for corrective or replacement equipment, if appropriate. Proposed solutions shall meet requirements of original installation.
 - c. Commissioning Provider shall evaluate proposed solution and submit recommendation of approval or disapproval to Owner and Engineer.
 - d. When approved, 2 examples of proposed solution shall be installed by GC/CM and Commissioning Provider shall schedule and conduct functional testing of proposed solution. Upon completion of functional testing of proposed solution, Commissioning Provider shall recommend acceptance or disapproval of proposed solution to Owner.
 - e. Upon acceptance of proposed solution by Owner, GC/CM shall replace or repair identical items and extend warranty accordingly, if original equipment warranty had begun. Replacement/repair work shall proceed with reasonable speed beginning within 2 weeks of approval of proposed solution.
8. Ensure that each Functional Performance Test is performed under conditions that simulate actual operating conditions as closely as is practically possible.
9. Simulation of operating conditions (not by overwritten value) may be allowed, at Commissioning Provider's discretion. Simulation of conditions shall be accomplished by subjecting the equipment to actual operating conditions by artificial means whenever possible.
10. Where actually achieving simulated operating condition is impractical, as determined by Commissioning Provider or as identified in Functional Performance Test procedure, use of signal generators to create simulated signal may be used to test and calibrate transducers and DDC constants instead of using sensor to act as signal generator via simulated conditions or overwritten values. Signal generators or simulators shall be provided by GC/CM.
11. Overwriting sensor values to simulate conditions, such as overwriting outside air temperature reading in control system to be different than it really is, may be allowed if approved by Commissioning Provider. Simulation of operating conditions is preferable.

12. Altering setpoints: rather than overwriting sensor values, and when simulating conditions is difficult, altering setpoints shall be used to test sequences.
13. Indirect indicators: relying on indirect indicators for responses or performance may be allowed only after the Commissioning Provider has visually and directly verified that indirect readings represent actual conditions and responses over range of test parameters.

3.5 RETESTING OF EQUIPMENT AND/OR SYSTEMS:

- A. Prior to retesting of functional performance tests found to be deficient, submit data indicating that deficient items have been completed and corrected to Commissioning Provider.
- B. After review of submitted data, if corrective measures are acceptable, Commissioning Provider shall schedule and conduct recheck.
- C. If during retesting it becomes apparent that deficient items have not been completed and corrected as indicated in data provided by GC/CM, retesting shall be stopped. Costs for commissioning team to further supervise retesting of Functional Performance Test shall be the responsibility of GC/CM.

3.6 DOCUMENTATION, NONCONFORMANCE, AND APPROVAL OF TESTS:

- A. Documentation: Witness and document results of functional tests using specific procedural forms developed for that purpose. Deficiencies or nonconformance issues shall be noted and reported with test results. Include completed test forms in final commissioning report.
- B. As Functional Performance Testing progresses and deficiencies are identified, discuss issues and attempt to resolve discrepancies with GC/CM.
- C. Approval: Note each satisfactorily demonstrated function on functional test form. Formal approval of functional tests shall be made after review of test reports by Commissioning Provider and Owner. Recommend acceptance of each test to the Owner using standard form. Owner shall give final approval on each test using same form, providing signed copy to Commissioning Provider and GC/CM.

3.7 DEFERRED TESTING:

- A. Deferred testing: If required pre-functional or functional test cannot be completed as scheduled, execution of checklists and functional testing may be delayed upon approval of Commissioning Provider and Owner. Deferred tests shall be conducted in same manner as seasonal tests as soon as possible.
- B. Schedule and coordinate any required seasonal testing, tests delayed until weather or other conditions are suitable for demonstration of equipment or system's performance. Seasonal testing shall be executed, documented, and deficiencies corrected as specified herein for functional testing. Adjustments or corrections to operations and maintenance manuals and record documents due to test results of shall be made before seasonal testing process is considered complete. Schedule deferred testing with GC/CM and Owner.

3.8 OPERATION AND MAINTENANCE MANUALS:

- A. Prior to beginning specified training programs, review draft operations and maintenance manuals, equipment documentation, and as-installed drawings for systems that were commissioned and verify compliance with documents. Communicate deficiencies in documents to Owner and Contractor. When identified deficiencies have been corrected, recommend approval and acceptance of operations and maintenance manuals to Owner. Review equipment warranties and verify that requirements needed to keep warranty valid are clearly identified.
- B. Ensure that Owner's Project Requirements, basis of design, are included in the first section of operations and maintenance manuals. Narrative sections shall be updated by responsible parties to record status.

END OF SECTION

DIVISION

2

SITE CONSTRUCTION

SECTION 02 41 13
SELECTIVE DEMOLITION

PART 1 GENERAL

1.1 RELATED DOCUMENTS

- A. The provisions of the General Conditions, Supplementary Conditions, Drawings, Specifications and the Sections included under Division 1, General Requirements and References are included as a part of this Section as though bound herein.

1.2 SECTION INCLUDES

- A. Provide labor, materials, services, and equipment necessary to furnish and install work as indicated and as specified herein, which includes, but is not limited to:
 - 1. Required demolition of designated existing elements
 - 2. Salvage of designated items

1.3 REFERENCES

- A. Comply with NFPA 1 – Chapter 29 and NFPA 241 Standard for Safeguarding Construction Alteration and Demolition Operation 2000 Edition
- B. Florida Building Code – FBC

1.4 NOTIFICATION OF OWNERS OF UTILITY LINES AND EQUIPMENT

- A. Notify the Owner or local authority owning any conduits, wires, pipes, or equipment affected by demolition work.
- B. Arrange for removal or relocation of affected items and pay fees or costs in conjunction with removal or relocation, except as otherwise noted.

1.5 PROTECTION

- A. Prior to starting any work on site, provide a safety plan as outlined in Section 453 FBC to the Building Department for approval.
- B. Coordinate the implementation of the safety plan with the Building Department, Campus Police, School Representative, and Program Management.
- C. Prior to starting demolition operations, provide necessary protection of existing spaces and items to remain.
- D. Owner may be continuously occupying areas of the building immediately adjacent to areas of selective demolition. If Owner continues to occupy the facility comply with the following:
 - 1. Conduct demolition work in a manner that will minimize need for disruption of the Owners normal operations.
 - 2. Provide protective measures as required to provide free and safe passage of Owner's personnel and public to and from occupied portions of the facilities.
 - 3. Provide minimum of 72 hours advance notice to Owner of demolition activities that will impact Owners normal operations.
 - a. Obtain specific approval from Owner for impact.
- E. Owner assumes no responsibility for actual condition of items to be demolished.
 - 1. Owner will maintain conditions at time of commencement of contract insofar as practical.

- F. Protect any exposed existing finish work that is to remain during demolition operations.
- G. Erect and maintain dust proof partitions, closures, and ventilator system as required preventing the spread of dust or fumes to occupied portions of the building.
 - 1. Take whatever precautions necessary to minimize impact on occupied areas.

1.6 REGULATORY REQUIREMENTS

- A. Conform to applicable codes for demolition of structures, safety of adjacent structures, dust control, runoff, and erosion control, and disposal of demolished materials.
- B. Obtain required permits from authorities having jurisdiction.
- C. Notify affected utility companies before starting work and comply with their requirements.
- D. Do not close or obstruct roadways, sidewalks, and hydrants, without permits.
- E. Conform to applicable regulatory procedures when discovering hazardous or contaminated materials.
 - 1. Contact the Architect and Owner immediately.
- F. Test soils around buried tanks for contamination.
- G. No demolition will occur during school hours without the written permission of the Owner.

1.7 EXPLOSIVES

- A. The use of explosives is strictly prohibited.

PART 2 PRODUCTS - (Not applicable)

PART 3 EXECUTION

3.1 PREPARATION

- A. Verify the proper disconnection and capping of all abandoned utilities.
- B. Verify that required barricades and other protective measures are in place.
- C. Provide necessary shoring, bracing, and other precautions required for proper support of existing structure during cutting and demolition operations.
- D. Photograph existing conditions of structure, surfaces, equipment and surrounding spaces that could be misconstrued as damage resulting from selective demolition work; submit photographs and written report of existing damage to Architect prior to starting work.
 - 1. Contractor shall repair damage caused to existing facilities at no cost to Owner unless they can provide documentation is indicating pre-existing damage.

3.2 DEMOLITION OPERATIONS

- A. Cut and remove elements and equipment as designated on Drawings.
 - 1. Remove elements in their entirety unless otherwise indicated.
- B. Execute demolition in a careful and orderly manner with least possible disturbance or damage to adjoining surfaces and structure.
- C. Exercise extreme caution in cutting and demolition of portions of existing structure.
 - 1. Obtain approval of Architect prior to cutting or removing structural members for any reason.
- D. Avoid excessive vibrations in demolition procedures that may transmit through existing structure and finish materials.

- E. If hazardous materials are encountered during demolition operations, comply with applicable regulations, laws, and ordinances concerning assessment, removal, handling, and protection against exposure or environmental pollution and immediately contact the District's ECO.

3.3 DISPOSAL

- A. Materials, equipment, and debris resulting from demolition operations shall become property of Contractor.
 - 1. Remove demolition debris at least once each day in accordance with applicable City, State, and Federal Laws.
- B. Cover debris in trucks with approved netting to prevent spillage during transportation.
- C. Do not store except in approved containers or burn materials on site.
 - 1. Remove combustible waste materials in a manner approved by local Fire Department.
 - 2. Remove, handle, and dispose of any hazardous waste and debris in accordance with applicable City, State, and Federal Laws.
- D. Transport demolition debris to off-site disposal area and legally dispose of debris.
- E. Use street routes specifically designated by City for hauling debris.
- F. When possible dispose of material to recycling centers.

3.4 CLEANING AND REPAIR

- A. Leave building broom clean and free of debris, ready to receive new work.
- B. Repair demolition performed in excess of that required.
 - 1. Return structures and surfaces to remain to condition existing prior to commencement of selective demolition.

END OF SECTION

DIVISION

3

CONCRETE

SECTION 03 54 16
HYDRAULIC CEMENT UNDERLAYMENT

PART 1 GENERAL

1.1 WORK SCOPE

- A. Floor leveling cement based underlayment and leveling coat over existing concrete flooring to receive finished flooring.

1.2 RELATED SECTIONS

- A. Section 01 25 12 – Product Substitution Procedures.
- B. Section 01 31 00 – Project Management and Coordination.
- C. Section 01 33 00 – Submittal Procedures.
- D. Section 01 42 00 – References.
- E. Section 01 45 00 – Quality Control.
- F. Section 01 66 00 – Product Storage and Handling Requirements.
- G. Section 01 74 00 – Cleaning and Waste Management.
- H. Section 01 78 00 – Closeout Submittals.
- I. Section 03 30 00 – Cast In-Place Concrete
- J. Section 09 65 19 – Resilient Tile Flooring
- J. Section 09 68 16 – Sheet Carpeting.

1.3 REFERENCES

- A. See Section 01 42 00 – References for additional reference standards, abbreviations, definitions and acronyms.
- B. American Society of Testing Materials (ASTM):
 - 1. ASTM C78/C78M-15a: Test Method for Flexural Strength of Concrete (Using Simple Beam with Third-Point Loading)
 - 2. ASTM C109/C109M-13e1: Standard Test Method for Compressive Strength of Hydraulic Cement Mortars (Using 2” [50 mm] cube specimens)

1.4 SUBMITTALS

- A. Submit in accord with Section 01 33 00 – Submittal Procedures.
- B. Product Data: Manufacturer's data sheets, including product specifications, test data, preparation instructions and recommendations, storage and handling requirements and recommendations, and installation methods.
- C. Maintenance instructions, including protection requirements after application.

1.5 QUALITY ASSURANCE

- A. Installer Qualifications: Applicator shall be experienced with installation of product and certified by manufacturer as authorized product applicator.
- B. Provide adequate number of skilled workers trained and familiar with application requirements.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Comply with Section 01 66 00 – Product Storage and Handling Requirements.
- B. Deliver product in factory numbered and sealed containers, protected from extreme temperatures and moisture.
- C. Store products in dry area in manufacturer's unopened containers until ready for installation with temperature maintained between 50° F (10° C) and 85° F (29° C). Protect from direct sunlight.
- D. Handle products in accord with manufacturer's printed recommendations.

1.7 WARRANTY

- A. Provide manufacturer's 10 year warranty that hydraulic cement underlayment over structurally sound concrete will not spall, crack or delaminate from concrete surface.

PART 2 PRODUCTS

2.1 APPROVED MANUFACTURERS

- A. ARDEX K15 Rapid Drying Self Leveling Sub-Floor Smoothing Compound as manufactured by Ardex Engineered Cements, 400 Ardex Park Drive, Aliquippa, PA 15001; Tel: 724-203-5000; Tel: 888-512-7339; Fax: 724-203-5001; Website: www.ardexamericas.com
- B. Henry 345 Premixed Patch n' Level as manufactured by W W Henry Co., 400 Ardex Park Drive, Aliquippa, PA 15001; Tel: 1-800-255-3924, 724-203-8499; Website: www.wwhenry.com.
- C. Requests for substitutions from other manufacturers will be considered in accord with Section 01 25 13 – Product Substitution Procedures.

2.2 PERFORMANCE AND PHYSICAL PROPERTIES

- A. Conforming with following values for material cured at 73° F +/-3° F (23° C +/- 2 C°) and +/-5% relative humidity:
 - 1. Application: barrel mix or pump.
 - 2. Flow time: 10 minutes.
 - 3. Initial Set: approximately 30 minutes.
 - 4. Final Set: approximately 90 minutes.
 - 5. Compressive Strength: 4100 psi at 28 days per ASTM C109/C109M13e1.
 - 6. Flexural Strength: 1000 psi at 28 days per ASTM C78/C78M-15a.
 - 7. VOC: 0 grams/liter, calculated per SCAQMD 1168.

2.3 MATERIALS

- A. Water shall be clean, potable, not exceeding 75° F (24° C).

PART 3 EXECUTION

3.1 EXAMINATION

- A. Inspect substrate prior to start of work. Notify Contractor/CM immediately of unsatisfactory surface preparation before proceeding.
- B. Proceeding with installation shall be deemed acceptance of surface substrate conditions.

3.2 PREPARATION

- A. Clean surfaces thoroughly prior to installation. Do not begin installation until substrates have been cleaned, free of oil, grease, dirt, curing compounds, or substances that may act as bond breaker. Mechanically clean, if required to remove foreign matter on concrete surface.
- B. Prepare surfaces using the methods recommended by underlayment manufacturer for achieving best result for substrate under project conditions.
- C. Subfloors shall be tested for excessive moisture content. Do not begin installation until substrate is cleaned and dry.
- D. Provide manufacturer's recommended flexible sealing compound at expansion or isolation joints, or joint filler at saw cuts and control joints.

3.3 INSTALLATION

- A. Install materials in accord with manufacturer's printed installation instructions.
- B. Applicator shall be authorized trained applicator of product. Provide written authorization from manufacturer.
- C. Do not install materials below 50° F (10° C). Apply product using steel trowel using sufficient pressure to achieve desired thickness up to 0.50" (12.7 mm) over large areas and to any thickness for filling holes or gouges in concrete slabs. Provide uniform leveling of surface. Feather product to zero edge thickness, as required.
- D. Coordinate installation with adjacent work to ensure proper sequence of construction. Prevent damage to and soiling of adjacent work.

3.4 PROTECTION

- A. Protect installed underlayment until application of floor finishes in accord with manufacturer's printed instructions.

END OF SECTION

DIVISION

6

WOODS, PLASTICS AND COMPOSITES

SECTION 06 10 00
ROUGH CARPENTRY

PART 1 GENERAL

1.1 RELATED DOCUMENTS

- A. The provisions of the General Conditions, Supplementary Conditions, Drawings, Specifications and the Sections included under Division 1, General Requirements and References are included as a part of this Section as though bound herein.

1.2 SECTION INCLUDES

- A. Provide labor, materials, services, and equipment necessary to furnish and install work as indicated and as specified herein, which includes, but is not limited to:
 - 1. Roof curbs, cants, blocking, nailers, structural framing, plywood sheathing and equipment mounting boards, furring, rough hardware, and light wood wall, and roof truss construction required or indicated for complete and functional systems.

1.3 RELATED WORK:

- A. Section 01 25 13 – Product Substitution Procedures.
- B. Section 01 33 00 – Submittal Procedures.
- C. Section 01 42 00 – References.
- D. Section 01 45 00 – Quality Control.
- E. Section 01 66 00 – Project Storage and Handling Requirements.
- F. Section 01 78 00 – Closeout Submittals.
- G. Section 07 52 00 – Modified Bituminous Membrane Roofing.
- H. Section 09 91 00 – Painting.
- I. Section 09 29 00 – Gypsum Board.

1.4 REFERENCES

- A. Comply with Section 01 42 00 – References for additional reference standards, definitions, abbreviations and acronyms.
- B. American Forest and Paper Association (AFPA):
 - 1. National Design Specification for Wood Construction NDS-05 Conventional Wood Frame Construction
- C. American National Standards Institute (ANSI)/American Society of Mechanical Engineers (ASME):
 - 1. B18.2.1-2012 – Square, Hex, Heavy Hex, and Askew Head Bolts and Hex, Heavy Hex, Hex Flange, Lobed Head and Lag Screws (Inch Series).
 - 2. B18.2.2-2010 – Nuts for General Applications: Machine Screw Nuts, Hex, Square, Hex Flange and Coupling Nuts
 - 3. B18.6.1-1981 (R2008) - Wood Screws, (Inch Series).
 - 4. B18.6.4-98(R2005) Thread Forming and Thread Cutting Tapping Screws and Metallic Drive Screws (Inch Series).
- D. American Plywood Association (APA):
 - 1. E30-07 Engineered Wood Construction Guide
- E. American Society for Testing and Materials (ASTM):

1. ASTM A47-99(2009): Standard Specification for Ferritic Malleable Iron Castings.
 2. ASTM A48-03(2012): Standard Specification for Gray Iron Castings.
 3. A653/A653M-13: Standard Specification for Steel Sheet Zinc-Coated (Galvanized) or Zinc-Iron Alloy Coated (Galvannealed) by the Hot Dip Process.
 4. ASTM C954-11: Standard Specification for Steel Drill Screws for the Application of Gypsum Board or Metal Plaster Bases to Steel Studs from 0.033” (2.24 mm) to 0.112” (2.84 mm) in thickness.
 5. ASTM C1002-07(2013): Standard Specification for Steel Self-Piercing Tapping Screws for the Application of Gypsum Panel Products or Metal Plaster Bases to Wood Studs or Metal Studs.
 6. ASTM D143-09: Standard Specification for Small Clear Specimens of Timber, Method of Testing.
 7. ASTM D2559-12a: Standard Specification for Adhesives for Structural Laminated Wood Products for Use Under Exterior (Wet Use) Exposure Conditions.
 8. ASTM D3498-03(2011): Standard Specification for Adhesives for Field-Gluing Plywood to Lumber Framing for Floor Systems.
 9. ASTM F844-0 7a (2013): Standard Specification for Washers, Steel, Plain (Flat) Unhardened for General Use.
 10. ASTM F1667-13: Standard Specification for Nails, Spikes, and Staples.
- F. American Wood Protection Association (AWPA):
1. AWPA Standard U1, Commodity Specification A, requirements of Use Category 2 (UC-2).
- G. Southern Pine Inspection Bureau (SPIB) – Standard Grading Rules for Southern Pine Lumber.
- H. U.S. Department of Commerce Product Standard (PS).
1. PS 1-95 - Construction and Industrial Plywood.
 2. PS 20 -10 - American Softwood Lumber Standard.

1.5 SUBMITTALS:

- A. Submit in accord with Section 01 33 00 – Submittal Procedures.
- B. Shop Drawings showing wood trusses, framing, connection details, fasteners, connections and dimensions.
- C. Product Data:
 1. Wood/Plywood.
 2. Fasteners and anchors.
 3. Wood preservative treatment materials and application instructions.
 4. MSDS of treatment materials.
- D. Samples:
 1. Fastener types: Two (2) of each type.
 2. Material samples, if requested by Architect.

1.6 PRODUCT DELIVERY, STORAGE AND HANDLING:

- A. Comply with Section 01 66 00 – Storage and Handling.
- B. Protect lumber and other products from dampness both during and after delivery at site.
- C. Stack lumber to provide air circulation around surfaces of each piece.
- D. Stack plywood and other board products to prevent warping.

- E Locate lumber and plywood in well drained areas, supported at least 6" (150 mm) above grade and cover with well ventilated sheds having firmly constructed over hanging roof with sufficient end wall to protect lumber from driving rain.

PART 2 PRODUCTS

2.1 LUMBER:

- A. Lumber shall be SPIB Stress Group D 1x and 2x No. 2 grade Southern Yellow Pine species, with specified preservative treatment.
 - 1. Identifying marks shall be in accord with rule or standard under which material is produced, including requirements for qualifications and authority of inspection organization, usage of authorized identification, and information included in identification.
- B. Lumber Other Than Structural:
 - 1. Unless otherwise specified, species graded under grading rules of inspection agency shall be approved by Board of Review, American Lumber Standards Committee.
 - 2. Framing lumber: Minimum extreme fiber stress in bending of 1100 psi.
 - 3. Furring, blocking, nailers and similar items 100 mm (4") and narrower Standard Grade; and, members 150 mm (6") and wider, Number 2 Grade.
- C. Sizes:
 - 1. Conform to Prod. Std. PS20.
 - 2. Size references are nominal sizes, unless otherwise specified, actual sizes within manufacturing tolerances allowed by standard under which produced.
- D. Moisture Content (At time of delivery and maintained on site):
 - 1. Boards and lumber 50 mm (2") and less in thickness: 19 percent or less.
 - 2. Lumber over 50 mm (2") thick: 25 percent or less.

2.2 PRESERVATIVE TREATMENT:

- A. Wood Preservative (Pressure Treatment) for wood (exterior, above ground): AWWA U1, Use Category 3 (UC3) using waterborne preservative with 4.0 kg/m³ (0.25 pcf) of wood product.
- B. Treat wood members and plywood exposed to weather or in contact with plaster, masonry or concrete, including framing of open roofed structures; sills, sole plates, furring, and sleepers that are less than 600 mm (24") from ground; nailers, edge strips, blocking, crickets, curbs, cant, vent strips and other members used in connection with roofing and flashing materials.
- C. Wood preservative shall be borate based product. Use of Chromated Copper Arsenate (CCA) for pressure treating wood is not permitted.
- D. Approved Wood Preservative Applicator:
 - 1. Robbins Lumber Co., 13001 N. Nebraska Ave., Tampa, FL 33612-4456; Tel: 813-971-3030; Website: www.robbinlumber.com.
 - 2. Other preservative treatment companies shall comply with Section 01 25 13 – Product Substitution Procedures.

2.3 PLYWOOD

- A. Comply with Prod. Std. PS 1.
- B. Bear mark of recognized association or independent inspection agency that maintains continuing control over quality of plywood which identifies compliance by veneer grade, group number, span rating where applicable, and glue type.

- C. Sheathing:
 - 1. APA rated Exposure 1 or Exterior; panel grade CD or better.
 - 2. Wall sheathing:
 - a. Minimum 12 mm (15/32") thick with vertical supports not more than 600 mm (24") on center unless specified otherwise.
 - b. Minimum 1200 mm (48") wide at corners without corner bracing of framing.
 - 3. Roof sheathing:
 - a. Minimum 15 mm (19/32") thick for supports not more than 600 mm (24") on center.
- D. Wall Mounted Plywood in Communications Rooms (MDF and IDF Rooms):
 - 1. 19.5 mm (3/4") AC Grade APA Exterior rated Exposure 1 Plywood, painted flat grey on both sides and panel edges per Section 09 91 00.
 - 2. Plywood shall have Class A fire rating per ASTM E84-01 – Standard Test Method for Surface Burning Characteristics of Building Materials.
 - 3. Fire Retardant Wood Treatment:
 - a. DRICON by Arch Wood Protection, Inc., 1955 Lake Park Dr., Suite 100, Smyrna, GA 30080; Tel: 770-801-6600; Fax: 770-801-1990); website: www.archchemicals.com
 - b. D-Blaze by Chemical Specialties, Inc., One Woodland Green, Suite 250, 200 East Woodlawn Rd., Charlotte, NC 28217. Tel: 800-421-8661; Fax: 704-527-8232; website: www.treatedwood.com.
 - c. FirePRO by Osmose, Inc., P.O. Drawer O, Griffin, GA 30224-0249; Tel: 800-241-0240; Fax: 770-229-5225; website: www.osmose.com.

2.4 ROUGH HARDWARE AND ADHESIVES:

- A. Anchor Bolts:
 - 1. ASME B18.2.1 and ANSI B18.2.2 galvanized, 13 mm (1/2") unless shown otherwise.
 - 2. Extend at least 200 mm (8") into masonry or concrete with ends bent 50 mm (2").
- B. Miscellaneous Bolts: Expansion Bolts: C1D, A-A-55615; lag bolt, long enough to extend at least 65 mm (2-1/2") into masonry or concrete. Use minimum 3/8" (9 mm) diameter bolts unless shown otherwise.
- C. Washers
 - 1. ASTM F844-07a (2013).
 - 2. Use zinc or cadmium coated steel for washers exposed to weather.
- D. Screws:
 - 1. Wood to Wood: ANSI B18.6.1 or ASTM C1002-07(2013), stainless steel.
 - 2. Wood to Steel: ASTM C954-11, or ASTM C1002-07(2013), stainless steel.
- E. Nails:
 - 1. Size and type best suited for purpose unless noted otherwise. Use aluminum-alloy nails, plated nails, or zinc-coated nails, for nailing wood work exposed to weather and on roof blocking.
 - 2. ASTM F1667-13:
 - a. Common: Type I, Style 10.
 - b. Concrete: Type I, Style 11.
 - c. Barbed: Type I, Style 26.
 - d. Underlayment: Type I, Style 25.
 - e. Masonry: Type I, Style 27.
 - f. Use special nails designed for use with ties, strap anchors, framing connectors, joists hangers, and similar items. Nails not less than 32 mm (1-1/4") long, 8d and deformed or annular ring shank.

PART 3 EXECUTION

3.1 INSTALLATION OF FRAMING AND MISCELLANEOUS WOOD MEMBERS:

- A. Conform to applicable requirements of the following:
 - 1. APA for installation of plywood or structural use panels.
 - 2. TPI for metal plate connected wood trusses.
- B. Fasteners:
 - 1. Nails.
 - a. Nail in accord with Recommended Nailing Schedule as specified in AFPA Manual for House Framing. Where detailed nailing requirements are not specified in nailing schedule, select nail size and nail spacing sufficient to develop adequate strength for connection without splitting members.
 - b. Use special nails with framing connectors.
 - c. For sheathing, select length of nails sufficient to extend 25 mm (1") into supports.
 - d. Use eight penny or larger nails for nailing through 25 mm (1") thick lumber and for toe nailing 50 mm (2") thick lumber.
 - e. Use 16d or larger nails for nailing through 50 mm (2") thick lumber.
 - f. Select the size and number of nails in accord with Nailing Schedule except for special nails with framing anchors.
 - g. Nailing Schedule; Using Common Nails:
 - 1) Sheathing:
 - a) 150 mm (6") wide or less to each joist face nail two-8d.
 - b) Plywood or structural use panel to each stud or joist face nail 8d, at supported edges 150 mm (6") on center and at intermediate supports 250 mm (10") on center. When gluing plywood to joint framing increase nail spacing to 300 mm (12") at supported edges and 500 mm (20") o.c. at intermediate supports.
- 2. Bolts:
 - a. Fit bolt heads and nuts bearing on wood with washers.
 - b. Countersink bolt heads flush with the surface of nailers.
 - c. Embed in concrete and solid masonry or use expansion bolts. Special bolts or screws designed for anchor to solid masonry or concrete in drilled holes may be used.
 - d. Use toggle bolts to hollow masonry or sheet metal.
 - e. Use bolts to steel over 2.84 mm (0.112", 11 gage) in thickness. Secure wood nailers to vertical structural steel members with bolts, placed one at ends of nailer and 600 mm (24 inch) intervals between end bolts. Use clips to beam flanges.
- 3. Drill Screws to steel less than 2.84 mm (0.112") thick.
 - a. ASTM C1002-07(2013) for steel less than 0.84 mm (0.033") thick.
 - b. ASTM C 954-11 for steel over 0.84 mm (0.033") thick.
- 4. Power actuated drive pins may be used where practical to anchor to solid masonry, concrete, or steel.
- 5. Do not anchor to wood plugs or nailing blocks in masonry or concrete. Use metal plugs, inserts or similar fastening.
- 6. Screws to Join Wood:
 - a. Where shown or option to nails.
 - b. ASTM C1002-07(2013), sized to provide not less than 25 mm (1") penetration into anchorage member.
 - c. Spaced same as nails.

- C. Cut notch or bore in accord with NFPA Manual for House-Framing for passage of ducts wires, bolts, pipes, conduits and to accommodate other work. Repair or replace miscut, misfit or damaged work.
- D. Blocking Nailers, and Furring:
 - 1. Install furring, blocking, nailers, and grounds where shown.
 - 2. Use longest lengths practicable.
 - 3. Use fire retardant treated wood blocking where shown at openings and where shown or specified.
 - 4. Layers of Blocking or Plates:
 - a. Stagger end joints between upper and lower pieces.
 - b. Nail at ends and not over 24" (600 mm) between ends.
 - c. Stagger nails from side to side of wood member over 5" (125 mm) in width.
 - 6. Unless otherwise shown, use wall furring 1" by 3" (25 mm by 75 mm) continuous wood strips installed plumb on walls, using wood shims where necessary so face of furring forms a true, even plane. Space furring not over 400 mm (16") on centers, butt joints over bearings and rigidly secure in place. Anchor furring on 16" (400 mm) centers.

END OF SECTION

SECTION 06 41 00
CUSTOM CASEWORK

PART 1 GENERAL

1.1 RELATED DOCUMENTS

- A. The provisions of the General Conditions, Supplementary Conditions, and the Sections included under Division 1, General Requirements, are included as a part of this Section as though bound herein.

1.2 SECTION INCLUDES

- A. Provide labor, materials, services, and equipment necessary to furnish and install work as indicated and as specified herein, which includes, but is not limited to:
 - 1. Millwork and custom casework including cabinetry, countertops, and shelving
 - 2. Millwork and casework hardware and accessories

1.3 REFERENCES

- A. ASTM E84 – Standard Test Method for Surface Burning Characteristics of Building Materials
- B. AWI – Quality Standards
- C. BHMA A156.9 – Cabinet Hardware
- D. FED MMM-A-130 – Adhesive, Contact
- E. NEMA (National Electric Manufacturer’s Association) LD3 – High Pressure Decorative Laminates
- F. PS 1 – Construction and Industrial Hardwood
- G. PS 20 – American Softwood Lumber Standard
- H. Voluntary Product Standards PS 20-70
- I. Grading rules of Southern Pine Inspection Bureau (SPIB)
- J. Forest Stewardship Council (FSC)
- K. Sustainable Forestry Initiative (SFI)
- L. Canadian Standards Association (CSA):
- M. FBC – Florida Building Code

1.4 SUBMITTALS

- A. Shop Drawings: Submit Shop Drawings in accordance with Specifications.
 - 1. Indicate quality grade, materials, species, construction, sizes, shapes, quantities, locations, and conditions of adjoining work.
 - 2. Indicate items in related or dimensional position with sections or details shown either full size or 3" = 1'-0" scale.
 - 3. Indicate required field measurements beyond control of mill.
 - 4. Indicate the allowable uniformly distributed loads for shelving.
- B. Samples: Submit manufacturer's full range of sample colors, textures, and patterns of plastic laminate for Architect's selection.
- C. Installation Instruction: Provide installation instructions and lists of replacement parts for all hardware and accessories.

- D. Product Data: Provide product data for all hardware and accessories. Product data. Unless otherwise indicated, submit the following for each type of product provided under work of this Section:
1. Recycled Content:
 - a. All interior wood lumber shall be formaldehyde free.
 - b. Salvaged Lumber: Provide documentation certifying products are from salvaged lumber sources.
 - c. Recovered Lumber: Provide documentation certifying products are from recovered lumber sources.
 2. Local/Regional Materials:
 - a. Sourcing Location(s): Indicate location of extraction, harvesting, and recovery; indicate distance between extraction, harvesting, and recovery and the project site.
 - b. Manufacturing Location(s): Indicate location of manufacturing facility; indicate distance between manufacturing facility and the project site.
 - c. Product Value: Indicate dollar value of product containing local/regional materials; include materials cost only.
 - d. Product Component(s) Value: Where product components are sourced or manufactured in separate locations, provide location information for each component. Indicate the percentage by weight of each component per unit of product.
 3. VOC Data:
 - a. Adhesives:
 - i) Submit manufacturer's product data for adhesives. Indicate VOC limits of the product. Submit MSDS highlighting VOC limits.
 - ii) Submit Green Seal Certification to GS-36 and description of the basis of certification.
 - iii) Submit manufacturer's certification that products comply with SCAQMD #1168.
 4. Submit environmental data in accordance with Table 1 of ASTM E2129 for products provided under work of this Section.
- E. Letter of Certification(s) for Sustainable Forestry:
1. Forest Stewardship Council (FSC): Provide letter of certification signed by lumber supplier. Indicate compliance with FSC "Principles for Natural Forest Management" and identify certifying organization.
 - a. Submit FSC certification numbers; identify each certified product on a line-item basis.
 - b. Submit copies of invoices bearing the FSC certification numbers.
 2. Sustainable Forestry Board: Provide letter of certification signed by lumber supplier. Indicate compliance with the Sustainable Forestry Board's "Sustainable Forestry Initiative" (SFI) and identify certifying organization.
 - a. Submit SFI certification numbers; identify each certified product on a line-item basis.
 - b. Submit copies of invoices bearing the SFI certification numbers.
 3. Canadian Standards Association (CSA): Provide letter of certification signed by lumber supplier. Indicate compliance with the CSA and identify certifying organization.
 - a. Submit CSA certification numbers; identify each certified product on a line-item basis.
 - b. Submit copies of invoices bearing the CSA certification numbers.
- F. Key Schedule:
1. Provide lock and key schedule for lockable cabinets.
 2. Coordinate key schedule with Specification Section - Door Hardware.
- G. Certification: Submit certifications by treating plant that pressure treatment materials comply with governing ordinances.

1.5 QUALITY ASSURANCE

- A. Millwork and casework fabricator shall have a minimum 5-years previous experience of successfully completed comparable work.
- B. Lumber Grading:
 - 1. Lumber Grading Rules and Wood Species in accordance with Voluntary Product Standards PS 20-70
 - 2. Grading rules of Southern Pine Inspection Bureau (SPIB) apply to materials furnished.
- C. Fire Hazard Classification: Comply with required NFPA, ANSI, and UL surface burning characteristics for plastic laminates, lumber, and plywood.
- D. Perform work in compliance with AWI standards.
- E. Sustainably Harvested Wood: Certification Organizations shall be accredited by the Forest Stewardship Council, Sustainable Forestry Board, or Canadian Standards Association.

1.6 MOCK-UP

- A. Prepare mock-up under provisions as specified.
- B. Provide full size base cabinet and upper cabinet of each type indicated, in specified finish with hardware installed. Contractor to coordinate with Architect for all required locations.
- C. Owner shall inspect units to ascertain quality and conformity to AWI Standards.
- D. Units will establish a minimum standard of quality for this work.
- E. Vendor may use undamaged approved units as part of the work.

1.7 FIELD MEASUREMENTS

- A. Design and fabricate units based upon field conditions and measurements.
- B. Verify field measurements are included in shop drawings.

1.8 PRE-INSTALLATION CONFERENCE

- A. Convene a pre-installation conference after site inspection and prior to commencement of work.
- B. Discuss any items that may alter fabrications or intended installation and determine acceptable conclusions.

1.9 COORDINATION

- A. Coordinate work with plumbing, mechanical, electrical, and other trades for rough-in work and installation of adjacent and associated components.

1.10 ENVIRONMENTAL REQUIREMENTS AND PROTECTION

- A. Specification Section - Material Equipment and Approved Equals: Environmental conditions affecting products on site.
- B. Immediately prior to, during and after installation of work of this section, maintain the same temperature and humidity conditions in building spaces as will occur after occupancy.
- C. Protect work from damage until final acceptance.

PART 2 PRODUCTS

2.1 QUALITY GRADE

- A. Materials and Fabrication: Provide premium grade construction and finishing in accordance with AWI "Quality Standards", conforming to Section 400B - Laminate Clad Cabinets.
- B. Design Type: Reveal overlay design in accordance with AWI Architectural Casework - General Details, except as otherwise specified and detailed.

2.2 CABINET MATERIALS

- A. Sub-base Material:
 - 1. Provide millwork or casework plywood cores of Hardwood Plywood "veneer core" with no-added-Urea Formaldehyde adhesives.
 - 2. Use ¾" thick, 9-ply closed-grain hardwood plywood typical unless noted otherwise.
 - 3. Use ¼" thick hardwood plywood at cabinet backs and drawer bottoms.
- B. Adhesive: Provide type II, CS 35 or as recommended by plastic laminate manufacturer.
 - 1. Adhesives shall be low VOC meeting USGB LEED for Schools requirements for low VOC.
- C. Plastic Laminate: High-pressure laminate, General Purpose Grade, NEMA LD3, GP-50 by Formica or Nevamar.
 - 1. Exposed horizontal surfaces: Use 0.050" thick, matte finish.
 - 2. Exposed vertical surfaces: Use 0.030" thick, matte finish.
 - 3. Provide GP 42 for post forming: Use 0.042" thick, matte finish.
 - 4. BK 20 for concealed backing: Use 0.020" thick, matte finish, vertical grade, white unless otherwise indicated.
 - 5. Architect and the District's Design Coordinator shall select the Color and pattern, which may determine the laminate manufacturer.
- D. Finish Hardware Items: Provide following items of finish hardware with millwork:
 - 1. Drawer Glides: No. 8400 Extension Slides by Knape & Vogt Mfg. Co.
 - a. Equal products to Knape & Vogt produced by Accuride and Blum are acceptable.
 - 2. Shelf Standards and Supports (recessed in cabinets): No. 255 Standard and No. 256 Supports by Knape & Vogt Mfg. Co., Natural aluminum finish.
 - a. Equal products to Knape & Vogt produced by Accuride and Blum are acceptable.
 - 3. Doors: 1 pair heavy-duty institutional hinges, Stanley HT1592, US28.
 - a. 1 catch, Stanley 41 Series.
 - b. 1 pull, Stanley 4483, US28.
 - c. Equal products to Stanley produced by Grant and Hettich America are acceptable.
 - 4. Drawer Pulls: Stanley 4483, US28. Equal products to Stanley produced by Grant and Hettich America are acceptable.
 - 5. Drawer Locks: Schlage CL 888R or Olympus 888IC cabinet drawer lock, US26D, complete with strike plate.
 - a. Provide locks with Interchangeable Core Schlage cylinders keyed to the existing Facility Master Key System as directed by Owner.
 - 6. Door Locks: Schlage CL 777R or Olympus 777IC cabinet door lock, US26D, complete with strike plate.
 - a. Provide locks with Interchangeable Core Schlage cylinders keyed to the existing Facility Master Key System as directed by Owner.
 - b. Provide one elbow catch per pair doors.

7. Cabinet locks keyed to the facility shall be coordinated with the Hardware Supplier of section 08 71 00 who shall provide the locks.
8. Master key:
 - a. Master key doors and drawers of cabinetry in each room with each other and the main entrance room door.
 - b. Use a Schlage Everest D245 or Schlage 1456 restricted keyway as directed by owner.
 - c. Equal products to Schlage produced by Olympus are acceptable.
9. Silencers: Use neoprene type with self-adhesive at all cabinet doors.
- E. Glazing: Provide clear, tempered glass for glazed doors and openings in cabinetwork, ¼" thick unless otherwise indicated, or approved.
 1. Alternate glazing: Varia – Organics Collection by 3Form to be provided as scheduled.
 - a. Provide gauge as recommended by manufacturer.
 - b. Finish and color to be selected by architect.
 - c. Provide all required hardware to secure panels per manufacturer's recommendations.
- F. Accessories: Provide adhesives, concealed fasteners, nuts, bolts, screws, pins, washers, and etc. of type and size to suit application and severity of use. Provide finish washers at all exposed screw locations.
 1. Provide finished grommets for holes and cut-outs and escutcheons at pipe penetration.
- G. Miscellaneous: Provide shims, blocking, etc. as required for complete installation.

2.3 FABRICATION

- A. General:
 1. All exposed cabinet edges shall be beveled or rounded to prevent sharp edges or corners.
 2. All counter tops exposed to room or student access have beveled or rounded edges, and exposed corners rounded with minimum ½" radius.
- B. Fabrication Workmanship:
 1. Construct millwork items in accordance with specified quality grade of reference standards, except as otherwise specified or detailed.
 2. Construct millwork items using materials specified for plastic laminate finish.
- C. Milling:
 1. Fabricate and assemble work at mill as complete as practicable.
 2. Deliver ready to assemble and set in place.
 3. Machine sand all work at mill and deliver free of machine or tool marks or defects that will show through finish.
- D. Plastic Laminate Tops, Panels, Cabinet Shelving, and All Exposed Surfaces:
 1. Use plywood substrate as specified.
 - a. Particleboard, hardboard, and flake-board are not acceptable.
 2. Glue tops and panels under pressure using Type II water-resistant adhesive.
 - a. Glue plastic, core, and backing sheet in one operation after applying edge bands.
 3. Plastic Laminate shall be applied to the top of all tall cabinets and scribed to wall.
- E. Fabricate finished tops and edges from one continuous sheet of plastic laminate.
 1. Make corners and joints hairline.
 2. Slightly bevel arises.
- F. Ease the edges of millwork as required to eliminate sharp edges.
- G. Backsplash and Aprons:
 1. Square edge, direct bond cover, and full returns.
 2. Make corners and joints hairline.
- H. Door and Drawer fronts shall be ¾" thick.

- I. Provide plastic laminate finish on all exposed surfaces of doors, drawers, countertops, splashes, etc. of cabinets.
 - 1. Shelves shall be finished on all sides and edges.
- J. Construction: Construct each unit or cabinet in one section where practical, or construct in largest practical sections to facilitate ease of handling and installation.
 - 1. Cabinet constructed in more than one section, ship trim and scribe strips loose at field joints.
 - 2. Locate counter butt joints minimum 2' from sink cutouts.
- K. Finish Hardware: Fit drawer guides and cabinet-mounted shelf standards at mill.
 - 1. Ship other finish hardware items loose for installation at job site.
- L. Glazing: Install glazing at mill to the greatest extent practical.
 - 1. Field glazing shall be with dry type glazing gaskets sized to eliminate gaps and prevent loose glazing installations.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Examine surfaces for conditions that would prevent quality installation of millwork.
- B. Verify that grounds and blocking are in place to support millwork.
- C. Do not install on defective conditions, doing so shall indicate acceptance of site conditions and require you to correct any defects.

3.2 INSTALLATION

- A. General:
 - 1. Install all millwork items, plumb, level and true (within 1/16" in 10'), in accordance with drawing details and shop drawings.
 - 2. Do not install trim until backs and unexposed edges have been back primed.
 - 3. Provide cutting, fitting, fabricating, erecting, wedging, bracing, blocking, nailing, and securing of items of rough woodwork throughout, including miscellaneous furring, grounds, blocking, and nailers.
 - a. Build-in items where indicated on Drawings or where required for attachment of finish and other work.
 - 4. Provide 4" high backsplash and end splashes at all locations where countertops abut walls.
 - 5. Fully bed backsplashes and end splashes to top and each other with Dow Corning #786 mildew resistant silicone sealant.
 - 6. Offsets: Offsets in plane on work surfaces and counters shall be negligible and no more than 1/32" at other abutting materials.
- B. Cabinets:
 - 1. Install cabinets plumb with countertops level to within 1/16" in 10'.
 - 2. Level the base cabinets to within allowable tolerances.
 - 3. Accurately scribe and fit scribe strips, trim strips, and filler panels to irregularities of adjacent surfaces, maximum gap opening 0.025". Plastic laminate overlay trim shall not be used to close caps.
 - 4. Secure cabinets permanently to floor using anchors spaced at maximum of 30" o.c., minimum of two for each unit while maintaining 3/4" clearance between the back of cabinet and the exterior wall.
 - 5. Bolt adjoining cases together, maximum width of joints 1/32".

6. Fasten tops to bases with screws driven through base cabinet top frame into bottom of countertop.
7. Scribe all backsplashes and aprons and caulk.
8. Blocking, Bucks, and Nailers: Install plumb, level and true with joints flush, fastened securely in place.
9. Furring and Stripping: Install plumb and level, shim to provide true finish surface.
10. Install color-matched sealant at unfinished joints with other materials.
11. Install wall-shelving standards on solid backing or with toggle bolts into steel studs or masonry or TEK screws into concrete.
 - a. Do not install wall-shelving standards into gypsum wallboard only.
 - b. Space standards as required to support indicated loading but not less than 5-plf based on shelf material provided.
12. Do not install cabinetry or millwork closer than 24" to ceilings in fully sprinklered buildings or such that installation obstructs any fire sprinkler head.

3.3 ADJUSTING AND CLEANING

- A. Adjust doors, drawers, hardware, fixtures, and other moving or operating parts to function smoothly and correctly.
- B. On completion of installation, touch up marred or abraded finished surfaces and wipe down surfaces to remove fingerprints and markings, and leave in clean condition.

3.4 WASTE MANAGEMENT

- A. Waste Management: Collect cutoffs and scrap and place in designated areas for recycling.

END OF SECTION

DIVISION

7

THERMAL AND MOISTURE PROTECTION

SECTION 07 84 00
FIRESTOPPING

PART 1 GENERAL

1.1 RELATED DOCUMENTS

- A. The provisions of the General Conditions, Supplementary Conditions, Drawings, Specifications and the Sections included under Division 1, General Requirements and References are included as a part of this Section as though bound herein.

1.2 SECTION INCLUDES

- A. Provide labor, material, services and equipment necessary to furnish and install work as indicated and as specified herein, which includes, but is not limited to:
 - 1. Firestopping at penetrations in fire rated assemblies, fire-resistive joints and intersections with fire rated walls, floors and roofs, perimeter fire containment systems in fire rated spaces, fire and smoke seals for doors and corridors.

1.3 RELATED SECTIONS

- A. Section 01 25 13 – Product Substitution Procedures.
- B. Section 01 31 13 – Project Coordination.
- C. Section 01 33 00 – Submittal Procedures.
- D. Section 01 42 00 – References.
- E. Section 01 45 00 – Quality Control.
- F. Section 01 66 00 – Project Storage and Handling Requirements.
- G. Section 01 78 00 – Closeout Submittals.
- H. Section 03 30 00 – Cast-In-Place Concrete.
- I. Section 04 22 00 – Concrete Unit Masonry.
- J. Section 07 92 00 – Joint Sealants.
- K. Section 09 29 00 – Gypsum Board.
- L. Division 23 – Heating, Ventilating and Air Conditioning (work requiring firestopping).
- M. Division 26 – Electrical (work requiring firestopping).
- N. Division 27 – Communications (work requiring firestopping).

1.4 REFERENCES

- A. See Section 01 42 00 – References for additional reference standards, definitions, abbreviations, and acronyms.
- B. American Society of Testing Materials (ASTM):
 - 1. ASTM C920-11: Standard Specification for Elastomeric Joint Sealants.
 - 2. ASTM E1399-13e1: Standard Test Method for Cyclic Movement and Measuring the Minimum and Maximum Widths of Architectural Joint Systems.
 - 3. ASTM E 1996-00: Standard Test Method for Fire Resistive Joint Systems.
- C. American National Standards Institute/Underwriter’s Laboratory (ANSI/UL):
 - 1. ANSI/UL 1479: Fire Test of Through Penetration Firestops.
 - 2. ANSI/UL 2079: Test for Fire Resistance of Building Joint Systems.
- D. Florida Building Code, 6th Edition.
- E. Florida Fire Prevention Code, 6th Edition.

1.5 PERFORMANCE REQUIREMENTS

- A. Provide products that upon curing, do not re-emulsify, dissolve, leach, breakdown, or otherwise deteriorate over time from exposure to atmospheric moisture, sweating pipes, ponding water or other forms of moisture characteristic during and after construction.
- B. Provide firestop sealants sufficiently flexible to accommodate motion such as pipe vibration, water hammer, thermal expansion and other normal building movement without damage to seal.
- C. Pipe insulation shall not be removed, cut away or otherwise interrupted through wall or floor openings. Provide products appropriately tested for thickness and type of insulation utilized.
- D. Openings within walls and floors designed to accommodate voice, data and video cabling shall be provided with re-enterable products specifically designed for retrofit.
- E. Penetrants passing through fire-resistance rated floor-ceiling assemblies contained within chase wall assemblies shall be protected with products tested by being fully exposed to fire outside of chase wall. Systems within UL Fire Resistance Directory that meet criterion are identified with words "Chase Wall Optional".
- F. Provide fire-resistive joint sealants sufficiently flexible to accommodate movement such as thermal expansion and other normal building movement without damage to seal.
- G. Provide fire-resistive joint sealants designed to accommodate specific range of movement and tested for purpose in accord with cyclic movement test criteria as outlined in Standards, ASTM E-1399, ASTM E-1966 or ANSI/ UL 2079.
- H. Provide through penetration firestop systems and fire-resistive joint systems and conduct air leakage test in accord with Standards, ANSI/UL1479 and ANSI/UL2079, respectively, with published L-Ratings for ambient and elevated temperatures as evidence of ability of through penetration firestop system or fire-resistive joint system to restrict movement of smoke.

1.6 SUBMITTALS

- A. Submit in accord with Section 01 33 00 – Submittal Procedures.
- B. Product Data: Provide manufacturer's standard catalog data for specified products demonstrating compliance with referenced standards and listing numbers of systems in which each product is to be used.
- C. Shop Drawings: Submit schedule of opening locations and sizes, penetrating items, and required listed design numbers to seal openings to maintain fire resistance rating of adjacent assembly.
- D. Certificates:
 - 2. Product certificates signed by firestop system manufacturer certifying material compliance with applicable code and specified performance characteristics.
 - 3. Certification of Installer's Qualifications.
- E. Installation Instructions: Submit manufacturer's printed installation instructions.

1.7 QUALITY ASSURANCE

- A. Comply with Section 01 45 00 – Quality Control.
- B. Products/Systems: Provide firestopping systems that comply with following requirements and as specified in Paragraph 1.04 - Performance Criteria.
 - 1. Firestopping tests shall be performed by qualified, testing and inspection agency, UL approved, or another agency performing testing and follow-up inspection services for firestop systems acceptable to authorities having jurisdiction.

2. Firestopping products bear classification marking of qualified testing and inspection agency.
- B. Installer Qualifications: Installer shall have five continuous previous years of experience in performing work specified, and is certified or approved by firestopping manufacturer as having required training to install firestop products specified.
- C. Mock-Ups:
 1. Comply with Section 01 43 39 – Mockups.
 2. Install mockup using acceptable products and manufacturer approved installation methods.
 3. Apply one of each unit type of firestopping material, such as penetrations through fire rated partition, to representative application.
 4. Locate where directed.
 5. Maintain mockup during construction for workmanship comparison.
 6. Remove and legally dispose of mockup when no longer required.
- D. Preinstallation Meeting:
 1. Comply with Section 01 31 13 – Project Coordination.
 2. Contractor/CM shall coordinate and conduct meeting with applicable installers to verify project requirements, review substrate conditions, plan and schedule work progress, determine phasing and layout of work with other trades to minimize conflicts.
 3. Review manufacturer's printed installation instructions, and warranty requirements.

1.8 DELIVERY, STORAGE, AND HANDLING

- A. Comply with Section 01 66 00 – Product Storage and Handling Requirements.
- B. Deliver products in manufacturer's original, unopened, undamaged containers, identification labels intact identifying product and manufacturer, date of manufacture; lot number; shelf life, if applicable; qualified testing and inspection agency's classification marking; and mixing instructions for multicomponent materials.
- B. Handle and store products in accord with manufacturer's written recommendations published in technical materials. Leave products wrapped or otherwise protected and under clean and dry storage conditions until required for installation.
- C. Store materials protected from exposure to harmful weather conditions and at temperature and humidity conditions recommended by manufacturer.

1.9 PROJECT CONDITIONS

- A. Do not install firestopping products when ambient or substrate temperatures are outside limitations recommended by manufacturer.
- B. Do not install firestopping products when substrates are wet due to rain, frost, condensation, or other causes.
- C. Maintain minimum temperature before, during, and for minimum 3 days after installation of materials
- D. Do not use materials containing flammable solvents.
- E. Coordinate construction of openings and penetrating items to ensure that through-penetration firestop systems are installed according to specified requirements.
- F. Coordinate sizing of sleeves, openings, core-drilled holes or cut openings to accommodate through-penetration firestop systems.
- G. Schedule installation of firestopping after completion of penetrating item installation but prior to covering or concealing of openings.

- H. Schedule installation of safing materials in linear opening at curtain wall prior to construction that limits access to safing slot.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Approved Manufacturer: Specified Technologies Inc., 200 Evans Way; Somerville, NJ 08876; Tel: 800-992-1180; Tel: 908-526-8000; Fax: 908-526-9623; Website: www.stifirestop.com.
- B. Other manufacturers shall make requests for product substitutions in accord Section 01 25 13 – Product Substitution Procedures.
- C. Single Source: Obtain firestop systems for each type of penetration or joint opening and construction condition indicated from single manufacturer.

2.2 MATERIALS

- A. Use firestopping products that have been tested for specific fire-resistance-rated construction conditions conforming to construction assembly type, penetrating item type or joint opening width and movement capabilities, annular space requirements, and fire-rating involved for each separate instance.
- B. Latex Sealants: STI SpecSeal Series single component latex formulations that upon cure do not re-emulsify during exposure to moisture. Following products are acceptable:
 - 1. Specified Technologies, Inc. (STI) SpecSeal Series SSS Intumescent Sealant.
 - 2. Specified Technologies, Inc. (STI) SpecSeal Series LCI Intumescent Sealant.
 - 3. Specified Technologies, Inc. (STI) SpecSeal Series LC Endothermic Sealant.
 - 4. Specified Technologies, Inc. (STI) SpecSeal Series AS Elastomeric Spray.
 - 5. Specified Technologies, Inc. (STI) SpecSeal Series ES Elastomeric Sealant.
- C. Firestop Devices: STI SpecSeal Series factory-assembled steel collars lined with intumescent material sized to fit specific outside diameter of penetrating item. Following products are acceptable:
 - 1. Specified Technologies, Inc. (STI) SpecSeal Series SSC Firestop Collars.
 - 2. Specified Technologies, Inc. (STI) SpecSeal Series LCC Firestop Collars.
- D. Wall Opening Protective Materials: STI SpecSeal Series intumescent, non-curing pads or inserts for protection of electrical switch and receptacle boxes to reduce horizontal separation to less than 24 inches (610mm). Following products are acceptable:
 - 1. Specified Technologies, Inc. (STI) SpecSeal Series SSP Firestop Putty Pads.
 - 2. Specified Technologies, Inc. (STI) SpecSeal Series EP PowerShield Insert Pads.
- E. Firestop Putty: STI SpecSeal Series intumescent, non-hardening, water resistant putties containing no solvents, inorganic fibers or silicone compounds. Following products are acceptable:
 - 1. Specified Technologies, Inc. (STI) SpecSeal Series SSP Firestop Putty.
- F. Fire Rated Cable Pathways: STI EZ-PATH device modules comprised of steel raceway with intumescent foam pads allowing 0 to 100 percent cable fill. Following products are acceptable:
 - 1. Specified Technologies Inc. (STI) EZ-PATH Fire Rated Pathway.
- G. Wrap Strips: STI SpecSeal Series single component intumescent elastomeric strips faced on both sides with plastic film. Following products are acceptable:
 - 1. Specified Technologies, Inc. (STI) SpecSeal Series RED Wrap Strip.
 - 2. Specified Technologies, Inc. (STI) SpecSeal Series BLU Wrap Strip.

3. Specified Technologies, Inc. (STI) SpecSeal Series BLU2 Wrap Strip.
- H. Firestop Pillows: STI SpecSeal Series re-enterable, non-curing, mineral fiber core encapsulated with an intumescent coating contained in flame retardant poly bag. Following products are acceptable:
 1. Specified Technologies, Inc. (STI) SpecSeal Series SSB Firestop Pillows.
- I. Mortar: STI SpecSeal Series Portland cement based dry-mix product formulated for mixing with water at Project site to form a non-shrinking, water-resistant, homogenous mortar. Following products are acceptable:
 1. Specified Technologies, Inc. (STI) SpecSeal Series SSM Firestop Mortar.
- J. Silicone Sealants: STI SpecSeal Series moisture curing, single component, silicone elastomeric sealant for horizontal surfaces (pourable or nonsag) or vertical surface (nonsag). Following products are acceptable:
 1. Specified Technologies, Inc. (STI) Pensil 300 Silicone Sealant.
 2. Specified Technologies, Inc. (STI) Pensil 300 SL Self-Leveling Silicone Sealant.
- K. Silicone Foam: STI SpecSeal Series multicomponent, silicone-based liquid elastomers, that when mixed, expand and cure in place to produce a flexible, non-shrinking foam. Following products are acceptable:
 1. Specified Technologies, Inc. (STI) Pensil 200 Silicone Foam.
- L. Silicone/Urethane Sealants: STI SpecSeal Series moisture curing, single component, silicone/urethane hybrid elastomeric sealant for horizontal surfaces. Following products are acceptable:
 1. Specified Technologies, Inc. (STI) SpecSeal Fast Tack Firestop Spray.
- M. Installation Accessories: Provide clips, collars, fasteners, temporary stops or dams, and other devices required to position and retain materials in place.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Before beginning installation, verify that substrate conditions previously installed under other sections are acceptable for installation of firestopping in accord with manufacturer's printed installation instructions and technical bulletins.
- B. Surfaces shall be free of dirt, grease, oil, scale, laitance, rust, release agents, water repellents, and any other substances that may inhibit optimum adhesion.
- C. Provide masking and temporary covering to protect adjacent surfaces.
- D. Do not proceed until unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. General: Install through-penetration firestop systems and fire-resistive joint systems in accord with Performance Criteria and in accord with conditions of testing and classification as specified in published design.
- B. Manufacturer's Instructions:
 1. Comply with manufacturer's printed instructions for installation of firestopping products and following.
 2. Seal openings or voids made by penetrations to ensure air and water resistant seal.
 3. Consult with mechanical engineer, project manager, and damper manufacturer prior to installation of through-penetration firestop systems that might hamper the performance of fire dampers as it pertains to duct work.
 4. Protect materials from damage on surfaces subjected to traffic.

5. Apply suitable bond-breaker to prevent three-sided adhesion in applications where conditions might occur such as intersection of gypsum wallboard/steel stud wall to floor or roof assembly where joint is backed by steel ceiling runner or track.
6. Where joint application is exposed to elements, fire-resistive joint sealant shall be approved by manufacturer for use in exterior applications and shall comply with ASTM C-920-11: Standard Specification for Elastomeric Joint Sealants.
7. Select materials pertinent to conditions from the list above within the Specification and the UL, FM, or other approved assembly information.

3.3 FIELD QUALITY CONTROL

- A. Keep areas of work accessible until inspection by authorities having jurisdiction.
- B. Where deficiencies are found, repair or replace firestopping products to comply with requirements.

3.4 ADJUSTING AND CLEANING

- A. Remove equipment, materials and debris, leaving area in undamaged, clean condition.
- B. Clean surfaces adjacent to sealed openings to be free of excess firestopping materials and soiling as work progresses.

END OF SECTION

SECTION 07 91 23
BACKER RODS

PART 1 GENERAL

1.1 RELATED DOCUMENTS

- A. The provisions of the General Conditions, Supplementary Conditions, Drawings, Specifications, and the Sections included under Division 1, General Requirements and References are included as a part of this Section as though bound herein.

1.2 SECTION INCLUDES

- A. Provide labor, material, services, and equipment necessary to furnish and install work as indicated and as specified herein, which includes, but is not limited to:
 - 1. Application of closed-cell polyethylene foam backer rod in expansion joints where indicated.

1.3 RELATED SECTIONS

- A. Section 01 25 13 – Product Substitution Procedures
- B. Section 01 31 00 – Project Coordination
- C. Section 01 33 00 – Submittal Procedures
- D. Section 01 42 00 – References
- E. Section 01 45 00 – Quality Control
- F. Section 01 66 00 – Product Storage and Handling Requirements
- G. Section 01 78 00 – Closeout Submittals
- H. Section 07 62 00 – Sheet Metal Flashing and Trim

1.4 REFERENCES

- A. Comply with Section 01 42 00 – References for additional reference standards, definitions, abbreviations and acronyms.
- B. American Society of Testing Materials:
 - 1. ASTM C1016-14: Standard Test Method for Determination of Water Absorption of Sealant Backing (Joint Filler) Material
 - 2. ASTM C1330-02(2013): Standard Specification for Cylindrical Sealant Backing for Use with Cold Liquid Applied Sealants.
 - 3. ASTM D1623-09: Standard Test Method for Tensile and Tensile Adhesion Properties of Rigid Cellular Plastics
 - 4. ASTM D1662-08(2014): Standard Test Method for Acid Sulfur in Cutting Oils
 - 5. ASTM D5249-14: Standard Test Method for Isolation and Enumeration of Enterococci from Water by the Membrane Filter Procedure

1.5 SUBMITTALS

- A. Comply with Section 01 33 00 - Submittal Procedures.
- B. Submit manufacturer's product data and printed application instructions.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Comply with Section 01 66 00 – Product Storage and Handling Requirements.
- B. Deliver materials to site in manufacturer's original, unopened containers and packaging, with labels clearly identifying product name and manufacturer.
- C. Store materials in a clean, dry area in accord with manufacturer's instructions.
- D. Protect materials during handling and application to prevent damage.

PART 2 PRODUCTS

2.1 APPROVED MANUFACTURER

- A. W. R. Meadows, Inc., PO Box 338, Hampshire, Illinois 60140-0338; Tel: 800-342-5976, 847-214-2100; Fax: 847-683-4544. Website: www.wrmeadows.com.
 - 1. Product: KOOL-ROD closed cell, backer rod joint filler.
 - 2. Color: Gray.
- B. Sonneborn, Division of BASF Construction Chemicals, LLC-Building Systems, 889 Valley Park Dr., Shakopee, MN 55379; Tel: 800-433-9517; Website: www.buildingsystems.BASF.com.
 - 1. Product: Sonalastic Closed-Cell Backer-Rod, closed-cell polyethylene foam joint-filler and backing for sealants in sizes to fit openings indicated.
 - 2. Color: Gray.
- C. Other manufacturers shall comply with Section 01 25 13 – Product Substitution Procedures.

2.2 MATERIALS

- A. Closed Cell Backer Rod Test Data:
 - 1. Water Absorption, oz/in³ (g/cc³): <0.017 (<0.03), per ASTM C1016-14.
 - 2. Density, lbs/ft³ (kg/m³): 1.50-3.0 (24-48), per ASTM D1662-08(2014).
 - 3. Compression Recovery, %: >90, per ASTM D5249-14.
 - 4. Compression Deflection, psi (KPa): >2.97 (>20.5), per ASTM D5249-14.
 - 5. Tensile Strength, psi (KPa): 29.0 (>200), per ASTM D1623-09.
 - 6. Service Temperature, °F (°C): -45 to 160 (-43 to 71).
- B. Size of Backer Rods:
 - 1. For joint widths up to 0.75” (19mm) wide, backer rods shall be sized 0.125” (3mm) larger than width of joint.
 - 2. For 0.75” (19mm) joint widths, backer rods shall be 1” (25mm).

PART 3 EXECUTION

3.1 EXAMINATION

- A. Examine areas to receive backer rod. Notify Contractor/CM if areas are not acceptable.
- B. Do not begin application until unacceptable conditions have been corrected. Commencement of installation shall be deemed acceptance of substrate conditions.
- C. Expansion joints shall be clean, dry and free of obstructions.

3.2 APPLICATION

- A. Install backer rod in accord with manufacturer's printed instructions.

- B. Select proper backer rod diameter and cut to length or use directly from spool. Do not stretch backer rod.
- C. Uniformly install backer rod with blunt instrument or roller at depth or level recommended by sealant manufacturer.
- D. Use template or roller gage to control depth of backer rods in joints to allow correct installation of joint sealant.

3.3 PROTECTION

- A. Protect expansion joints, backer rods and joint sealant from damage until project's Substantial Completion.

END OF SECTION

SECTION 07 92 00
JOINT SEALANTS

PART 1 GENERAL

1.1 RELATED DOCUMENTS

- A. The provisions of the General Conditions, Supplementary Conditions, Drawings, Specifications, and the Sections included under Division 1, General Requirements, and References are included as a part of this Section as though bound herein.

1.2 SECTION INCLUDES

- A. Provide labor, materials, services, and equipment necessary to furnish and install work as indicated and as specified herein, which includes, but is not limited to:
 - 1. Joint sealers

1.3 JOB CONDITIONS

- A. This Contractor shall inspect the job conditions as he finds them, and his starting of the work constitutes approval of all conditions.

1.4 QUALITY ASSURANCE

- A. All manufacturer items must be factory labeled, on the material or its container.
- B. Manufacturer shall have a minimum of 10-years experience specializing in specified item.
- C. Applicator shall be Sealant Manufacturer approved with 5-years successful experience.
 - 1. Applicator shall also agree to employ only skilled tradesmen for the Work.
- D. Obtain elastomeric materials only from manufacturers that if requested, will send a qualified technical representative to the project site for advising the Installer of proper procedures and precautions for the use of the materials.
- E. Contractor shall hold a pre-caulking meeting at the project site with the Architect and all involved parties to review conditions, materials, colors, and other requirements.

1.5 REFERENCES

- A. ACI 504 R – Guide to Joint Sealants for Concrete Structures
- B. ASTM C834 – Standard Specification for Latex Sealants
- C. ASTM C919 – Standard Practice for Use of Sealants in Acoustical Applications
- D. ASTM C920 – Standard Specification for Elastomeric Joint Sealants
- E. ASTM C 1193 – Standard Guide for Use of Joint Sealants
- F. ASTM D1056 – Standard Specification for Flexible Cellular Materials - Sponge or Expanded Rubber
- G. SWRI (Sealant, Waterproofing and Restoration Institute) - Sealant and Caulking Guide Specification.
- H. California South Coast Air Quality Management District (SCAQMD) #1168

1.6 SUBMITTALS

- A. Submit manufacturer's detailed technical data for materials, fabrication, and installation, including catalog cuts of bond breakers, backer rods, and accessories.
 - 1. Submit full color samples for Architect selection.
- B. Certificates from the manufacturers of joint sealants attesting that their products comply with the specification and are suitable for the use indicated.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials to the project site in original unopened containers or bundles with labels indicating manufacturer, product name and designation, color, expiration period for use, pot life, curing time, and mixing instructions for multi-component materials.
- B. Store and handle materials in compliance with manufacturer's requirements to prevent their deterioration or damage due to moisture, temperature, contaminants, or other causes.

1.8 WARRANTY

- A. The Contractor shall furnish written guarantee that work executed under this section is free from defects of material and workmanship for a period of 5-years from date of substantial completion of the entire project.
 - 1. Include coverage that he will immediately and at his own expense, repair and replace all such defects as may develop during the term of this guarantee.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturer shall be one of the following however products of other manufacturers will be considered for acceptance provided they equal or exceed the material requirements and functional qualities of the specified product.
 - 1. DAP, Inc., Dayton, Ohio
 - 2. Dow Corning Corp., Midland, Michigan
 - 3. General Electric Co., GE Silicones, Waterford, New York
 - 4. Pecora Corp., Harleysville, Pennsylvania
 - 5. Sonneborn Building Products Div., Minneapolis, Minnesota
 - 6. Tremco, Inc., Beachwood, Ohio
 - 7. Hilti Construction Chemicals, Tulsa, Oklahoma
- B. Contractor may request other products or manufacturers for acceptance provided they equal or exceed the material requirements and functional qualities of the specified product.
 - 1. The "Substitution Request Form" and complete technical data for evaluation must accompany requests for Architect's approval.
 - 2. All materials for evaluation must be received at least 10-days prior to bid due date.
- C. Toxicity/IEQ:
 - 1. Comply with applicable regulations regarding toxic and hazardous materials, and as specified. Sealants must meet or exceed requirements of Bay Area Resources Board, reg. 8, rule 51.
 - 2. Sealants containing aromatic solvents, fibrous talc, formaldehyde, halogenated solvents, mercury, lead, cadmium, chromium and their compounds, are not permitted.
- D. Backer Rods: Provide composite backer rods.

2.2 MATERIALS

A. General

1. The term “Acceptable Standard” when used within this Section, refers to the manufacturer and product listed, specified as to type and quality required for this project.
2. Contractor shall supply a single resource responsibility for joint sealer materials.
 - a. Obtain joint sealer materials from a single manufacturer for each different product required.
3. Compatibility: Provide joint sealers, joint fillers, and other related materials that are compatible with one another and with joint substrates under conditions of service and application, as demonstrated by sealant manufacturer based on testing and final experience.

B. Caulking Compounds (Acrylic Latex Sealant)

1. Latex rubber modified, acrylic emulsion polymer sealant compound; manufacturer’s standard, one part, non-sag, mildew resistant, acrylic emulsion sealant complying with ASTM C 834, formulated for accepting paint. (Product recommended for exposed interior locations involving joint movement of less than 5%).
2. Acceptable Standard
 - a. “Sonolac”; Sonneborn Building Products, Inc
 - b. “Acrylic Latex Caulk 832”; Tremco, Inc
 - c. “Acrylic Latex Caulk with Silicone”; DAP

C. One-Part Elastomeric Sealant (Silicone)

1. One component elastomeric sealant complying with ASTM C 920, Class 25, Type NS (non-sag), unless manufacturer recommends Type S (self-leveling) for the application shown (general caulking , glazing applications).
 - a. Acceptable Standard
 - i) “Dow Corning 791; Dow Corning Corp.
 - ii) “Omniseal”; Sonneborn Building Products, Inc.
 - iii) “Spectrem 2; Tremco, Inc.
2. One component mildew resistant silicone sealant used around countertops, backsplashes, and other wet interior locations.
 - a. Acceptable Standard
 - i) “Dow Corning 786”, Dow Corning Corp.
 - ii) “Sanitary 1700”; General Electric
3. One-component high movement joints (+100/-50) use sealants in locations indicating high movement.
 - a. “Dow Corning 790”; Dow Corning Corp.
 - b. “Spectrem 1”; Tremco, Inc.

D. One-part self-leveling polyurethane sealant (for traffic areas)

1. One component polyurethane self-leveling sealant, complying with ASTM C 920, Type S, Grade P, Class 25.
 - a. Acceptable Standard
 - i) “Sonolastic SL 1”; Sonneborn Building Products, Inc.
 - ii) “NR-201 Urexpant”; Pecora Corp.
2. Two component polyurethane self-leveling sealant, complying with ASTM C920, Type M, Grade P, Class 25.
 - a. Acceptable Standard
 - i) “Sonolaastic SL 2”; Sonneborn Building Products, Inc.
 - ii) “NR-200 Urexpant”: Pecora Corp.
 - iii) “THC900/THC901”: Tremco, Inc.

- E. Flexible Polyurethane Security Sealant (for use on interior joints, perimeter of fixtures, penetrations, vents, doors, windows and similar openings)
 - 1. Two component polyurethane sealant, complying with ASTM C 920, Grade NS, Class 12.5, with a Shore A Hardness of 55, Type M.
 - a. Acceptable Standard
 - i) “Dynaflex”, Pecora Corp.
 - ii) “Ultra”, Sonneborn Building Products, Inc.
- F. Miscellaneous Materials
 - 1. Provide joint cleaner and joint primer sealer as recommended by the sealant or caulking compound manufacturer.
 - 2. Sealant backer rod shall be compressible rod stock, polyethylene foam; polyethylene jacketed polyurethane foam, butyl rubber foam, neoprene foam, or other materials as recommended by sealant manufacturer.
 - a. Where plans indicate a 2" building expansion joint, provide an expanding foam secondary sealant, “BackerSeal” as manufactured by Emseal Joint Systems, Ltd., or Apolytite Standard as manufactured by Polytite Manufacturing Corporation, behind sealant in lieu of standard backer rod.
 - 3. Primer: Provide type recommended by joint sealer manufacturer where required for adhesion of sealant to joint substrates indicated, as determined from preconstruction joint sealer substrate tests and field tests.
 - 4. Cleaners for Nonporous Surfaces: Provide non-staining, chemical cleaners of type acceptable to manufacturer of sealant and sealant backing materials, which are not harmful to substrates and adjacent nonporous materials, and which do not leave oily residues or otherwise have a detrimental effect on sealant adhesion or in service performance.
 - 5. Masking Tape: Provide non-staining, non-absorbent type compatible with joint sealants and to surfaces adjacent to joints.

PART 3 EXECUTIONS

3.1 INSPECTION

- A. This Contractor shall notify the General Contractor, when he has completed his work and is ready for A/E inspection.
- B. Verify that substrate surfaces and joint openings are ready to receive work.
- C. Verify that joint backing and release tapes are compatible with sealant.
- D. Clean and prime all joints in accordance with manufacturer’s instructions.
- E. Remove loose materials and foreign matter that might impair adhesion of sealant.

3.2 INSTALLATION

- A. Install all products in strict accordance to all manufacturers' recommendations.
- B. Measure joint dimensions and size materials to achieve required width/depth ratios.
- C. Install joint backing to achieve a neck dimension no greater than 1/3 the joint width.
- D. Install bond breaker where joint backing is not used.
- E. Install sealant free of air pockets, foreign embedded matter, ridges, and sags.
- F. Apply sealant within recommended application temperature ranges.
 - 1. Consult manufacturer when sealant cannot be applied within ranges.
- G. Tool joints concave.
- H. Tilt-up concrete wall panel joints; clean joints free of moisture, dust, sealers and form release agents using a wire brush and rag without solvents to clean concrete.

1. Exterior wall joints
 - a. Seal both sides (outside and inside) with an exterior joint system consisting of a foam-backer rod (set into the joint for the entire length of the joint cavity) and cover with a urethane or other acceptable joint sealant material (sealant depth should be one-half the joint width, max. ½” depth) tool joint material in place.
 - b. Protect sealant material during painting of walls.
2. Interior wall joints
 - a. In fire resistance rated walls
 - i) Seal both sides of joint with a fire-stopping sealant, encapsulating the ceramic blanket protection material, finish joint similar to that of the exterior wall joint described above.
 - b. In non-fire resistance rated walls
 - i) Seal exposed concrete panel joints
 - ii) Concealed (furred) concrete panel joints need not be sealed

3.3 ADJUSTMENT AND CLEANING

- A. After installation, thoroughly clean all exposed surfaces and restore all damaged material to its original condition, or replaced with new material.

3.4 SITE ENVIRONMENTAL PROCEDURES

- A. Indoor Air Quality:
 1. Temporary ventilation: Provide temporary ventilation during work of this Section.
 - a. Coordinate interior application of joint sealants with interior finishes schedules.

END OF SECTION

DIVISION

8

OPENINGS

SECTION 08 06 00
DOOR AND FRAME SCHEDULE NOTES AND LEGEND

1.1 General Notes and Legend

A. Legend

- | | | | |
|----|-----|---|----------------------|
| 1. | AL | - | Aluminum |
| 2. | GL | - | Glass |
| 3. | HM | - | Hollow Metal - Steel |
| 4. | SS | - | Stainless Steel |
| 5. | STL | - | Steel |
| 6. | WD | - | Wood |

B. Fire Rating in Minutes

- | | | | |
|----|-----|---|--|
| 1. | 20 | - | 20 Minute |
| 2. | 45 | - | C Label 3/4 Hour (interior); E label 3/4 hour (exterior) |
| 3. | 60 | - | B Label 1 Hour |
| 4. | 90 | - | B Label 1-1/2 Hour (interior); D label 1-1/2 hour (exterior) |
| 5. | 180 | - | A Label 3 Hour |

C. Door sizes are indicated thus: 21070 (2'-10"W. x 7'-0"H.) Door sizes as shown on Door and Frame Schedule are nominal. Approved shop drawings must be distributed between trades to coordinate and verify actual door and frame sizes.

D. Door thickness shall be 1-3/4 inch, unless noted otherwise.

E. (HM) hollow metal doors and frames shall be as specified in Section – Steel Doors and Frames.

F. Hardware sets indicated on schedule are specified under Section – Door Hardware.

G. Type and thickness of glazing for doors and frames shall be as specified in Section – Glazing.

H. UL frame anchors required for labeled openings.

I. For door and frame elevations see Drawing sheet A-104.

J. Closers shall be the last hardware item installed. Installing Contractor shall verify maximum degree of door swing that field conditions will allow and install closers accordingly regardless of swing shown on Drawings.

K. Except when restricted by individual published listings, it is permissible for a fire door assembly to consist of the labeled, listed, or classified components of different organizations that are acceptable to the authority having jurisdiction.

L. Steel astragals and wood door metal vision light frame shall be painted. Color to be as selected by the Architect.

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- M. Provide knurled levers on all doors to hazardous areas. Tactile material is not acceptable.
- N. Contractor shall provide shims for wall mounted wall stop/holders where the trim (pull, lever, or knobs) extend beyond the engaged depth of wall holder.
- O. Door specified with kickplates and vertical rod exit devices – cut kickplate short of vertical rod bottom latch case.
- P. Door under cut ½ maximum inches from finished floor.

The following information has been noted on the Door and Frame Schedule under the remarks column:

- A. Refer to the notes under the Remarks Column on the Door Schedule.

END OF SECTION

SECTION 08 41 13
ALUMINUM STOREFRONT SYSTEM

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

- A. The provisions of the General Conditions, Supplementary Conditions, Drawings, Specifications, and the Sections included under Division 1, General Requirements and References are included as a part of this Section as though bound herein.

1.2 SUMMARY

- A. Provide labor, materials, services, and equipment necessary to furnish and install work as indicated and as specified herein, which includes, but is not limited to:
 - 1. Aluminum storefront door and window systems.
 - 2. Hardware for aluminum doors will be furnished under Specification Section–Door Hardware, except continuous gear hinges, but installed under this Section.

1.3 REFERENCES

- A. AA (Aluminum Association) – Designation System for Aluminum Finishes
- B. AAMA Series number 11 – Design Wind Loads for Buildings and Boundary Layer Wind Tunnel Testing
- C. AAMA 101 – Standard Specification for Window, Doors, and Skylights
- D. AAMA 200 – Standard Practice for the Installation of Windows with Frontal Flanges for Surface Barrier Masonry Construction
- E. AAMA 502-08 – Voluntary Specification for field Testing of Newly Installed Fenestration Products
- F. AAMA 511 – Voluntary Guideline for Forensic Water Penetration Testing of Fenestration Products
- G. AAMA 606.1 – Voluntary Guide Specifications and Inspection Methods for Integral Color Anodic Finishes for Architectural Aluminum
- H. AAMA 607.1 – Voluntary Guide Specification and Inspection Methods for Clear Anodic Finishes for Architectural Aluminum
- I. AAMA 608.1 – Voluntary Guide Specification and Inspection Methods for Electrolytically Deposited Color Anodic Finishes for Architectural Aluminum
- J. AAMA 701/702 – Combined Voluntary Specifications for Pile Weather-stripping and Replaceable Fenestration Weatherseals
- K. AAMA 1503.1 – Voluntary Test Method for Thermal Transmittance and Condensation Resistance of Windows, Doors and Glazed Wall Sections
- L. ASCE 7 – Minimum Design Loads for Buildings and other Structures
- M. ASTM A123/A123M – Standard Specification for Zinc (Hot Dip Galvanized) Coatings on Iron and Steel Products
- N. ASTM B209 – Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate
- O. ASTM B221 – Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes
- P. ASTM C509 – Standard Specification for Elastomeric Cellular Preformed Gasket and Sealing Material

- Q. ASTM D2000 – Standard Classification System for Rubber Products in Automotive Applications
- R. ASTM D2287 – Standard Specification for Non-rigid Vinyl Chloride Polymer and Copolymer Molding and Extrusion Compounds
- S. ASTM E283 – Standard Test Method for Determining the Rate of Air Leakage Through Exterior Windows, Curtain Walls and Doors Under Specified Pressure Differences Across the Specimen
- T. ASTM E330 – Standard Test Method for Structural Performance of Exterior Windows, Doors, Skylights and Curtain Walls by Uniform Static Air Pressure Difference
- U. ASTM E331 – Standard Test Method for Water Penetration of Exterior Windows, Skylights, Doors, and Curtain Walls by Uniform Static Air Pressure Difference
- V. ASTM E1105 – Standard Test Method for Field Determination of Water Penetration of Installed Exterior Windows, Skylights, Doors, and Curtain Walls by Uniform or Cyclic Static Air Pressure Difference
- W. ASTM F588 – Standard Test Methods for Measuring the Forced Entry Resistance of Window Assemblies, Excluding Glazing Impact
- X. FED L-S-125B – Screening, Insect, Nonmetallic
- Y. FED RR-W-365A – Wire Fabric (Insect Screening)
- Z. FBC – Florida Building Code 6th Edition
- AA. Current Florida Building Code Product Approval

1.4 SUBMITTALS

- A. Product Data: For each product specified include details of construction relative to materials, dimensions of individual components, profiles, manufacturer's specifications and catalog cuts, and finishes. Provide structural test reports that meet all hurricane and impact resistant codes and requirements.
- B. Shop drawings shall show elevations of each door type, door construction details and methods of assembling sections, hardware locations and installation methods, dimensions, and shapes of materials, anchorage and fastening methods, weatherstripping, and finish requirements.
 - 1. Provide schedule of doors and frames using same reference numbers for details and openings as those on Contract Drawings and Schedules.

1.5 PERFORMANCE REQUIREMENTS FOR EXTERIOR STOREFRONT AND WINDOW SYSTEMS

- A. Performance Requirements: Provide aluminum curtain wall systems that comply with performance requirements indicated, as demonstrated by testing manufacturer's assemblies in accordance with South Florida Building Code Test Protocols TAS 201, TAS 202 and TAS 203.
 - 1. Air Infiltration: Completed storefront systems shall have 0.06 CFM/FT² (1.10 m³/h·m²) maximum allowable infiltration when tested in accordance with ASTM E 283 at differential static pressure of 6.24 psf (299 Pa).
- B. Water Infiltration: No uncontrolled water when tested in accordance with ASTM E 331 at test pressure differential of: 12 PSF (575 Pa) (or when required, field tested in accordance with AAMA 503). Fastener Heads must be seated and sealed against Sill Flashing on any fasteners that penetrate through the Sill Flashing.
- C. Wind Loads: Completed storefront system shall withstand wind pressure loads normal to wall plane indicated on structural drawings.

- D. Deflection: Maximum allowable deflection in any member when tested in accordance with ASTM E 330 with allowable stress in accordance with AAMA Specifications for Aluminum Structures.
 - 1. Without Horizontals: $L/175$ or $3/4"$ (19.1mm) maximum.
 - 2. With Horizontals: $L/175$ or $L/240 + 1/4"$ (6.4mm) for spans greater than 13'-6" (4.1m) but less than 40'-0" (12.2m).
- E. Thermal Movement: Provide for thermal movement caused by 180 degrees F. (82.2 degrees C.) surface temperature, without causing buckling stresses on glass, joint seal failure, undue stress on structural elements, damaging loads on fasteners, reduction of performance, or detrimental effects.

1.6 PERFORMANCE REQUIREMENTS FOR INTERIOR STOREFRONTS

- A. Deflection: Maximum allowable deflection in any member when tested in accordance with ASTM E 330 with allowable stress in accordance with AAMA Specifications for Aluminum Structures.
 - 1. Without Horizontals: $L/175$ or $3/4"$ (19.1 mm) maximum.
 - 2. With Horizontals: $L/175$ or $L/240 + 1/4"$ (6.4 mm) for spans greater than 13'-6" (4.1 m) but less than 40'-0" (12.2 m).
- B. Thermal Movement: Provide for thermal movement caused by 180 degrees F. (82.2 degrees C.) surface temperature, without causing buckling stresses on glass, joint seal failure, undue stress on structural elements, damaging loads on fasteners, reduction of performance, or detrimental effects.

1.7 QUALITY ASSURANCE

- A. Doors shall be provided to conform to the Florida Building Code. These requirements supersede Technical Specifications in this Section.
- B. Provide test reports from AAMA Accredited Laboratories.
- C. System shall conform to large and small impact requirements.

1.8 PROJECT CONDITIONS

- A. Field Measurements: Check openings by accurate field measurement before fabrication. Show recorded measurements on shop drawings. Coordinate fabrication schedule with construction progress to avoid delay of the work.

1.9 EHPA REQUIREMENTS (for use only if an EHPA designated area is indicated)

- A. Storefront systems that are indicated to be provided in an EHPA shelter area shall be designed and modified if necessary and installed to comply with structural design loads and all applicable codes. Documentation shall be provided indicating compliance with requirements.

PART 2 – PRODUCTS

2.1 MANUFACTURERS

- A. Basis of Design Product: Subject to compliance with requirements provide the following manufacturer.
 - 1. YKK North America

- B. The following manufacturers are acceptable provided they equal or exceed the material requirements and functional qualities of the basis of design product.
1. Tubelite Division of Indal, Inc., Reed City, Michigan
 2. Wausau Metals Corp., Wausau, Wisconsin
 3. EFCO Corp., Monett, Missouri

2.2 STOREFRONT SYSTEM

- A. Basis of Design
1. Storefront Door
 - a. Basis of Design: YHS 50H medium stile impact system with insulated impact resistant glazing.
 - b. FPA-FL #16554.4.
 2. Storefront Wall and Window System
 - a. Basis of Design: YHS 50 TU, thermally broken impact system with insulated impact resistant glazing.
 - b. FPA – FL #14218.10.

2.3 MATERIALS AND CONSTRUCTION

- A. Sections shall be extruded from 6063-T5 aluminum alloy (A.S.T.M. B221 Alloy GS 10A T5).
- B. Major portions of the door stiles shall be .125 inch in thickness, and glazing molding shall be .050 inch thick.
 1. Mullions shall be as detailed on Drawings and as required for type of door being furnished.
- C. Screws, miscellaneous fastening devices, and internal components shall be of stainless steel, plated, or corrosion-resistant materials of sufficient strength to perform the functions for which they are used.
- D. Wide Stile: Vertical stiles shall be 5 inches, top rail 6-1/2 inches, and bottom rail 10 inches. Corner construction shall consist of both sigma deep penetration and sigma fillet welds and mechanical fastening. Inside joints between the top rail and vertical stiles shall have a continuous bead of sealant. Interior glazing stops shall be square snap-in type with neoprene bulb type glazing. Square stops on exterior side shall be lock-in tamperproof type. No exposed screws shall be required to secure stops.
- E. Door shall be weatherstripped on 3 sides with metal backed pile cloth installed in the door and/or frame. An adjustable weatherstrip astragal with stainless steel backing shall be provided at the meeting stiles of a pair of doors.
 1. Provide compression weatherstripping at fixed stops. At other locations, provide sliding weatherstripping retained in adjustable strip mortised into door edge.
- F. Doors shall have a portion of the top rail closed for mounting security door contacts.
- G. Where aluminum doors are scheduled to receive a concealed overhead stop, the jamb bracket shall be mortised into the frame and the channel mortised into the top of the door. The cut for the arm on the stop side of the door shall not be cut below the stop strip of the frame.
- H. All dissimilar metals must be properly insulated to prevent galvanic action.
- I. All exposed fasteners shall be aluminum or stainless steel.
- J. All aluminum extrusions shall have a minimum wall thickness of .080" and comply with ASTM B221 (ASTM B221M), 6063-T5 Aluminum Alloy.
- K. All units to be "dry-glazed" with EPDM gasket to accept impact rated glass.

2.4 SILL PAN AT EXTERIOR STOREFRONT

- A. Provide .125 inch aluminum sill pan with ¼" upturn at inside edge.
- B. Finish shall match storefront system.

2.5 ENTRANCE DOOR HARDWARE

- A. General:
 - 1. Provide hardware that is compliance with the Miami Dade NOA and/or Florida Product Approval.
 - 2. Opening-Force Requirements:
 - a. Egress Doors: Not more than 8.5 lbf to open the door to its minimum required width.
- B. Opening-Force Requirements:
 - 1. Latches and Exit Devices: Not more than 5 lbf required to release latch.
- C. Pivot Hinges: BHMA A156.4, Grade 1.
 - 1. Offset-Pivot Hinges: Provide top, bottom, and intermediate offset pivots at each door leaf.
- D. Manual Flush Bolts: BHMA A156.16, Grade 1.
- E. Mortise Auxiliary Locks: BHMA A156.5, Grade 1.
- F. Panic Exit Devices: BHMA A156.3, Grade 1, listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for panic protection, based on testing according to UL 305.
- G. Cylinders: To match cylinder manufacturer as specified in 08 71 00 "Door Hardware".
- H. Strikes: Provide strike with black-plastic dust box for each latch or lock bolt; fabricated for aluminum framing.
- I. Operating Trim: BHMA A156.6.
- J. Closers: BHMA A156.4, Grade 1, with accessories required for a complete installation, sized as required by door size, exposure to weather, and anticipated frequency of use; adjustable to meet field conditions and requirements for opening force.
- K. Door Stops: BHMA A156.16, Grade 1, floor or wall mounted, as appropriate for door location indicated, with integral rubber bumper.
- L. Weather Stripping: Manufacturer's standard replaceable components.
 - 1. Compression Type: Made of ASTM D 2000, molded neoprene, or ASTM D 2287, molded PVC.
 - 2. Sliding Type: AAMA 701, made of wool, polypropylene, or nylon woven pile with nylon-fabric or aluminum-strip backing.
- M. Weather Sweeps: Manufacturer's standard exterior-door bottom sweep with concealed fasteners on mounting strip.
- N. Silencers: BHMA A156.16, Grade 1.
- O. Thresholds: BHMA A156.21, raised thresholds beveled with a slope of not more than 1:2, with maximum height of 1/2 inch.

2.6 FABRICATION

- A. General: Fabricate components that, when assembled, will have accurately fitted joints with ends coped or mitered to produce hairline joints free of burrs and distortion. After fabrication, clearly mark components to identify their locations in Project according to shop drawings.
- B. Forming: Form shapes with sharp profiles, straight and free of defects or deformations, before finishing.

- C. Entrances: Fabricate door framing in profiles indicated. Reinforce as required to support imposed loads. Factory-assemble door units and factory install hardware to greatest extent possible. Reinforce door units as required for installing hardware indicated. Cut, drill, and tap for factory installed hardware before finishing components.
 - 1. Interior Doors: Provide ANSI/BHMA A156.16 silencers at stops to prevent metal to metal contact. Provide 3 silencers on strike jamb of single door frames and 2 silencers on head of double door frame.
- D. Storefront frames: Unless otherwise noted on drawings.
 - 1. Depth of frame as required for applicable wind loading.
 - 2. Frame components shall be shear block construction.

2.7 ALUMINUM FINISHES

- A. Clear Anodic Finish: AAMA 611, AA-M12C22A31, Class II, 0.010 mm or thicker.

PART 3 – EXECUTION

3.1 PREPARATION

- A. Openings for aluminum entrances and storefronts shall be prepared to the proper size, plumb, square, level, and in the proper location and alignment as shown on the Architect's Drawings and the final shop drawings.

3.2 INSTALLATION

- A. Aluminum doors shall be securely installed according to the manufacturer's recommendations, and operating hardware shall be checked for proper function and adjustment.
- B. Install entrances plumb and true in alignment with established lines and grades without warp or rack. Lubricate operating hardware and other moving parts according to hardware manufacturer's written instructions.
 - 1. Install surface mounted hardware according to manufacturer's written instructions using concealed fasteners to greatest extent possible.
- C. Install glazing to comply with requirements of Section – Glazing, unless otherwise indicated.
- D. Do not cut aluminum frame stop strip when mounting exit devices and closers.
- E. Provide conduits at frames and card reader locations to accommodate the future installation of card readers at doors indicated on the finish schedule. Conduits shall be run to 6" above the finished ceiling height and accessible to ceiling space.

3.3 ADJUSTING AND CLEANING

- A. Adjust doors and hardware to provide tight fit at contact points and weatherstripping, smooth operation, and weathertight closure.

3.4 PROTECTION

- A. Protect the aluminum doors and their finish against damage from construction activities and harmful substances. Clean the aluminum surfaces as recommended for the type of finish applied.

END OF SECTION

SECTION 08 71 00
DOOR HARDWARE

PART 1 GENERAL

1.1 RELATED DOCUMENTS

- A. The provisions of the General Conditions, Supplementary Conditions, Drawings, Specifications, and the Sections included under Division 1, General Requirements and References are included as a part of this Section as though bound herein.

1.2 SECTION INCLUDES

- A. Provide labor, material, services, and equipment necessary to furnish and install work as indicated and as specified herein, which includes, but is not limited to:
 - 1. Hardware for wood and hollow steel doors.
 - 2. Lock Cylinders for gates, folding partitions, wire cages, and doors.
 - 3. Thresholds.
 - 4. Gaskets.
 - 5. Screws, bolts, expansion shields and related prep work.
 - 6. Hardware layout templates.
 - 7. Keys key cabinet and Knox Box.

1.3 RELATED WORK

- A. Section 01 25 13 – Product Substitution Procedures.
- B. Section 01 31 00 – Project Coordination.
- C. Section 01 33 00 – Submittal Procedures.
- D. Section 01 42 00 – References.
- E. Section 01 45 00 – Quality Control.
- F. Section 01 74 00 – Cleaning and Waste Management.
- G. Section 01 78 00 – Closeout Submittals.
- H. Section 08 11 13 – Hollow Metal Doors and Frames.
- I. Section 08 14 29 – Prefinished Wood Doors.
- J. Section 08 41 00 – Entrances and Storefronts.

1.4 REFERENCES

- A. See Section 01 42 00 – References for additional reference standards, abbreviations, definitions and acronyms.
- B. ANSI A117.1 – Specifications for Making Buildings and Facilities Accessible to and Usable by Physically Handicapped People.
- C. ANSI/NFPA 80 – Fire Doors and Windows.
- D. AWI – Architectural Woodwork Institute.
- E. BHMA – Builders' Hardware Manufacturers Association.
- F. DHI – Door and Hardware Institute.
- G. Florida Fire Prevention Code.
- H. NAAMM – National Association of Architectural Metal Manufacturers.
- I. NFPA 101 – Life Safety Code, Current Edition.
- J. SDI – Steel Door Institute.

K. Florida Building Code (FBC), 5th Edition.

1.5 COORDINATION

A. Coordinate hardware installation with other affected trades in accord with Section 01 31 00 – Project Coordination.

1.6 QUALITY ASSURANCE

- A. Manufacturers: Company shall specialize in manufacturing door hardware with five years continuous experience.
- B. Hardware Supplier: Company shall specialize in supplying institutional door hardware with five years continuous documented experience, approved by manufacturer.
- C. Hardware Supplier Personnel: Employ Architectural Hardware Consultant (AHC) on project.

1.7 REGULATORY REQUIREMENTS

- A. Conform to Florida Building Code for requirements applicable to fire rated doors, frames, and accessibility for physically disabled.
- B. Conform to Florida Fire Prevention Code and applicable sections of NFPA 101.

1.8 CERTIFICATIONS

- A. Architectural Hardware Consultant shall inspect complete installation and certify that hardware and installation has been furnished and installed in accord with manufacturer's printed instructions and as specified.
- B. Provide two copies of certifications to Architect.

1.9 SUBMITTALS

- A. Submit schedules, samples, parts lists, templates, installation instructions and product data per Section 01 33 00 – Submittals.
- B. Submittals shall identify each door and each set number following numbering system noted on Drawings.
- C. Manufacturing order shall not be placed until hardware schedule has been submitted and reviewed by Architect.
- D. Furnish templates to facilitate work schedule.
- E. Indicate locations and mounting heights of each type of hardware.
- F. Submit samples of hinge, latch set, exit device, door closer, thresholds, illustrating style, color and finish.
- G. Project samples may be incorporated in Work.
- H. Submit manufacturer, supplier, fabricator and installer's qualifications in accord with Section 01 33 00 – Submittal Procedures.

1.10 OPERATION AND MAINTENANCE DATA

- A. Submit operation and maintenance data in accord with Section 01 78 00 – Closeout Submittals.
- B. Include data on operating hardware, and inspection procedures related to preventative maintenance.

1.11 DELIVERY, STORAGE, AND HANDLING

- A. Deliver, store, and protect products in original packaging to site in accord with Section 01 66 00 – Project Storage and Handling Requirements.
- B. Hardware Packaging
 - 1. Items shall be individually labeled and identified with door opening code and hardware group to match hardware schedule.
 - 2. Each item shall identify door location by number identified on Door Schedule.
- C. Hardware manufacturers shall deliver via security shipping following items to District Maintenance Dept., 2485 SE Dixie Hwy., Stuart, FL 34996:
 - 1. Two copies of factory key biting schedule.
 - 2. Permanent building keys and construction key voiding devices.
- D. Protect hardware from theft by cataloging and storing in secured area.

1.12 WARRANTY

- A. Provide five-year warranty period in accord with Section 01 78 00 - Closeout Submittals for locksets, latch sets, exit devices hinges and items listed in the hardware schedule excluding overhead door closers.
- B. Provide ten-year warranty period in accord with Section 01 78 00 - Closeout Submittals for overhead door closers.

1.13 MAINTENANCE MATERIALS

- A. Provide special wrenches and tools applicable to different or special hardware component.
- B. Provide maintenance tools and accessories supplied by hardware component manufacturer.

PART 2 – PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

- A. Manufacturers not listed may submit requests for substitution except as noted in accord with Section 01 25 13 – Product Substitution Procedures.
- B. Obtain each kind of hardware from one manufacturer.
- C. Acceptable products and manufacturers are listed below:
 - 1. Hinges: Ives, Hager, Stanley, Bommer.
 - 2. Locks and Latches: Best Access (No Substitution Permitted).
 - 3. Cylinders, Keys, Keying: Corbin/Russwin (No Substitution Permitted).
 - 4. Exit Devices: Von Duprin (No Substitution Permitted).
 - 5. Removable Mullions: Von Duprin (No Substitution Permitted).
 - 6. Door Closers: LCN (No Substitution Permitted).
 - 7. Overhead Stops/holders: Glen Johnson, Rixon.
 - 8. Wall/Floor Stops/Flush Bolts: Ives, Rockwood, Glen Johnson.
 - 9. Kick Plates: Ives, Rockwood, Quality.
 - 10. Thresholds/Weatherstripping: National Guard, Zero, Pemko.
 - 11. Silencers: Ives, Rockwood, Quality, Glen Johnson.
 - 12. Push/Pulls: Quality, Rockwood.
 - 13. Key Cabinet: Lund, Key Control, Telkey.

2.2 HARDWARE FINISH

- A. Hardware shall have the following finishes:
 - 1. Exterior Hinges: Stainless Steel (32D).
 - 2. Interior Hinges/Locks/Exit Devices/Overhead Holders: Satin Chrome (26D).
 - 3. Door Closers: Aluminum.
 - 4. Flat Goods: Stainless Steel (32D) or Satin Chrome (26D).
 - 5. Thresholds: Mill Finish Aluminum.

2.3 HINGES AND PIVOTS

- A. Exterior butts shall be stainless steel (32D). Butts on all out-swinging doors shall be furnished with non-removable pins (NRP). Size: 4½" wide x 4½" high, for exterior doors up to 42" wide and heavy weight 4½" wide x 4½" high hinges for doors over 42" wide.
- B. Interior butts shall be steel, standard weight 4½" wide x 4½" high hinges doors up to 42" wide and heavy weight 4½" wide x 4½" high hinges for doors over 42" wide.
- C. Doors less than 5'-0" high shall have two (2) butts. Furnish one (1) additional butt for each 2'-6" of height or fraction thereof.

2.4 KEYING

- A. Pre-Order Meeting: Hardware supplier shall meet with District's Maintenance Lock Dept. Representative to establish keying order before lock order is placed.
- B. Locks shall be construction master keyed using split key method keyed to School District's restricted keyway.
- C. Hardware supplier shall meet with District's Maintenance Lock Dept. Representative will establish final count of locks and cylinders and transmit release order to Best Access Systems Lock Company for production in amounts established with Hardware Supplier.
- D. Construction keys in following quantities:
 - 1. 12 master keys
- E. Supply permanent keys in following quantities:
 - 1. Six keys for each lock with maximum of 12 keys of keyed alike sets.
 - 2. Five master keys for each building or area grouping. Key groups include:
 - a. Auditorium/Multipurpose/Stage (including adjacent support spaces).
 - b. Food Service (including Kitchen and adjacent support spaces).
 - c. Media Center (including adjacent support spaces).
 - d. Administrative Offices (including adjacent support spaces).
 - e. Classrooms, Resource Rooms and Labs (including adjacent storage area) subdivided into subgroups by floor level or building(s).
 - f. Mechanical/Electrical Rooms.
 - g. Custodial/Receiving Areas.
 - 3. Grand master keys shall be supplied based on size of facility as follows:
 - a. Five (5) Grandmaster keys for Elementary Schools and Ancillary Projects.
 - b. Ten (10) Grandmaster Keys for Middle Schools.
 - c. Twenty (20) Grandmaster keys for High Schools.
 - 4. Keys shall be stamped "DO NOT DUPLICATE".
- F. Key Function
 - 1. Supply locksets with following key functions:

Location	Function
a. Passage	N

- b. Privacy L
- c. Classroom/Office R
- d. Storage/Mechanical Rm D
- e. Electronic Lever Lockset DEL

2.5 KEY CABINETS

- A. Key Cabinet: Lund 1203 with pin tumbler lock.
- B. Cabinet Size: Size for project keys plus 10% spare capacity.
 - 1. Horizontal metal strips for key hook labeling with clear plastic strip cover over labels.
 - 2. Finish: Baked enamel finish, gray color.
- C. Attach key legend in key cabinet with 5-way cross-reference system indicating keyset number, FISH Room number, key code number, hook number and key description.

2.6 KEY VAULT

- A. Recessed Key Vault: Knox Company, Series 4400 Know-Vault, Model 4400-R.
- B. Key Vault shall be keyed to Owner's key system and will be Owner provided.
- C. Manufacturer: Knox Company. Key box shall meet criteria of fire department having jurisdiction at project location.

2.7 CLOSER/MAGNETIC HOLD OPEN SYSTEM

- A. LCN, Series No: 4041.
- B. Furnish closer/electromagnet compete with required accessories necessary for complete working system.
- C. Furnish two-year warranty.

2.8 LOCKSETS

- A. Lever Lock: Best Access Lock Company, heavy duty cylindrical type, Best 93K Series, Lever Design 15D.
- B. Electronic Lever Lock: Best Access Lock Company, heavy duty cylindrical type, Best 93KW7DEU, Lever Design 15D.

2.9 EXIT DEVICES

- A. Von Duprin 98 Series in types and functions listed.
- B. Devices shall be listed under "Panic Hardware" in accident equipment list of Underwriter Laboratories. Fire ratings shall be attached where indicated per UL requirements.
- C. Exit devices shall be tested per ANSI/BHMA A156.3 by BHMA certified testing laboratory. Provide written certification of 1,000,000 cycle testing per Section 01 33 00 – Submittals.
- D. Supply locksets with following key functions:

Location	Function
1. Non Fire Rated	19R NLP, 19R DT, or 19R BE with 560 strike as required.
2. Fire Rated	F19R SE or F19R BE with 570 strike as required.
3. Non Fire Rated (Pairs)	19R NLP, 19R DT, or 19R BE with 570 strike as required.

- 4. Fire Rated (Pairs) F19R SE or F19R BE with 570 strike and F4023 mullion as required.
- 5. Fire Rated (Electronic) ELX981-F X 992L X 06 X 26D.
- 6. Non-fire Rated (Electronic) SD ELL X 98NL X 990NL X 06 X 26D.
- 7. Power Supply PS873B X 4TD
- E. Electrical Power Transfer: EPT-10 X SP28.
- F. Surface strikes shall be roller type with plate underneath to prevent movement and dead-latching feature to prevent latchbolt tampering.

2.10 DOOR CLOSERS

- A. Door closers shall be LCN 4040/4041 Series with non-ferrous covers, forged steel arms, separate valves for adjusting backcheck closing and latching cycles and adjustable spring to provide up to 50% increase in spring power.
- B. Furnish closers with parallel arm mounted on door openings into egress spaces, mounted to permit 180 degree door swing where wall conditions permit, and have non-hold open arms unless otherwise noted.
- C. Door closer cylinders shall be high strength cast iron construction.
- D. Door closers shall be tested in accord with ANSI/BHMA A156.4 by BHMA certified testing laboratory and attest in writing that closers have successfully completed one million cycles.
- E. Door closers shall utilize temperature stable fluid capable of withstanding temperature ranges of 120° F (49°C) to -30°F (-34°C), without requiring seasonal adjustment of closer speed to properly close door.
- F. Closers for fire rated doors shall be provided with temperature stabilizing fluid complying with UCB 7-2 (1997) and UL 10C.
- G. Door closers shall incorporate tamper resistant non-critical screw valves of V-slot design to reduce clogging from particles within closer.
- H. Closers shall have separate and independent screw valve adjustments for latch speed, general speed, and hydraulic backcheck.
- I. Backcheck shall be located to effectively slow swing of door at minimum of 10 degrees in advance of dead stop location to protect door frame and hardware from damage.

2.11 DOOR TRIM

- A. Push/pull plates, armor plates, and kick plates shall be .050 gage stainless steel with US32D finish.
- B. Plates shall be two (2") less than door width with beveled edges, sized as follows:
 - 1. Push and pull plates shall be 4" wide x 16" high mounted 42" from door bottom.
 - 2. Armor plates shall be 36" high less than door width mounted 2" from door bottom.
 - 3. Kick plates 10" high x 2" less than door width mounted 2" from door bottom.

2.12 DOOR STOPS

- A. Door stops shall be furnished for doors to prevent door and hardware damage. Wall bumpers are preferred. Provide floor stops where wall bumpers are not practical. Where neither wall nor floor stops are practical, use surface mounted overhead stops as follows:
 - 1. Wall Stops: Ives WS407CVX Series.
 - 2. Floor Stops: Ives FS436 or FS438.
 - 3. Overhead Stops: Glynn Johnson 450 Series (Interior) and 900 Series (Exterior).

2.13 THRESHOLDS, WEATHERSTRIPPING AND SEALS

- A. Thresholds and weatherstripping shall be as listed in Hardware Schedule.

2.14 DOOR SILENCERS

- A. Door Silencers: Ives SR64 Two (2) per door pair and three (3) per single door frame.

2.15 AUTOMATIC FLUSH BOLTS, SURFACE BOLTS AND COORDINATORS

A. Door Bolts:

1. Manufacturer: H. B. Ives.
 - a. Non Fire-rated: 454-f26D 8".
 - b. Fire-rated: 456-B26D.
2. Manufacturer: Glynn Johnson:
 - a. Non Fire-rated: 1631 or 1632.
 - b. Fire-rated: FB7 or FB8.
3. Manufacturer: DCI.
 - a. Non Fire-rated: 1008-US26D.
 - b. Fire-rated: 842-US26D.

B. Coordinators:

1. Manufacturer: Monarch, B-1277 with B-1278 opening bar.
2. Manufacturer: H. B. Ives, 469-B26D with 478 carry bar.
3. Manufacturer: DCI, 500 with carry bar.

2.16 OVERHEAD RAIN DRIP

- A. Rain Drip: Pemko 346PW at exterior HM Steel door locations or as scheduled herein.

PART 3 – EXECUTION

3.1 INSPECTION

- A. Verify that doors and frames are ready to receive work and dimensions are as indicated on shop drawings.
- B. Beginning of installation shall indicate installer's acceptance of existing conditions.

3.2 INSTALLATION

- A. Install hardware in accord with manufacturer's instructions and requirements of DHI.
- B. Use templates provided by hardware item manufacturer.
- C. Mounting heights for hardware from finished floor to center line of hardware item:
1. Locksets: 38"
 2. Push/Pulls: 42"
 3. Dead Locks: 48"
 4. Exit Devices: 40"
- D. Conform to of Florida Bldg. Code: Accessibility, 5th Edition.
- E. Set door thresholds in full bed of butyl rubber.

3.3 ADJUST AND CLEAN

- A. Adjust and check operation of each item of hardware and door, to ensure proper function of every item.
- B. Replace items that cannot be adjusted to operate freely and smoothly.
- C. Final adjustment shall be made after ventilating systems are in operation.
- D. Clean hardware and adjacent surfaces after hardware installation.
- E. Instruct Owner's personnel in adjustment and maintenance of hardware and hardware finishes.

3.4 PROTECTION

- A. Protect installed hardware from damage.
- B. Replace damaged hardware.

3.5 HARDWARE SCHEDULE

- A. Attached Schedule is furnished for guidance in preparing Bidder's cost proposal and should not be considered as totally inclusive.
- B. Bidders shall use drawings to prepare hardware quantities. Variations between this schedule and drawings shall be communicated to Architect for resolution.
- C. Quantities listed are for each pair of doors or for each single door.
- D. Hardware Schedule was prepared by: Hardware Consultant's Name, Address, FAX and Phone Number and email address.
- E. Index of Manufacturers:
 - 1. Corbin/Russwin: NGP.
 - 2. Glynn-Johnson: BLY.
 - 3. Hager: HAG.
 - 4. Ives: IVE.
 - 5. LCN Closers: LCN.
 - 6. Best: BES.
 - 7. Von Durprin: VON.
 - 8. Pemko: PEM
 - 9. B/O: supplied by other trades.
- F. Hardware Group Schedules

Martin County School District
 Indiantown Middle School
 Enhanced Security Project A2

Hardware Group No. 10 – CARD ACCESS

For use on Door #(s):

Provide each PR door(s) with the following:

QT		DESCRIPTION	CATALOG NUMBER		FINIS	MFR
Y					H	
6	EA	HINGE	5BB1 4.5 X 4.5 NRP		652	IVE
2	EA	POWER TRANSFER	EPT10		⚡ 689	VON
2	EA	ELEC PANIC HARDWARE	QEL-9947-NL-OP-110MD 24 VDC		⚡ 626	VON
2	EA	RIM CYLINDER	1E62		626	BES
2	EA	SURFACE CLOSER	4040XP EDA		689	LCN
2	EA	PA MOUNTING PLATE	4040-18PA		689	LCN
1	EA	POWER SUPPLY	PS902		⚡ LGR	VON

BALANCE OF HARDWARE BY DOOR MANUFACTURER. CARD ACCESS SYSTEM AND CARD READER TO BE SUPPLIED BY DIV.28.

Hardware Group No. 15.2 – CARD ACCESS

For use on Door #(s):

Provide each SGL door(s) with the following:

QT		DESCRIPTION	CATALOG NUMBER		FINIS	MFR
Y					H	
1	EA	HINGE	5BB1 4.5 X 4.5		652	IVE
1	EA	STOREROOM LOCK	T581BDC DANE		626	FAL
1	EA	PERMANENT CORE	I.C.CORE		626	BES
1	EA	ELECTRIC STRIKE	6211 FSE		⚡ 630	VON
1	EA	SURFACE CLOSER	4040XP REG OR PA AS REQ		689	LCN
1	EA	GASKETING	328AA		AA	ZER

BALANCE OF HARDWARE BY DOOR MANUFACTURER. CARD ACCESS SYSTEM AND CARD READER TO BE SUPPLIED BY DIV.28.

3.6 DOOR INDEX

Door#	HwSet#
A	10
B	15.2

END OF SECTION

SECTION 08 80 00
GLAZING

PART 1 GENERAL

1.1 RELATED DOCUMENTS:

- A. The provisions of the General Conditions, Supplementary Conditions, Drawings, Specifications and the Sections included under Division 1, General Requirements and References are included as a part of this Section as though bound herein.

1.2 SECTION INCLUDES

- A. Provide labor, materials, services, and equipment necessary to furnish and install work as indicated and as specified herein, which includes, but is not limited to:
 - 1. Glass and glazing

1.3 REFERENCES

- A. ASCE-7 – Minimum Design Loads for Buildings and other Structures
- B. ANSI Z97.1 – Safety Glazing Materials Used in Buildings - Safety Performance Specifications and Methods of Test
- C. ASTM C-162 – Standard Terminology of Glass and Glass Products
- D. ASTM C864 – Standard Specification for Dense Elastomeric Compression Seal Gaskets, Setting Blocks, and Spacers
- E. ASTM C920 – Standard Specification for Elastomeric Joint Sealants
- F. ASTM C1036 – Standard Specification for Flat Glass
- G. ASTM C1048 – Standard Specification for Heat-Treated Flat Glass - Kind HS, Kind FT Coated and Uncoated Glass
- H. ASTM C1172 – Standard Specification for Laminated Architectural Safety Glass
- I. ASTM C1349 – Standard Specification for Architectural Flat Glass Clad Polycarbonate
- J. ASTM C 1503 – Standard Specification for Silvered Flat Glass Mirror.
- K. ASTM E84 – Standard Test Method for Surface Burning Characteristics of Building Materials
- L. ASTM E152 – Methods for Fire Test of Door Assemblies
- M. ASTM E283 – Standard Test Method For Determining Rate of Air leakage Through Exterior Windows, Curtain Walls and Doors Under Specified Pressure Differences Across the Specimen
- N. ASTM E330 – Standard Test Method for Structural Performance of Exterior Windows, Doors, Skylights and Curtain Walls by Uniform Static Air Pressure Difference
- O. ASTM E1996 – Standard Specification for Performance of Exterior Windows, Curtain Walls, Doors and Impact Protective Systems Impacted by Windborne Debris in Hurricanes
- P. ASTM E2025 – Standard Test Method for Evaluating Fenestration Components and Assemblies for Resistance to Impact Energies
- Q. CPSC 16 CFR 1201 Safety Standards for Architectural Glazing Materials
- R. FBC – Florida Building Code
- S. GANA – Glazing Manual
- T. GANA Laminated Glazing Reference Manual
- U. FGMA – Sealant Manual
- V. NFPA 80 – Standard for Fire Doors and Fire Windows
- W. NFPA 252 – Standard Methods of Fire Test of Doors Assemblies
- X. NFPA 257 – Standards on Fire Test of Window and Glass Block Assemblies

1.4 SUBMITTALS

- A. Manufacturer's Data:
 - 1. Submit two-copies of manufacturer's specifications, and installation instruction for each type of glass, glazing sealant and compound, gasket and associated miscellaneous material required.
 - 2. Include manufacturer's published data, or letter of certification, or certified test laboratory report indicating that each material complies with the requirements and is intended generally for the applications shown.
 - 3. Show by transmittal that the Glazer distributed one copy of each recommendation and instruction.
 - 4. If Safety glass, provide two copies of manufacturer certification of the glass meeting the requirements of CPSC 16 CFR 1201.
- B. Samples: Submit two-samples 12" x 12" in size illustrating glass coloration.
- C. Manufacturer shall certify that product complies with large and small missile impact criteria and have been tested and conform to SSTD and ASTM, Miami-Dade County, TAS 201, 202, and 203.

1.5 SYSTEM PERFORMANCE REQUIREMENTS

- A. General: Provide glazing systems that are produced, fabricated, and installed to withstand normal thermal movement, wind loading, and impact loading, without failure including loss or glass breakage attributable to the following: defective manufacturer, fabrication, and installation; failure of sealants or gaskets to remain watertight and airtight; deterioration of glazing materials; and other defects in construction.
- B. Hurricane rated impact loading on exterior glazing.
- C. Deterioration of Laminated Glass: Defects developed from normal use that are attributed to the manufacturing process and not to causes other than glass breakage and practices for maintaining and cleaning laminated glass contrary to manufacturer's written instructions. Defects include edge separation, delamination materially obstructing vision through glass, and blemishes exceeding those allowed by referenced laminated-glass standard.
- D. Glass Design: Glass thicknesses as indicated are for detailing only. Confirm glass thicknesses by analyzing Project loads and in service conditions. Provide glass lites for the various size openings in the thicknesses and strengths (annealed or heat-treated) to meet or exceed the following criteria:
 - 1. Glass Thicknesses: Minimum glass thickness, nominally, of lites in exterior walls is 6.0 mm.
 - 2. Glass Thicknesses (Hurricane): Select minimum glass thicknesses to comply with ASTM E-1300, according to the following requirements and performance standards:
 - a. Specified Design Wind Loads: 140 mph.
 - b. Safety
 - i) CPSC Cat. I and II
 - c. Security
 - i) UL972
 - ii) Blast Resistance
 - d. Natural Disasters
 - i) Hurricane Small Missile (River Gravel #6 for impact)
 - ii) Hurricane Large Missile (2" x 4" timber weighing 9 lbs.)

- E. Specific hazardous locations: The following shall be considered specific hazardous locations for purposes of glazing.
 - 1. Glazing in ingress and means of egress doors.
 - 2. Glazing adjacent to a door and within the same wall plane as the door whose nearest vertical edge is within 24 inches of the door in a closed position and whose bottom edge is less than 60 inches above the floor or walking surface, unless an intervening interior permanent wall is between the door and the glazing.
 - 3. Glazing in fixed panels having a glazed area in excess of 9 square feet with the lowest edge less than 18 inches above the finish floor level or walking surface within 36 inches of such glazing, unless a horizontal member not less than 1-1/2 inches in width is located between 24 inches and 36 inches above the walking surface.
- F. Normal thermal movement results from the following maximum change (range) in ambient and surface temperatures acting on glass framing members and glazing components. Base engineering calculation on materials' actual surface temperatures due to both solar heat gain and nighttime sky heat loss.
 - 1. Temperature Change (Range): 120 deg F, ambient; 180 deg F, material surfaces.

1.6 LABELS

- A. Glass shall bear labels indicating the manufacturer, type and thickness, and a note "Do Not Remove Label".
- B. All safety glass shall at least a permanent label indicating manufacturer, type, thickness, and compliance with CPSC 16 CFR 1201.
- C. If temporary label, label is to remain on glass until District Building Inspection is complete, then removed and turned into the District Building Department.

1.7 GLASS BREAKAGE

- A. The glazing subcontractor shall be responsible for all glass broken, scratched, damaged, or defective and shall replace same at his expense.

1.8 QUALITY ASSURANCE

- A. Perform Work in accordance with FGMA Glazing Manual, FGMA Sealant Manual, SIGMA and Laminators Safety Glass Association - Standards Manual for glazing installation methods.
- B. Installer Qualifications: Company specializing in performing the work of this section with minimum 5-years documented experience.

1.9 WARRANTY

- A. General: Warranties specified in this Article shall not deprive the Owner of other rights the Owner may have under other provisions of the Contract Documents and will be in addition to and run concurrent with other warranties made by the Contractor under requirements of the Contract Documents.
- B. Manufacturer's Special Warranty on Laminated Glass: Written warranty made out to Owner and signed by laminated-glass manufacturer agreeing to furnish replacements for laminated glass units that deteriorate as defined in "Definitions" Article f.o.b. the nearest shipping point to Project Site, within specified warranty period indicated below:
 - 1. Warranty Period: Five years from date of Substantial Completion.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Primary Glass; provide products from one of the following:
 - 1. PPG, Ford City, Pennsylvania
 - 2. Guardian, Carleton, Michigan
 - 3. Visteon, Detroit, Michigan
 - 4. LOF, Toledo, Ohio
 - 5. AFG, Kingsport, Tennessee
 - 6. Wire Glass
 - a. Pilkington, Don Mills, Ontario, Canada
 - b. Asahi, Miami Beach, Florida
 - c. Nippon, Los Angeles, California
- B. Architectural Glass Fabricators; provide products from one of the following:
 - 1. Primary glass manufacturers
 - 2. Globe-Amerada Glass, Elk Grove Village, Illinois (laminated glass products)
 - 3. Interpane/Spectrum Glass Products, Deerfield, Wisconsin (high performance glass)
 - 4. HGP and affiliates, Moorestown, New Jersey (full line glass fabricator)
 - 5. Viracon, Owatonna, Minnesota (high performance glass et. al)
 - 6. Laminated Glass Corporation, Plymouth Meeting, Pennsylvania
 - 7. Glasstemp, Bensenville, Illinois (glass door manufacturer also)
 - 8. Perilstein Distributing Corporation (PDC), Cheswick, Pennsylvania
- C. Plastic Interlayer Manufacturers, provide products from one of the following:
 - 1. DuPont, Wilmington, Delaware.
 - 2. Saflex, St. Louis, Missouri.
- D. Products of other manufacturers will be considered for acceptance provided they equal or exceed the material requirements and functional qualities of the specified product. Requests for Architect's approval and complete technical data for evaluation must be received at least 14 days prior to bid due date. Additional approved manufacturers will be issued by Addendum.

2.2 GLASS STANDARDS

- A. General
 - 1. Unless indicated otherwise, reference numbers used throughout this Specification Section are from ASTM C 1036 and C 1048. When the end product involves one or more categories, both, the primary glass specifications and the specifications of the additional features or construction shall be met.
- B. Clear Float Glass: Type I (transparent glass, flat), Class 1 (clear), Quality q3 (glazing select).
- C. Tinted Float Glass: Type I (transparent glass, flat), Class 2 (tinted heat absorbing and light reducing), Quality q3 (glazing select). Final shade shall be Architect selected from the manufacturer's standards within the following range:
 - 1. Grey: Visible light transmittance of 41-43 percent and shading coefficient of 0.67 – 0.69 percent for ¼ inch thick glass.
 - 2. Medium Green: Visible light transmittance of 75 percent and shading coefficient of 0.69 percent for ¼ inch thick glass.
- D. Tempered Glass (Safety Glass): Condition C (other than coated glass), kind FT (fully tempered), complying with ANSI Z97.1, ASTM C 1036 and ASTM C 1048 and "Federal CPSC Standard 16 CFR 1201 Category II."

- E. Heat-Treated Float Glass: ASTM C1048; Type I (transparent glass, flat); Quality q³ (glazing select); class, kind, and condition as indicated in examples under Article 4-GLASS USAGE.
- F. Fire Rated Glazing: Shall be listed and labeled by Underwriters Laboratories.
- G. Laminated glass shall meet minimum requirements as specified in ASTM C 1036-85 and laminate shall comply with ANSI Z97.1-1984 CPSC 16 CFR 1201 Category II where required.

2.3 MIRROR GLASS

- A. Safety Glass Mirrors
 - 1. Tapeback: Provide annealed float glass mirrors with manufacturer applied safety tape applied to the back surface and complying with FS DD-G-1403, ANSI Z97.1-1984 CPSC 16 CFR 1201 Category II.
- B. Mirror Glass Production and Fabrication
 - 1. Glass coating: Coat second surface of glass, unless otherwise indicated, with glass coating system complying with FS DD-M-00411 requirements and consisting of successive layers of chemically deposited silver, electrically or chemically deposited copper, and manufacturer's standard protective organic coating.
- C. Mirror Sizes: After application of glass coating, cut mirror glass to sizes as shown on Drawings and in 1/4 inch glass thickness.
- D. Edges: Seal edges after treatment to prevent chemical or atmospheric penetration of backing. Perform edge treatment and sealing in factory immediately after cutting to final sizes.
- E. Provide CRL mirror mount system in satin anodized finish. Continuous top channel shall be two pieces, D1638 channel and D1637 cleat. Bottom and ends shall have D638 channel. System shall be as manufactured by C.R. Lawrence Company, Inc. (800-421-6144) or an approved equal.

2.4 GLASS USAGE

- A. Exterior Insulated (Hurricane) – Large and Small Impact Rated
 - 1. Glass for all exterior door storefront, exterior door lites, and window openings: 1-3/16 inch insulated laminated glass complying with the following:
 - a. Insulated laminated Lite 1-3/16" Laminate – ¼" Clear – 0.090" Clear PVB – ¼" Clear, ½" air space, ¼" Tinted, Low-E on #5 surface
 - b. Performance Characteristics
 - Thermal
 - Winter U-factor/U-Value (Btu/hr-ft²-F°): 0.28
 - Solar Heat Gain Coefficient: between .25 and .27
 - Optical
 - Visible Light Transmittance: between 32% and 36%
 - Visible Light Reflectance (outside): less than 9%
 - Visible Light Reflectance (inside): less than 7%
 - c. Laminated glass products to be fabricated in autoclave with heat, plus pressure, free of foreign substances and air pockets.
 - d. Interlayer material: Polyvinyl Butyral sheets
 - e. Tint: Colored tint as selected by the Architect.
 - f. Impact rated as required by FBC Product Approval System.
- B. Fire Rated Glass
 - 1. Shall meet the safety glazing requirements of CPSC 16 CFR 1201, and
 - 2. Have the proper fire rating for the assembly (see plans for assembly fire ratings).

- a. SAFTI – Superlite 1-W acceptable for Cat II location per CPSC
 - b. Pilkington – Pyroshield Plus acceptable for Cat I location per CPSC
 - c. Cat I location is glass area less than or equal to 9 SF, and Cat II is glass area greater than 9 SF.
3. All glass shall have label indicating fire rating and safety glazing rating.
- C. Interior
1. Glass for Vestibule Doors, Sidelights, and Transoms: 1/4 inch thick clear tempered glass.
 2. Glass for Interior Fire Rated Doors and Windows: 1/4 inch fire rated glazing, polished both sides.
 3. Glass for Interior Non-Fire Rated Doors and Windows: 1/4 inch clear tempered safety glass.
 4. Large Mirrors: Where indicated.

2.5 GLAZING GASKETS

- A. Polyvinyl Chloride Glazing Gaskets: Shall be extruded, flexible PVC gaskets of the profile and hardness shown or as required for watertight construction, complying with ASTM D2287.

2.6 MISCELLANEOUS GLAZING MATERIALS

- A. Setting Blocks: Neoprene, 70-90 Durometer hardness, with proven compatibility of sealants used.
- B. Spacers: Provide neoprene, 40-50 Durometer hardness, with proven compatibility of sealants used.
- C. Compressible Filler Rod: Shall be closed-cell or waterproof jacketed rodstock of synthetic rubber or plastic foam with proven compatibility with sealants used. Rod shall be flexible and resilient with 5-10 PSI compression strength for 25 percent deflection.
- D. Cleaners, Primers and Sealers: Type recommended by sealant or gasket manufacturer.

2.7 ACCESSORIES

- A. Aluminum T-Trim:
1. Extruded aluminum TEE model # E-11177 EA as manufactured by Eagle Mouldings. Trim shall be used around decorative glass at per detail 5/A3.5

2.8 OTHER MATERIALS

- A. Provide other materials not specifically described but required for a complete and proper installation.

PART 3 EXECUTION

3.1 INSTALLATION OF GLASS

- A. General Requirements:
1. Follow recommendations of the glass manufacturer and the sealant, gaskets and glazing materials manufacturer, except if the codes or listed references are more restrictive.
 2. Where a combination of sealing materials is required for glazing in the same frame, the manufacturer must certify that all glazing materials furnished are compatible with each other.

3. Where setting blocks and spacer shims require setting into a glazing compound or sealant, contractor may butter them with the compound or sealant, then place them in position and allow to firmly setting prior to installation of glass.
- B. Sash and Frame Preparation and Acceptance
1. Inspect all window sash, frames, and surrounds glazed under this section and notify the Contractor of any defects, improper materials, or workmanship of other conditions that will affect the satisfactory installation of glass.
 - a. Do not proceed with glazing until such conditions are acceptable.
 - b. Absence of notification, or the beginning of glazing, will indicate acceptance of all previously placed related work executed by other trades.
 2. Other trades will execute the following work; but before starting glazing work, the glazier shall verify compliance with the requirements listed.
 - a. That the sash and frames are firmly anchored in proper position, plumb and square within 1/8" nominal dimensions on approved shop drawings.
 - b. That the rivet, screw, bolt or nail heads, welding fillets and other projections are removed from glazing rabbets to provide the specified clearances.
 - c. That all corners and fabrication intersections are sealed and sash and frames are weather-tight.
 - d. That rabbets at seals weep to outside and all rabbets are of sufficient depth and width to receive the glass and provide the required overlap of the glass.
 - e. That all sealing surfaces of steel sash and frames are primer painted.
- C. Preparation of Glass and Rabbets:
1. Clean the sealing surfaces of glass and the sealing surfaces of rabbets and stop beads before applying any glazing compound or gaskets.
 2. Use only the approved solvents and cleaning agents recommended by the compound manufacturer.
- D. Positioning Glass:
1. Center in glazing in the frame and rabbet to maintain specified clearances at perimeter on all four sides.
 2. Maintain centered position of glass in rabbet and provide the required sealer thickness (1/8" maximum) on both sides of glass.
 3. Whenever glass dimensions are larger than 50 united inches, provide setting blocks at the sill and spacer shims on all four sides; locate setting blocks one-quarter way in from each end of glass.
- E. Stop Bead Glazing; Use Putty or Elastic Glazing Compound for bedding glass in hollow metal frames, except if otherwise specified in this document.
1. Apply ample back putty or compound to rabbet so that it will ooze out when pressing glass into position and completely cover glass in rabbet.
 - a. Place setting blocks and spacer shims as required, and press glass into position.
 2. Secure glass in place by the application of stop beads.
 - a. Bed stop beads against glass and bottom of rabbet with compound and/or putty, leaving proper thickness between glass and stop beads.
 - b. Secure stop beads in place with suitable fastenings.
 - c. Strip surplus compound or putty from both sides of glass and tool to provide clean sight lines.

3.2 REPLACEMENT AND CLEANING:

- A. Upon completion of work, all glass shall be free from cracks and other defects.
- B. Any defective or broken glass that may appear before acceptance or within the 1-year warranty period shall be removed and replaced with new glass without additional cost to the Owner; excepting glass which is broken by a specific cause relating to building occupancy not relating to this contract.
- C. Thoroughly wash and clean all glass upon completion of the work and just prior to occupancy of the building.

END OF SECTION

DIVISION

9

FINISHES

SECTION 09 22 16
NON-STRUCTURAL METAL FRAMING

PART 1 GENERAL

1.1 RELATED DOCUMENTS

- A. The provisions of the General Conditions, Supplementary Conditions, Drawings, Specifications and the Sections included under Division 1, General Requirements and References are included as a part of this Section as though bound herein.

1.2 SECTION INCLUDES

- A. Provide labor, material, services and equipment necessary to furnish and install work as indicated and as specified herein, which includes, but is not limited to:
 - 1. Non-load bearing metal studs, support framing, bridging, bracing, strapping, attachments and accessories required for complete partition walls, soffits, bulkheads, and ceiling assemblies as indicated.
 - 2. Area separation and shaft wall framing products.

1.3 RELATED SECTIONS

- A. Section 01 25 13 – Product Substitution Procedures.
- B. Section 01 31 00 – Project Coordination.
- C. Section 01 33 00 – Submittal Procedures.
- D. Section 01 43 39 – Mockups
- E. Section 01 45 00 – Quality Control.
- F. Section 01 66 00 – Product Storage and Handling Requirements.
- G. Section 01 78 00 – Closeout Submittals.
- H. Section 09 29 00 – Gypsum Board.
- I. Section 09 91 00 – Painting.

1.4 REFERENCES

- A. See Section 01 42 00 – References for additional reference standards, abbreviations, acronyms and definitions.
- B. AISI - Standard for Cold-Formed Steel Framing General Provisions.
- C. AISI - North American Specification (NASPEC) for the Design of Cold-Formed Steel Structural Members - 2001.
- D. American Society of Testing Materials (ASTM):
 - 1. ASTM A653/A653M-13: Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy Coated (Galvannealed) by the Hot-Dip Process
 - 2. ASTM A780/A789M-09: Standard Practice for Repair of Damaged and Uncoated Areas of Hot-Dip Galvanized Coatings
 - 3. ASTM A1003/A1003M-15: Standard Specification for Steel Sheet, Carbon, Metallic- and Nonmetallic-Coated for Cold-Formed Framing Members
 - 4. ASTM C645-14: Standard Specification for Nonstructural Steel Framing Members
 - 5. ASTM C754-15: Standard Specification for Installation of Steel Framing Members to Receive Screw-Attached Gypsum Panel Products.
 - 6. ASTM C840-13: Specification for Application and Finishing of Gypsum Board.

7. ASTM C1513-13: Standard Specification for Steel Tapping Screws for Cold-Formed Steel Framing Connections.
8. ASTM E84-15a: Standard Test Method for Surface Burning Characteristics of Building Materials.
9. ASTM E90-09: Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements.
10. ASTM E119-14: Standard Test Methods for Fire Tests of Building Construction and Materials.
11. ASTM E413-10: Classification for Rating Sound Insulation.
- E. Gypsum Association (GA): GA-600 - Fire Resistance Design Manual.
- F. Steel Stud Manufacturers Association (SSMA): Product Technical Guide, Current Edition).

1.5 DESIGN REQUIREMENTS

- A. Design steel in accord with American Iron and Steel Institute Publication "Specification for the Design of Cold-Formed Steel Structural Members", except as otherwise shown or specified.
- B. Design loads: As indicated on the Architectural Drawings. 5 PSF minimum design lateral load is required for interior walls by building code. Shaftwall framing minimum design lateral load is 15 PSF.
- C. Framing systems for interior non-load bearing walls shall withstand design loads for lateral deflections less than $L/180$.
- D. Framing system to accommodate deflection of primary building structure and construction tolerances.
- E. Fire-Test-Response Characteristics:
 1. For fire-resistance-rated assemblies that incorporate non-load-bearing steel framing, provide materials and construction identical to those tested in assembly indicated according to ASTM E119-14 by independent testing laboratory.
 2. Products used in assembly shall carry classification label from testing laboratory.
- F. Sound Transmission Characteristics (STC):
 1. For gypsum assemblies wall and ceilings with STC rated requirements, provide materials and construction methods that are identical to requirements of ASTM E90-09.
 2. Testing or inspection agencies shall be certified and independent organizations.

1.6 SUBMITTALS

- A. Comply with Section 01 33 00 – Submittal Procedures.
- B. Submit manufacturer's product literature and data sheets for specified products.
- C. Manufacturer's certification of product compliance with codes and standards.

1.7 QUALITY ASSURANCE

- A. Comply with Section 01 45 00 – Quality Control.
- B. Product manufacturers shall be current members of Steel Stud Manufacturers Association (SSMA).
- C. Provide full time quality control over fabrication and erection complying with applicable codes and regulations of government agencies having jurisdiction.
- D. Conduct pre-installation meeting to verify project requirements, substrate conditions, and manufacturer's installation instructions.
- E. Submit manufacturer's storage and product installation instructions.

- F. Submit documentation verifying materials and components are from single manufacturer.
- G. Installer shall submit qualifications demonstrating five consecutive years of installing specified products of similar and equivalent work scope.

1.8 MOCKUPS

- A. Comply with Section 01 43 39 – Mockups.
- B. Prepare 8' (2.44 m) x 8' (2.44 m) wall section where directed by Architect to demonstrate, quality of substrate framing, material application and finished gypsum board surface on one side of partition mockup.
- C. Do not proceed with additional work until mockup is approved by Architect.
- D. Mockup may be incorporated into finished work product providing mockup remains available for inspection until end of framing and gypsum board work.

1.9 DELIVERY, STORAGE AND HANDLING

- A. Comply with Section 01 66 00 – Product Storage and Handling Requirements.
- B. Notify manufacturer of damaged materials received prior to installing.
- C. Deliver materials in manufacturer's original, unopened, undamaged containers with identification labels intact.
- D. Store materials inside building, protected from exposure to water, wind or other harmful weather conditions.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Approved Manufacturer's:
 - 1. Clark Dietrich Building Systems, 9100 Centre Point Dr., Suite 210 West Chester, OH 45069; Tel: 513-870-1100, 800-543-7140; Fax: 513-870-874-1300; Website: www.clarkdietrick.com.
- B. Manufacturers listed below are approved providing their products are equal to those specified as basis of design:
 - 1. Marino/Ware, Inc., 400 Metuchen Rd., South Plainfield, NJ 07080; Tel: 1-800-627-4661, 908-757-9000; Fax: 908-753-8786; Website: www.marinoware.com.
- C. Requests for substitutions by other manufacturers will be considered in accord with Section 01 25 13 – Product Substitution Procedures.

2.2 MATERIALS

- A. Steel: Galvanized Steel meeting requirements of ASTM A1003/A1003M-15.
 - 1. Coating: Galvanized G40 (Z120) coating minimum, complying with ASTM C645-14.

2.3 COMPONENTS

- A. Nonstructural Studs: Cold-Formed galvanized steel C-studs. Material: Galvanized steel meeting or exceeding the requirements of ASTM A754-15 for conditions indicated below:
 - 1. Flange Length: 1.25" (32 mm) 125 flange, web depth 1-5/8" and 3-5/8" and as indicated on Drawings.
 - 2. Minimum Material Thickness: Traditional 20ga or UltraSTEEL 20 EQ.

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3. Punch Outs: 12" (305 mm) from base and every 48" (1219 mm) thereafter.
- B. Nonstructural Track: Cold-Formed galvanized steel runner tracks.
 1. Flange Length: 1.25" (32 mm) T125 flange.
 2. Web: Track web to match stud web size.
 3. Minimum Material Thickness: Traditional 20ga or UltraSTEEL 20 EQ.
 4. Minimum Material Thickness: Track thickness to match wall stud thickness.
- C. Deflection Track: Cold-Formed Deep Leg Runner Slip Track.
 1. Leg Length: As required by design.
 2. Minimum Material Thickness: To match stud thickness.
- D. Channel (CRC Cold Rolled Channel):
 1. Size: 150U50-54, 1.5" (38 mm) 54mils (16 ga.).
- E. Furring Channel: Furring walls and suspended ceiling applications.
 1. Size: 087F125-30 .875" (22 mm) Furring Channel 30 mils (20 ga Drywall).
 2. Size: 087F125-33 .875" (22 mm) Furring Channel 33 mils (20 ga Structural).
 3. Sizes and locations as indicated on Drawings.
- F. Resilient Channel: Cold-Formed Resilient Channel System to decrease sound transmissions.
 1. Size: Two Leg .50" x 1.25" Resilient Channel.
- G. Area Separation Wall System: Lightweight non-load-bearing gypsum panel assembly designed to provide fire resistive protection at common walls, complying with ASTM C754-15 for conditions indicated.
- H. Drywall Corner Beads: Cold-Formed galvanized steel beads.
 1. 103 USG Durabead Deluxe Metal Corner Bead 1.25" x 1.25" (32 mm x 32 mm).
- I. Drywall Trims: Cold-Formed galvanized steel trims.
 1. U-Trim (Mudable) Size: .625" (15.9 mm).
 2. J-Trim (Reveal) Size: .625" (15.9 mm).
- J. Framing Accessories: Accessories required in this project.
 1. Flat Strapping for Backing Strip.
 2. Flat Strapping and bridging for lateral bracing.
 3. Angles.
 4. SwiftClip Fixed Connection Angles.
- I. Fasteners: Self-drilling, self-tapping screws; complying with ASTM C1513-13 - Standard Specification for Steel Tapping Screws for Cold-Formed Steel Framing Connections.
- J. All Window & Door opening stud framing Studs: Cold-Formed galvanized steel C-studs. Material: Galvanized steel meeting or exceeding the requirements of ASTM A754-15 for conditions indicated below:
 1. Flange Length: 1.25" (32 mm) 125 flange, web depth 1-5/8" and 3-5/8" and as indicated on Drawings.
 - a. Minimum Material Thickness: Traditional 18ga.
 - b. Punch Outs: 12" (305 mm) from base and every 48" (1219 mm) thereafter.
 - c. Double Studs at each jamb, sill & head of door & window openings.
- K. Touch-Up Paint:
 1. Comply with Section 09 91 00 – Painting.
 2. Comply with ASTM A780/A780M-09 (2015): Standard Practice for Repair of Damaged and Uncoated Areas of Hot-Dip Galvanized Coatings.

PART 3 EXECUTION

3.1 INSPECTION

- A. Inspect supporting substrates and structures for compliance of proper conditions for installation and performance of non-structural metal framing.

3.2 PREPARATION

- A. Prepare attachment surfaces for plumb, level, and proper alignment for accepting cold-formed structural framing.

3.3 FABRICATION

- A. Prior to fabrication of framing, submit product submittal sheets to Architect for approval.
- B. Framing components may be preassembled into panels prior to erecting. Prefabricate panels to be plumb and square, with components attached to prevent racking and minimizes distortion during lifting and transport.
- C. Cut framing components square for attachment to perpendicular members or as required for angular fit against abutting members.
- D. Plumb, align and securely attach studs to flanges of both upper and lower runners, except that for interior, non-load bearing walls where studs need not be attached to upper or lower runners.
- E. Splices in members other than top and bottom runner track are not permitted.
- F. Provide temporary bracing where required, until erection is complete.

3.4 INSTALLATION – NON-AXIAL LOAD-BEARING PARTITION WALLS

- A. Runners shall be securely anchored to supporting structure.
- B. Jack studs or cripples shall be installed below window sills, above window and door heads, and elsewhere to furnish supports.
- C. Lateral bracing shall be provided by use of gypsum board and gypsum sheathing, metal studs, or cold-rolled steel angles or channels.
- D. Provisions for structure vertical movement shall be provided where indicated.
- E. Partition walls shall extend to bottom of deck above floor, unless otherwise noted.
- F. Handling and lifting of prefabricated panels shall not cause distortion in members.

3.5 PROTECTION

- A. Protect installed products until completion of project.
- B. Touch-up, repair or replace damaged products before substantial completion of final installation.

END OF SECTION

SECTION 09 29 00
GYPSUM BOARD SYSTEM

PART 1 GENERAL

1.1 RELATED DOCUMENTS

- A. The provisions of the General Conditions, Supplementary Conditions, Drawings, Specifications and the Sections included under Division 1, General Requirements and References are included as a part of this Section as though bound herein.

1.2 SECTION INCLUDES

- A. Provide labor, materials, services, and equipment necessary to furnish and install work as indicated and as specified herein, which includes, but is not limited to:
 - 1. Gypsum Board Partition Systems
 - 2. Gypsum Board Accessories
 - 3. Joint Treatment
 - 4. Textured Finish

1.3 REFERENCES

- A. ASTM C36/C36M – Standard Specification for Gypsum Wallboard
- B. ASTM C79/C79M – Standard Specification for Treated Core and Non-treated Core Gypsum Sheathing Board
- C. ASTM C442/C442M – Standard Specification for Gypsum Backing Board and Coreboard, and Gypsum Shaftliner Board
- D. ASTM C475 – Standard Specification for Joint Compound and Joint Tape for Finishing Gypsum Board
- E. ASTM C630/C630M – Standard Specification for Water Resistant Gypsum Backing Board
- F. ASTM C645 – Standard Specification for Nonstructural Steel Framing Members
- G. ASTM C754 – Standard Specification for Installation of Steel Framing Members to Receive Screw Attached Gypsum Panel Products
- H. ASTM C931/C931M - Standard Specification for Exterior Gypsum Soffit Board
- I. ASTM E695 – Standard method for Measuring Relative Resistance of Wall, Floor, and Roof Construction to Impact loading
- J. ASTM D3273 – Standard Test Method for Resistance to Growth of Mold on the Surface of Interior Coatings in an Environmental Chamber
- K. ASTM D5420 – Standard Test Method for Impact Resistance of Flat Rigid Plastic Specimen By Means of a Striker Impacted by Falling Weight (Gardner Impact)
- L. ASTM E119 – Standard Test Methods for Fire Tests of Building Construction and Materials
- M. ASTM C840 – Standard Specification for the Application and Finishing of Gypsum Board
- N. GA 201 – Using Gypsum Board for Walls and Ceilings
- O. GA-216 – Recommended Specifications for the Application and Finishing of Gypsum Board
- P. GA-600 – Fire Resistance Design Manual
- Q. Florida Building Code (FBC)

1.4 SUBMITTALS

- A. Product Data: Submit manufacturer's product data sheets and printed installation instructions for each product or system proposed for use.

1.5 QUALITY ASSURANCE

- A. Perform gypsum board systems work in accordance with recommendations of ASTM C754, C840, and GA-216 except as otherwise specified in this Section.
- B. Regulatory Requirements:
 - 1. Fire-rated Assemblies: Listed and rated by Underwriter's Laboratories, Inc. or generic fire resistance ratings listed in GA-600.
 - 2. Fire-Hazard Classification: Listed and labeled by Underwriter's Laboratories, Inc.

1.6 COORDINATION

- A. Prior to and during installation, coordinate with work of other trades to facilities required openings and finishes.
- B. Conduct pre-construction meeting with drywall contractor, architect, owner, project coordinator, and others involved with process.

1.7 DELIVERY, STORAGE AND HANDLING

- A. Store the material off the floor in dry area to prevent damage from moisture or excessive handling.
- B. Follow manufacturer's requirements for on site storage and handling of materials.

1.8 PROJECT CONDITIONS

- A. Environmental Conditions, General: Establish and maintain environmental conditions for applying and finishing gypsum board to comply with ASTM C840 and with gypsum board manufacturer's recommendations.
- B. Room Temperatures: For non-adhesive attachment of gypsum board to framing, maintain not less than 40 degrees F. For adhesive attachment and finishing of gypsum board, maintain not less than 50 degrees F. for 48 hours prior to application and continuously after until dry. Do not exceed 95 degrees F. when using temporary heat sources.
- C. Ventilation: Ventilate building spaces, as required, for dry joint treatment materials. Avoid drafts during hot dry weather to prevent finishing materials from drying too rapidly.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturer shall be one of the following however products of other manufacturers will be considered for acceptance provided they equal or exceed the material requirements and functional qualities of the specified product.
 - 1. National Gypsum Corp.
 - 2. U.S. Gypsum Corp.
 - 3. Georgia-Pacific Corp.
- B. All gypsum board products shall have minimum mold growth ASTM D3273 rating of 10.

- C. Do not use drywall manufactured in China.

2.2 MATERIALS

- A. Furring Channels: USG metal stud channel, 1½" deep, roll-formed sections of 20-ga galvanized steel, ASTM C645.
- B. Gypsum Wallboard (General and above 8' AFF): ½" thick, ASTM C36/C36M, tapered edge, fire rated Type X. (Note: At radius walls the Contractor has the option to install ¼" and/or ⅜" thick gypsum wallboard in layers.)
- C. Gypsum Wallboard (Corridors, stairways, cafeteria, stage, and gymnasium up to at least 8' AFF minimum): Abuse resistant brand, ½" thick, ASTM C36/C36M, tapered edge, fire rated Type X. (Note: At radius walls the Contractor has the option to install ¼" and/or ⅜" thick gypsum wallboard in layers.)
 - 1. Acceptable abuse resistant drywall:
 - a. Fiber Rock VHI by USG
 - b. Or approved equal.
- D. Water Resistant Gypsum Wallboard: ½" thick, tapered edge.
 - 1. Provide at "wet" areas (areas subject to contact with water), as shown on plans.
- E. Cementitious backer board for tile and wet locations: Complying with ANSI A118.9 of thickness indicated and in maximum lengths available to minimize end-to-end butt joints. Ends and edges shall be square cut and finished smooth; formed in a continuous process of aggregated Portland cement slurry; and reinforced with vinyl coated, woven glass-fiber mesh embedded in both surfaces.
 - 1. Thickness: Manufacturer's standard thickness, but not less than 7/16 inch, unless otherwise indicated.
 - 2. Products: Subject to compliance with requirements, provide one of the following products:
 - a. Wonderboard Multi-Board; Custom Building Products.
 - b. DonCrete Cementitious Tile Backer Board; Domtar Gypsum.
 - c. Durock Cement Board; United States Gypsum Co.
- F. Gypsum Backing Board: Standard or Fire Rated type, square edges, ASTM C442/C442M.

2.3 MISCELLANEOUS MATERIALS

- A. Joint treatment materials and adhesives shall be as recommended by the gypsum board manufacturer. Joint tape shall be paper-reinforcing tape, unless otherwise recommended by gypsum board manufacturer for use with setting type compound.
 - 1. Setting Type Joint Compounds for Gypsum Board: Factory packaged, job mixed, and chemical hardening powder products formulated for use indicated.
 - a. Where setting type joint compounds are indicated as a taping compound only or for taping and filling only, use formulation that is compatible with other joint compounds applied over it.
 - b. For prefilling gypsum board joints, use formulation recommended by gypsum board manufacturer.
 - c. For filling joints and treating fasteners of water resistant gypsum backing board behind base for ceramic tile, use formulation recommended by gypsum board manufacturer.
 - d. Drying Type Joint Compounds for Gypsum Board: Factory packaged vinyl based products complying with the following requirements for formulation and intended use.
 - e. Ready Mixed Formulation: Factory mixed product.
 - 1) Topping compound formulated for finish (third) coats.
 - 2) All-purpose compound formulated for topping compound.

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- f. Toxicity/IEQ: Sheetrock Joint Tape. Paper; fiberglass joint tape not permitted.
- B. Joint Compound for Cementitious Backer Board: Material recommended by cementitious backer unit manufacturer.
 - 1. Toxicity/IEQ: Lime compound. All purpose joint and texturing compound containing inert fillers and natural binders. Pre-mixed compounds shall be free of antifreeze, vinyl adhesives, preservatives, biocides, and other slow releasing compounds.
- C. Joint compound for gypsum sheathing board. G.P. setting type joint compound.
 - 1. Toxicity/IEQ: Lime compound. All purpose joint and texturing compound containing inert fillers and natural binders. Pre-mixed compounds shall be free of antifreeze, vinyl adhesives, preservatives, biocides, and other slow releasing compounds.
- D. Joint Tape for Cementitious Backer Board: Polymer-Coated, open glass-fiber mesh recommended by cementitious backer unit manufacturer.
 - 1. Toxicity/IEQ: Sheetrock Joint Tape, Paper: fiberglass joint tape not permitted.
- E. Screws for Gypsum Board (ASTM C1002): Phillips head galvanized steel Type "S" or "S-12" self-drilling screws, length and type as required and recommended by gypsum board manufacturer.
- F. Screws for Gypsum Sheathing Board.
 - 1. Type S-12, Bugle head, self-tapping, rust-resistant, fine tread for heavy gauge steel.
 - 2. Type S, bugle head, rust resistant, sharp point, and fine thread for light gauge steel or furring.
- G. Accessories for Interior Installation: Corner bead, edge trim, and control joints complying with ASTM C1047 and requirements indicated below:
 - 1. Material: Formed metal with metal complying with the following requirements:
 - a. Steel sheet zinc coated by hot-dip or electrolytic process, or steel sheet coated with aluminum or rolled zinc.
 - b. Do not use plastic accessories.
 - 2. Shapes indicated below by reference Figure 1 designations in ASTM C1047:
 - a. Corner bead on outside corners, unless otherwise indicated.
 - 1) Product shall be similar to "Dur-A-Bead Corner Bead (103)"; USG or as approved by board manufacturer and Architect.
 - b. L-bead with face flange only; face flanged formed to receive joint compound. Use L-beads for edge trim (perimeter relief).
 - 1) Product shall be similar to "No. 200-B Metal Trim"; USG or as approved by board manufacturer and Architect.
 - c. One-piece control joint formed with V-shaped slot and removable strip covering slot opening.
 - 1) Product shall be similar to "No. 093 Control Joint"; USG or as approved by board manufacturer and Architect.
- H. Sheathing Tape: 2-1/2 inch wide, 10 by 10 self-adhering fiberglass reinforced joint tape like No. 8086 Contractor Sheathing Tape as produced by the 3M Company of St. Paul, Minnesota.
- I. Spot Grout: ASTM C475, setting type joint compound recommended for spot grouting hollow metal doorframes.
- J. Texture Compound: Acrylic texture coating DS4000 as manufactured by TWI.
 - 1. Finish: Match Existing
- K. Asphalt Saturated Organic Felt: ASTM D 226, Type I (No. 15 asphalt felt), nonperforated.
- L. Foam Gaskets: Closed cell vinyl foam adhesive backed strips that allow fastener penetration without foam displacement, 1/8 inch thick, in width to suit metal stud size indicated.
- M. Gypsum board sheathing sealants, caulk, tape:
 - 1. Don Corning 795 or equivalent; Pecora 895 or equivalent
 - 2. Borden HPPG Elmer's siliconized acrylic latex caulk or equivalent.
 - 3. 2" wide 10 x 10 glass mesh quick tape or equivalent.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Examine adjacent construction for conditions that prevent proper installation of drywall systems.
- B. Do not proceed until defects are corrected.

3.2 METAL FRAMING INSTALLATION

- A. General:
 - 1. Install metal framing in accordance with ASTM C754 except as otherwise specified.
 - 2. Install the members true to line and level to provide surface flatness with maximum variation of 1/8" in 10' in any direction.
 - 3. Install metal studs at 16" o.c. unless noted otherwise.
- B. Metal Furring Channels
 - 1. Secure to masonry walls and around door and window openings, intersections, and corners with low velocity power driven anchors.
 - 2. Install metal furring at 16" o.c. vertically.
 - 3. Extend furring on exterior walls full height of wall.

3.3 GYPSUM BOARD SYSTEM INSTALLATION

- A. Gypsum Board Application and Finishing Standards: Install and finish gypsum panels to comply with ASTM C840 GA -201, GA-216 and GA-600.
- B. Work shall be provided in accordance with the manufacturer's printed instructions and as specified herein. Where fire rating requirements for systems are indicated on the Drawings or in the schedules, install components in accordance with manufacturer's instructions to comply with indicated fire rating requirements.
- C. Wallboard joints shall be butted tightly together. Maximum allowable gap at end joints shall be 1/8 inch. Support end joints on framing members.
 - 1. On partitions/walls apply gypsum panels vertically, unless parallel application is required for fire-resistive-rated assemblies. Use maximum length panels to minimize end joints.
 - 2. Install ceiling boards in direction, either parallel or perpendicular to framing members, which results in the least number of joints. Install in maximum practical lengths to span with minimum number of end (butt) joints. Stagger end joints of adjoining boards.
 - 3. Where ceiling or walls consist of 2 layers, face layer shall be installed perpendicular to base layer. Base layer to be screw attached and face layer to be strip laminated per manufacturer's instructions and screw attached to base layer in accordance with gypsum board application and finishing standards. Lay out joints so that tapered edges do not align with edges of openings.
 - 4. Fire Rated Walls: Construct required rated wall using thickness of Type "X" gypsum board required by code, installed to code requirements.
 - 5. Do not attach wallboard to head track.
 - 6. Provide a minimum of 1/4 inch perimeter relief where board abuts different materials. Trim edges with U-bead edge trim, where edges of gypsum panels are exposed. Seal joints between edges and abutting structural surfaces with acoustical sealant.
 - 7. Provide no less than 1/4", nor more than 3/8", space at bottom of board above floor.

- D. Wall Tile Substrates: For substrates indicated to receive thin-set ceramic tile and similar rigid applied wall finishes, comply with the following:
 - 1. Install cementitious backer units where tile is to be installed to comply with ANSI A108.11. Refer to Tile Specification.
- E. Soffits and Ceilings: Apply exterior gypsum soffit board panels perpendicular to supports, with end joints staggered over supports. Install with 1/4 inch open space where panels abut other construction or structural penetrations.
 - 1. Fasten with corrosion-resistant screws.
- F. Openings cut in gypsum board to fit electrical outlets, plumbing, and piping shall fit snugly and shall be small enough to be covered by plates and escutcheons. Both face and back paper shall be cut for cutouts that are not made by use of a saw.
- G. Fasteners: Install fasteners no closer than 3/8 inch to end or edge. Space fasteners approximately 7 inches o.c., opposite each other on adjacent ends or edges. Begin fastening from center of wallboard and proceed toward outer end or edges.
- H. Apply pressure on gypsum board, adjacent to fasteners being driven, to ensure that gypsum board will be secured tightly to framing member. Check for looseness at fasteners. Drive fastener with shank reasonably perpendicular to face of board.
- I. Drive screws with power screwdriver as recommended by gypsum board manufacturer. Surface of head shall be below surface of paper without cutting paper.
- J. Joint and corner treatment shall be in accordance with the manufacturer's printed instructions to provide a finished surface, ready for painting. Surface shall be free of dimples, excess finishing compound, ridges, or untrue corners.
 - 1. Install edge trim where edge of gypsum panels would otherwise be exposed or semi-exposed. Provide edge trim type with face flange formed to receive joint compound except where other types are indicated.
- K. Provide control joints in gypsum board partitions, bulkheads, ceilings, and soffits as follows:
 - 1. Partition, furring, or column fireproofing abuts a structural element (except floor) or dissimilar wall or ceiling.
 - 2. Ceiling or soffit abuts a structural element, dissimilar wall or partition or other vertical penetration.
 - 3. Construction changes within plane of partition or ceiling.
 - 4. Partition or furring run exceeds 40 feet, unless noted otherwise.
 - 5. Ceiling dimensions exceed 50 feet in either direction.
 - 6. Exterior soffits exceed 30 feet in either direction.
 - 7. Wings of "L", "U", and "T"-shaped ceiling areas are joined.
 - 8. Expansion or control joints occur in the exterior wall.
 - 9. Less than ceiling height frames should have control joints extending to the ceiling from both corners. Ceiling height door frames may be used as control joints. Treat window openings in same manner as doors.
 - 10. USG Control Joint No. 093: Apply over face of gypsum board where specified. Cut to length with a fine-toothed hacksaw (32 teeth per inch). Cut end joints square, butt together, and align to provide neat fit. Attach control joint to gypsum board with fasteners spaced 6 inches o.c. maximum along each flange. Remove plastic tape after finishing with joint compound or veneer finish.
 - a. Leave a 1/2 inch continuous opening between gypsum boards for insertion of surface-mounted joint.
 - b. Interrupt wood floor and ceiling plates with a 1/2 inch gap, wherever there is a control joint in the structure.
 - c. Do not attach gypsum board to steel studs on one side of control joint.
 - d. Provide separate supports for each control joint flange.

- e. Provide an adequate seal behind control joint where sound or fire ratings are prime considerations.
- L. Maximum variation in flatness required is $\frac{1}{8}$ " in 10'.
- M. Install sound-attenuation blankets, where indicated, prior to installing gypsum panels unless blankets are readily installed after panels have been installed on one side.
- N. Install ceiling board panels across framing to minimize the number of abutting end joints and to avoid abutting end joints in the central area of each ceiling.
 - 1. Stagger abutting end joints of adjacent panel not less than one framing member.
- O. Install gypsum panels with face side out.
 - 1. Do not install imperfect, damaged, or damp panels.
 - 2. Butt panels together for a light contact at edges and ends with not more than $\frac{1}{16}$ " of open space between panels.
 - 3. Do not force into place.
 - 4. Install all wall board with $\frac{1}{4}$ " to $\frac{1}{2}$ " separation from floor surface in accordance with manufacture's recommendation.
- P. Locate both edge or end joints over supports, except in ceiling applications where providing intermediate supports or gypsum board back blocking behind end joints.
 - 1. Do not place tapered edges against cut edges or ends.
 - 2. Stagger vertical joints on opposite sides of partitions.
 - 3. Avoid joints other than control joints at corners of framed openings where possible.
- Q. Attach gypsum panels to steel studs so leading edge or end of each panel is attached to open (unsupported) edges of stud flanges first.
- R. Attach gypsum panels to framing provided at openings and cutouts.
- S. Spot grout hollow metal doorframes for solid-core wood doors, and hollow metal doors.
 - 1. Apply spot grout at each jamb anchor clip and immediately insert gypsum panels into frames.
- T. Form control and expansion joints at locations indicated and as detailed, and as recommended by manufacturer with space between edges of adjoining gypsum panels, as well as supporting framing behind gypsum panels.
- U. Cover both faces of steel stud partition framing with gypsum panels in concealed spaces (above ceilings, etc.), except in chases braced internally.
 - 1. Except in concealed applications indicating or requiring sound, fire, air, or smoke ratings, may use scraps of not less than 8 s.f. in.
 - 2. Fit gypsum panels around ducts, pipes, and conduits.
 - 3. Where partitions intersect open concrete coffers, concrete joists, and other structural members projecting below underside of floor/roof slabs and decks, cut gypsum panels to fit profile formed by coffers, joists, and other structural members; allow $\frac{1}{4}$ " - $\frac{3}{8}$ " wide joints to install sealant.
- V. Isolate perimeter of non load-bearing gypsum board partitions at structural abutments, except floors, as detailed.
 - 1. Provide $\frac{1}{4}$ " - $\frac{1}{2}$ " wide spaces at these locations and trim edges with U-bead edge trim where edges of gypsum panels are exposed.
 - 2. Seal joints between edges and abutting structural surfaces with acoustical sealant.
- W. In STC-rated gypsum board assemblies, seal construction at perimeters, behind control and expansion joints, openings, and penetrations with a continuous bead of acoustical sealant at both faces of the partitions.
 - 1. Comply with ASTM C 919 and manufacturer's recommendations for location of edge trim and closing off sound-flanking paths around or through gypsum board assemblies, including sealing partitions above acoustical ceilings. Contractor to coordinate with all required fire/smoke rated separations.

- X. Space the fasteners in gypsum panels according to GA-216, finishing standard, and manufacturer's recommendations.

3.4 ACCESSORIES INSTALLATION

- A. Corner Beads: Install on external corners, with screws spaced 8" o.c. both sides.
- B. Trim: Install over face-layer gypsum board with fasteners spaced 8" o.c. Install where gypsum board surfaces meet dissimilar surfaces and at other detailed locations.
- C. Corner beads and trim may be either galvanized metal or plastic.

3.5 JOINT TREATMENT

- A. Treat joints, interior angles, fastener depressions, and finishing trim on face-layer gypsum board, including gypsum board in ceiling plenums.
- B. Pre-fill, tape, fill, and finish in accordance with manufacturer's directions.
- C. Apply a thin skim coat of joint compound over entire surface of gypsum board.
- D. Sand finish coat and leave surfaces smooth, uniform, and free of fins, depressions, cracks and other imperfections.
- E. Provide draft stopping in any concealed or furred space of the extruded insulation at the ceiling line and horizontally and vertically at 10'-0" o.c. maximum spacing. Provide at locations where interior wall(s) intersect or abut the exterior wall, at no more than 10' intervals in large rooms with walls over 20', and as required by FBC.
 - 1. Draft stopping may be ½" drywall, solid minimum 22-gauge metal strip, or ½" minimum mineral wool.
 - 2. Anchor draft stopping independent of the extruded insulation.
- F. Finish level shall be as indicated:
 - a. All spaces: level 4 with textured finish unless noted otherwise.

3.6 FINISHING GYPSUM BOARD ASSEMBLIES

- A. Levels of Finish: The following levels of finish are established as a guide for specific final finishes in accordance with GA-214.
 - 1. Level 0: No taping, finishing, or accessories required. This level of finish shall be used in temporary construction only.
 - 2. Level 1: Joints and interior angles shall have tape embedded in joint compound. Surface shall be free of excess joint compound. Tool marks and ridges are acceptable. This finish level shall be used in plenum areas above ceilings, in attics, in areas where the assembly is concealed.
 - 3. Level 2: Joints and interior angles shall have tape embedded in joint compound, and one separate coat of joint compound applied over joints, angles, fastener heads, and accessories. Surface shall be free of excess joint compound. Tool marks and ridges are acceptable. This finish level shall be used where water resistant gypsum backing board (ASTM C630) is used as a substrate for tile only.
 - 4. Level 3: Joints and interior angles shall have tape embedded in joint compound, and two separate coats of joint compound applied over joints, angles, fastener heads, and accessories. Joint compound shall be smooth and free of tool marks and ridges. Note: It is recommended that the prepared surface be coated with a primer/sealer prior to the application of final finishes. See painting/wall covering specification in this regard. This final level shall be used in areas that are to receive heavy textured, thick (1/8 inch or greater) wall coverings.

5. Level 4: Joints and interior angles shall have tape embedded in joint compound, and three separate coats of joint compound applied over joints, angles, fastener heads, and accessories. Joint compound shall be smooth and free of tool marks and ridges. Note: Prepare surface to be coated with a primer/sealer prior to the application of final finishes. This finish level shall be used where textured finishes, wall coverings, and painted (flat or eggshell) finishes are to be applied.
 6. Level 5: Joints and interior angles shall have tape embedded in joint compound and three separate coats of joint compound applied over joints, angles, fastener heads, and accessories. A thin skim coat of joint compound, or a material manufactured especially for this purpose, shall be applied to the entire surface. The surface shall be smooth and free of tool marks and ridges. Note: Prepare surface to be coated with a primer/sealer prior to the application of finish paint. This finish level shall be used with semi-gloss or gloss painted finishes and where indicated on the Room Finish Schedule.
- B. Use the following joint compound combination as applicable to the finish levels specified:
1. Embedding and First Coat: Setting type joint compound. Fill (Second) Coat: Setting type joint compound. Finish (Third) Coat: Ready mixed, drying type, all purpose or topping compound.

3.7 SITE ENVIRONMENTAL PROCEDURES

- A. Indoor Air Quality:
 1. Temporary ventilation: Provide temporary ventilation for work of this Section.
 2. Multi-layer gypsum board: Screw attachment. Adhesive attachment will not be permitted.
- B. Waste Management: As specified.
- C. Select panel sizes and layout panels to minimize waste; reuse cut offs to the greatest extent possible.

END OF SECTION

SECTION 09 65 20
RESILIENT FLOORING

PART 1 GENERAL

1.1 RELATED SECTIONS

- A. The provisions of the General Conditions, Supplementary Conditions, Drawings, Specifications, and the Sections included under Division 1, General Requirements and References are included as a part of this Section as though bound herein.

1.2 SECTION INCLUDES

- A. Provide labor, material, services, and equipment necessary to furnish and install work as indicated and as specified herein, which includes, but is not limited to:
 - 1. Work consists of vinyl composition tile flooring, composite sheet flooring, vinyl base, accessories and surface preparation required for complete installation.

1.3 RELATED SECTIONS

- A. Section 01 25 13 – Product Substitution Procedures
- B. Section 01 33 00 – Submittal Procedures
- C. Section 01 42 00 – References
- D. Section 01 45 00 – Quality Control
- E. Section 01 66 00 – Project Storage and Handling Requirements
- F. Section 01 78 00 – Closeout Submittals
- G. Section 03 54 16 – Hydraulic Cement Underlayment

1.4 REFERENCES

- A. See Section 01 42 00 – References for abbreviations, acronyms, definitions and reference standards.
- B. American Society for Testing and Materials (ASTM):
 - 1. D570-98 (2010) e1: Standard Test Method for Water Absorption of Plastics.
 - 2. D2047-11: Standard Test Method for Static Coefficient of Friction of Polish-Coated Flooring Surfaces as Measured by the James Machine.
 - 3. E648-14c: Test Method for Critical Radiant Flux of Floor-Covering Systems Using a Radiant Heat Energy Source.
 - 4. E662-15: Test Method for Specific Optical Density of Smoke Generated by Solid Materials.
 - 5. F510/F510M-14: Standard Test Method for Resistance to Abrasion of Resilient Floor Covering Using an Abrader with a Grit Feed Method.
 - 6. F710-11: Standard Practice for Preparing Concrete Floors and Other Monolithic Floors to Receive Resilient Flooring.
 - 7. F970-07(2011): Standard Test Method for Static Load Limit.
 - 8. F1066-04(2014)e1: Standard Specification for Vinyl Composition Floor Tile
 - 9. E1428-15a: Standard Test Method for Evaluating the Performance of Antimicrobials in or on Polymeric Solids Against Staining by Streptomyces Species (A Pink Stain Organism).
 - 10. F925-13: Standard Test Method for Resistance to Chemicals of Resilient Flooring

11. F1515-03 (2008): Standard Test Method for Measuring Light Stability of Resilient Flooring by Color Changes.
12. F1869-11: Standard Test Method for Measuring Moisture Vapor Emission Rate of Concrete Subfloor using Anhydrous Calcium Chloride.
13. G21-15: Standard Practice for Determining Resistance of Synthetic Polymeric Materials to Fungi.

1.5 SUBMITTALS

- A. Comply with Section 01 33 00 – Submittal Procedures.
- C. Submit product data, including installation instructions before starting work.
- D. Submit manufacturer's standard size samples of each type, color, and finish of resilient flooring and required accessories including full range of flooring color and pattern variations available from proposed manufacturer.
- E. Manufacturer's Safety Data Sheet (MSDS) for adhesive.
- F. Submit manufacturer's printed documentation indicating compliance to slip-resistant coefficient requirements.
- G. Submit manufacturer's written instructions for recommended maintenance practices for installed resilient flooring to include:
 1. Schedule: Frequency and type of maintenance defined.
 2. Equipment: Equipment and tools specified by generic language or manufacturer's name.
 3. Materials: Chemicals required to maintain flooring by brand name, quantities, and proper solutions.

1.6 QUALITY ASSURANCE

- A. Comply with Section 01 45 00 – Quality Control.
- B. Regulatory Requirements:
 1. Resilient tile flooring systems shall have minimum slip-resistant coefficients:
 - a. 0.5 for leveled floors such as assembly areas including cafeterias, multipurpose spaces and music rooms.
 - b. 0.6 for accessible routes such as interior corridors.
 - c. 0.8 for inclined floors such as ramps.
 2. Non-compliance of slip-resistant coefficient factor will be grounds for removal and disposal of installed flooring system, properly preparing floor substrate and installation of required slip-resistant flooring system at no additional expense.
 3. Taber Abrasionmeter Testing:
 - a. Weight loss of each tile shall average no more than 0.60 grams when ten tiles are abraded with aluminum oxide grit and S-39 leather wheel for 2000 cycles according to ASTM F510-14.
- C. Installer shall provide documentation of five years successful experience completing similar resilient tile installations.
- D. Preinstallation Conference:
 1. Conduct meeting at site prior to commencing tile work related to installation with parties associated with work.
 2. Review site conditions, procedures, and coordination required with related work.
- E. Mockups:
 1. Comply with Section 01 43 39 – Mockups.
 2. Provide mockup of each type of installation using approved materials and installation procedures.

3. Obtain A/E's acceptance of mock-up prior to start of resilient tile installation.
4. Approved mockup may be incorporated into project.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Comply with Section 01 66 00 – Product Storage and Handling.
- B. Deliver products in manufacturer's unopened original dry packaging, with tags and labels intact.
- C. Provide equipment and personnel to handle materials to prevent damage from dropping, careless storage, and handling.
- D. Store material in weather protected space with temperature between 65°- 90° F (18° – 32° C).

1.8 SITE CONDITIONS

- A. Maintain room and material temperature between 65° F (18° C) and 90° F (32° C) for 48 hours before, during, and 48 hours after installation. Maintain minimum 65° F. (18° C) thereafter.
- B. Prior to installation, painting shall be completed, air-conditioning system is operational, and exterior thresholds are installed.

1.9 WARRANTY

- A. Comply with Section 01 78 00 – Closeout Documents.
- B. Furnish manufacturer's warranty covering manufacturing defects for a period of 2 years and 10 years for traffic wear resistance, excluding abusive treatment.
- C. Installer shall warrant in writing to correct conditions due to faulty installation or replace defective materials after project completion, including loss of adhesion to substrate.

PART 2 PRODUCTS

2.1 MATERIALS

- A. Products and manufacturers specified are approved for project. Other manufacturers may submit requests for product substitution in accord with Section 01 25 13 – Product Substitution Procedures.

2.2 SUPPLIER: AVA by Novalis Innovative Flooring; distributed by Capri cork email: sales@avaflor.com website: www.avaflor.com.

2.3 SUBSTITUTIONS: Refer to Division 1 Project Requirements for Product Substitution procedures.

2.4 PRODUCT OPTIONS

- A. AVA SMPL HPC Floating Plank
 1. Gauge: 2.5 mm (nominal)
 2. Wear layer: 0.5 mm (20.0)
 3. Core Specification: 4.0 mm high performance vinyl core, 1050 kg/m³ density
 4. Acoustical Backing: 1.0 mm cork underlayment
 5. Size: Planks: 7' x 48' planks

6. Carton: Planks: 22.836 sq. ft.
 7. Edges: Straight Edge
 8. Installation Method: Floating /Triple Lock Locking Mechanism
 9. Color Planks:
Tangent Collection; Color: Charcoal; SKU; T20-600
 10. Cobalt Tangent HPC construction is also available with any of the AVA DSGN, SNSE, STYL or SPRK colors/patterns for a minimum order of 4000 sf per color/patterns; lead times will apply.
- 2.5 PERFORMANCE: Physical properties of Cobalt Planks and Tiles shall conform to the published technical specifications for each individual product. Technical data can be found at www.cobaltsurfaces.com.
- 2.6 ACCESSORY PRODUCTS
- A. Provide matching trims, moldings and reducing strips specifically designed for luxury vinyl flooring. Architect / Designer shall specify the type and color of each molding. Follow industry or manufacturer's guidelines for proper use and installation of all moldings.
 - B. Cleaning Products: Architect can specify per the latest edition of the maintenance instructions (available from www.avaflor.com).
 - C. Resilient Tile Base:
 1. Manufacturers:
 - a. Armstrong World Industries, 2500 Columbia Ave., Lancaster, PA. 17603; Tel: 717-397-0611; Website: www.armstrong.com.
 - b. Flexco Corp., 1401 East 6th St., Tuscumbia, AL 35674; Tel: 800-633-3151; Fax: 800-346-9075; Website: www.flexcofloors.com.
 - c. Tarkett Collection by Johnsonite, Inc., 16910 Munn Rd., Chagrin Falls, OH 44023; Tel: 800-899-8916, 440-543-8916; Fax: 440-543-8920; Website: www.johnsonite.com.
 - d. Burke Mercer Industries, Inc., 2250 South Tenth St., San Jose, CA 95112; Tel: 800-447-8442; Website: www.burkemercerflooring.com.
 - e. Roppe Corp., 1602 N. Union St., P.O. Box 1158, Fostoria, OH 44830-1158.
 2. Base:
 - a. 0.125" (3.18 mm) thick, 4" (101 mm) high, Type TP rubber base with cove profile.
 - b. Colors shall be judged equivalent, as determined by A/E.
 - c. At corners, provide inside/outside corners as applicable to specific corner, to extend 4" (101 mm) (minimum) beyond corners.
 - D. Accessories:
 1. Manufacturer (Basis of Design): Armstrong World Industries, 2500 Columbia Ave., 3001, Lancaster, PA. 17603; Tel: 717-397-0611; Website: www.armstrong.com.
 2. Transition Strips: Homogeneous vinyl, tapered edges in colors selected by A/E.
 - a. Carpet to tile reducer: VT0.
 - b. Carpet to concrete: VT2.
 - c. Tile to concrete: VT8.
 3. Tile Adhesive: Non-toxic with zero VOC content, waterproof, stabilized type as recommended by resilient tile flooring manufacturer.
 - E. Subfloor Filler:
 1. Leveling concrete patching compound and leveling concrete underlayment shall be in accord with Section 03 30 00 – Concrete, Para. 2.5.

PART 3 EXECUTION

3.1 INSPECTION

- A. Notify Contractor/CM of work surface conditions detrimental to proper installation of work. Do not proceed until conditions have been corrected in manner acceptable to installer.
- B. Substrate surfaces shall be thoroughly cleaned of debris and have been reviewed for flatness and levelness per Section 03 30 00 – Concrete. Surface irregularities shall be filled or leveled as required.
- C. Verify condition of substrate by testing concrete in accord with ASTM F1869-11 and obtain results of 5lbs. (2.27 kg) or less of vapor transmission (MVER), surface alkali of 9 or less as measured by ph test paper, and be free of carbonization and dust.
- D. Proceeding with installation indicates installer's acceptance of substrate conditions.

3.2 PREPARATION

- A. Comply with ASTM F710-11, manufacturer's printed recommendations, and as specified for surface preparation.
- B. Concrete flatness and levelness shall comply with Section 03 30 0 – Concrete Para. 3.06. Grind down ridges and irregularities or fill to comply with requirements.
- C. Remove loose impediments from substrate with power vacuum.
- D. Fill cracks, holes, and depressions with cementitious based or underlayment as noted in Part 2 - Products.
- F. Remove paint, oils, bond breakers, waxes, and sealers from surface. Inorganic solvents shall not be used.
- G. See Section 03 54 16 – Hydraulic Cement Underlayment for preparation of uneven and damaged flooring.

3.3 INSTALLATION

- A. Lay resilient flooring, base and accessories with adhesive cement in accord with manufacturer's recommendations in patterns indicated.
- B. Layout:
 - 1. Butt tightly to vertical surfaces, thresholds, nosings, and edges.
 - 2. Scribe, as necessary, around obstructions to produce neat joints, laid tight, even, and straight.
 - 3. Extend flooring into toe spaces, door reveals, into closets, and similar openings.
 - 4. Install border tiles next to walls of not less than one half tile and of approximately equal size around the perimeter of room.
- C. Fill surface imperfections such as cracks, depressions, or rough areas with underlayment.
- D. Provide ventilation in areas where adhesive is being used. When natural ventilation is inadequate, use safety-spark-proof fans and prohibit smoking.
- E. Transition (Edge) Strips:
 - 1. Install vinyl transition (edge) strips wherever exposed edges of resilient flooring materials occur.
 - 2. Where resilient flooring stops at doorways, set transition thresholds directly under doors in closed position.

3.4 CLEANING, POLISHING AND PROTECTION

- A. Remove excess adhesive and other soilings from floors and adjacent surfaces, using neutral type cleaners as recommended by resilient flooring manufacturer.
- B. Do not use acids or other caustic solutions as cleaning agents.
- C. Clean and apply six (6) coats of liquid wax floor finish in accord with manufacturer's printed instructions.
- D. Prohibit traffic on floors for 48 hrs. Protect installed flooring from damage by covering with clean, heavy duty building paper from time of cleaning until work area is complete.
- E. Do not allow movement of heavy objects over flooring which could damage flooring or finish.
- F. Replace flooring damaged by subsequent construction operations.

END OF SECTION

SECTION 09 91 00
PAINTING

PART 1 GENERAL

1.1 RELATED DOCUMENTS

- A. The provisions of the General Conditions, Supplementary Conditions, Drawings, Specifications, and the Sections included under Division 1, General Requirements and References are included as a part of this Section as though bound herein.

1.2 SECTION INCLUDES

- A. Provide labor, material, services, and equipment necessary to furnish and install work as indicated and as specified herein, which includes, but is not limited to:
- B. Surface preparation and field application of paints and coatings.
1. Exposed interior items and surfaces.
 2. Surface preparation, priming and finish coats specified are in addition to shop priming and surface treatment specified elsewhere.
- C. Paint exposed surfaces, except where paint schedule indicates surfaces or materials to remain unpainted.
- D. If paint schedule do not specifically mention items or surfaces, paint to match adjacent materials or surfaces.
- E. If paint schedule does not indicate color or finish, the Architect will select color or finish from manufacturer's standard colors or finishes.
- F. Painting includes field painting of exposed and covered pipes and ducts, color coding, hangars, exposed steel and iron work, and primed metal surfaces of mechanical and electrical equipment.
- G. Do not paint prefinished items, concealed building surfaces, finished metal surfaces, operating parts, and labels.
1. Prefinished items include the following factory finished components:
 - a. Architectural woodwork and casework.
 - b. Finished mechanical and electrical equipment.
 - c. Light fixtures.
 - d. Distribution cabinets.
 2. Concealed surfaces include walls or ceilings in the following normally concealed spaces:
 - a. Furred areas.
 - b. Ceiling plenums.
 - c. pipe chases.
 - d. Duct shafts.
 3. Finished metal surfaces include the following:
 - a. Anodized aluminum.
 - b. Stainless Steel.
 - c. Pre-finished aluminum or steel.
 4. Operating parts include moving parts of operating equipment and the following items:
 - a. Valve and damper operators.
 - b. Linkages.
 - c. Sensing devices.
 - d. Motor and fan shafts.

- G. Do not paint over Underwriter's Laboratories (UL), Factory Mutual (FM), or other code-required labels, equipment names, identification, performance rating, or other nomenclature plates.

1.3 RELATED SECTIONS

- A. Section 01 25 13 – Request for Substitution
- B. Section 01 31 00 – Project Management and Coordination
- C. Section 01 33 00 – Submittal Procedures
- D. Section 01 42 00 – References
- E. Section 01 45 00 – Quality Control
- F. Section 01 74 00 – Cleaning and Waste Management
- G. Section 01 78 00 – Closeout Submittals
- H. Section 10 14 00 – Signage
- I. Section 21 05 53 – Identification for fire Suppression Piping and Equipment
- J. Section 22 05 53 – Identification for Plumbing Piping and Equipment

1.4 REFERENCES

- A. See Section 01 42 00 – References for additional reference standards, acronyms, abbreviations and definitions.
- B. American Society of Testing Materials (ASTM):
 - 1. ASTM D1614: Standard Terminology for Paint, Related Coatings, Materials and Applications
 - 2. ASTM D4442-15: Standard Test Method for Direct Moisture Content Measurement of Wood and Wood Based Materials
- C. NACE (National Association of Corrosion Engineers) - Industrial Maintenance Painting.
- D. NPCA (National Paint and Coatings Association) - Guide to U.S. Government Paint Specifications.
- E. PDCA (Painting and Decorating Contractors of America) - Painting - Architectural Specifications Manual.
- F. SSPC (Steel Structures Painting Council) - Steel Structures Painting Manual.
 - 1. SP 1 - Solvent Cleaning.
 - 2. SP 2 - Hand Tool Cleaning.
 - 3. SP 3 - Power Cleaning.

1.5 SUBMITTALS

- A. Comply with Section 01 33 00 - Submittals.
- B. Product Data: Provide manufacturer's specifications and data sheets for each paint and coating product indicating the following:
 - 1 Product Characteristics.
 - 2 Surface preparation instructions.
 - 3 Primer requirements.
 - 4 Storage and handling requirements.
 - 5 Application methods.
 - 6 Precautionary requirements.
- C. Provide a list of required coatings indicating each material and cross referencing each specific coating, finish system and application by manufacturer's product number, color and classification.

1. Include manufacturer's technical information, label analysis and application instructions for each product.
 2. Provide certification that products comply with regulations controlling use of volatile organic compounds (VOC).
- D. Samples:
1. Submit manufacturer's color charts indicating full range of colors for each product indicated.
 2. Submit two 9" (22.9 cm) x 9" (22.9 cm) samples of each product illustrating selected colors, sheens and textures for each product.
- E. Manufacturer's Instructions: Indicate special surface preparation procedures, substrate conditions requiring special attention.
- F. Provide manufacturer's warranties for each product used.

1.6 QUALIFICATIONS

- A. Manufacturer: Company shall specialize in manufacture of the products specified with minimum ten years continuous documented manufacturing experience.
- B. Applicator: Company specializing in performing the work of this section with five years minimum continuous documented experience on similar project scope.

1.7 REGULATORY REQUIREMENTS

- A. Conform to applicable codes for flame and smoke rating requirements for finishes.

1.8 MOCK UP PANELS

- A. Comply with Section 01 45 00 – Quality Control.
- B. Provide a complete room field sample illustrating coating color, texture, and finish.
- C. Locate mockups where directed by Architect and Owner's Project Manager.
- D. Work samples that are accepted may remain as part of completed work.
- E. Work is not to proceed until mockups are approved.

1.9 DELIVERY, STORAGE, AND HANDLING

- A. Comply with Section 01 66 00 – Product Storage and Handling Requirements for delivery, storage, protection and handling of products.
- B. Deliver products to site in sealed and labeled containers; inspect to verify acceptability.
- C. Container label to include manufacturer's name, type of paint, brand name, lot number, batch date, color name and number, surface coverage, surface preparation, drying time, cleanup requirements, environmental issues, VOC content, and instructions for mixing.
- D. Store paint materials at minimum ambient temperature of 45° F (7° C) and maximum of 90° F (32° C) in ventilated area and as required by manufacturer's instructions.

1.10 ENVIRONMENTAL REQUIREMENTS

- A. Do not apply materials when surface and ambient temperatures are outside temperature ranges required by paint product manufacturer.
- B. Minimum Application Temperatures for Latex Paints: 45° F (7° C) for interiors.
- C. Minimum Application Temperature for Varnish and Stain Finishes: 65° F (18° C) for interior unless required otherwise by manufacturer's instructions.

- D. Provide lighting level of 80 foot-candles measured mid-height at substrate surface.
- E. Dispose of waste in accord with applicable regulations.

1.11 PRE-INSTALLATION MEETING

- A. Comply with Section 01 31 00 – Project Coordination for sequencing of trades to allow timely work start and completion.
- B. Pre-installation meeting shall be held minimum of one week prior to scheduled work start to verify acceptable condition of substrate surfaces to be painted, sequencing and protection of work until substantial completion.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Acceptable Manufacturer:
 - 1. The Sherwin-Williams Company, 101 Prospect Avenue NW, Cleveland, OH 44115; Tel: 1 800-321-8194; Fax: 216-566-1392; website: www.sherwin-williams.com.
- B. Other manufacturers may submit their products for approval per Section 01 25 13 – Substitutions Procedures. Manufacturers shall specify which Sherwin Williams products conform to products proposed for substitution.

2.2 MATERIALS

- A. Paintings and Coatings:
 - 1. Ready mixed, unless otherwise indicated.
 - 2. Process pigments to soft paste consistency, capable of being readily and uniformly dispersed to homogeneous coating; good flow and brushing properties.
 - 3. Capable of drying or curing free of streaks or sags.
- B. Accessory Materials: Coating application accessories shall be in accord with manufacturer's recommendations for patching materials, sealers, cleaning agents, cleaning cloths, primers, sanding paper, clean up materials, and other materials not specifically indicated but required to achieve specified finishes.

2.3 FINISHES

- A. Refer to schedule in Paragraphs 3.7 and 3.8 for interior surface finishes.
- B. Paint colors will be selected by Owner. Contractor/CM shall submit color samples to Architect who shall prepare color board for Owner's review and approval.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that surfaces are ready to receive work as instructed by the product manufacturer.
- B. Examine surfaces scheduled to be finished prior to commencement of work. Report any condition that may potentially affect proper paint application.
- C. Do not begin work until surfaces are ready to receive paint coatings. Start of work indicates acceptance of surfaces.
- D. Test shop applied primer for compatibility with subsequent cover materials.

- E. Measure moisture content of surfaces using an electronic moisture meter. Do not apply finishes unless moisture content of surfaces are below the following maximums:
 - 1. Plaster and Gypsum Wallboard: 12%.
 - 2. Masonry, Concrete, and Concrete Unit Masonry: 12%.
 - 3. Interior Wood: 15%, measured in accord with ASTM D4442-15.
 - 4. Concrete Floors: 8%.

3.2 PREPARATION

- A. Remove or mask electrical plates, hardware, light fixture trim, escutcheons and fittings prior to preparing surfaces or finishing.
- B. Correct defects and clean surfaces that affect work. Remove existing coatings that exhibit loose surface defects.
- C. Seal surface marks which may bleed through surface finishes.
- D. Remove mildew on surfaces per manufacturer's written recommendations.
- E. Aluminum Surfaces Scheduled for Paint Finish: Remove surface contamination by steam or high-pressure water. Remove oxidation with acid etch and solvent washing. Apply etching primer immediately following cleaning.
- F. Gypsum Board Surfaces: Fill minor defects with filler compound. Spot prime defects after repair.
- G. Galvanized Surfaces: Remove surface contamination and oils and wash with solvent. Apply coat of etching primer.
- H. Concrete and Unit Masonry Surfaces Scheduled to Receive Paint Finish: Remove dirt, loose mortar, scale, salt or alkali powder, and other foreign matter. Remove oil and grease with a solution of tri-sodium phosphate; rinse well and allow to dry. Remove stains caused by weathering of corroding metals with solution of sodium metasilicate after thoroughly wetting with water. Allow to dry.
- I. Plaster Surfaces: Fill hairline cracks, small holes, and imperfections with latex patching plaster. Make smooth and flush with adjacent surfaces. Wash and neutralize high alkali surfaces.
- J. Uncoated Steel and Iron Surfaces: Remove grease, mill scale, weld splatter, dirt and rust. Where heavy coatings of scale are evident, remove by power tool, wire brushing or sandblasting; clean by washing with solvent. Apply treatment of phosphoric acid solution, ensuring weld joints, bolts, and nuts are similarly cleaned. Spot prime paint after repairs.
- K. Shop Primed Steel Surfaces: Sand and scrape to remove loose primer and rust. Feather edges to make touch-up patches inconspicuous. Clean surfaces with solvent. Prime steel surfaces.
- L. Interior Wood Items Scheduled to Receive Finish: Wipe off dust and grit prior to priming. Seal knots, pitch streaks, and sappy sections with sealer. Fill nail holes and cracks after primer has dried; sand between coats.
- R. Interior Wood Items Scheduled to Receive Transparent Finish: Wipe off dust and grit prior to sealing, seal knots, pitch streaks, and sappy sections with sealer. Fill nail holes and cracks after primer has dried; sand lightly between coats.
- S. Wood and Metal Doors Scheduled for Painting: Seal top and bottom edges with primer and paint per Schedule.

3.3 APPLICATION

- A. Apply products in accord with manufacturer's written installation instructions.
- B. Do not apply paint coatings finishes to surfaces that are not dry, immediately before or after rain, during foggy conditions, or when temperature is less than 50° F (10° C).
- C. Apply each coat to uniform finish.

- D. Apply each coat of paint slightly darker than preceding coat unless otherwise approved.
- E. Sand wood and metal lightly between coats to achieve required finish.
- F. Vacuum clean surfaces free of loose particles. Use tack cloth just prior to applying next coat.
- G. Allow applied coat to dry before next coat is applied.
- H. Where clear finishes are required, tint fillers to match wood. Work fillers into the grain before set. Wipe excess from surface.
- I. Prime concealed surfaces of interior woodwork scheduled to receive stain or varnish finish with gloss varnish reduced 25% with mineral spirits.

3.4 FINISHING MECHANICAL AND ELECTRICAL EQUIPMENT

- A. Coordinate with Mechanical and Electrical Specifications and Drawings for schedules of color-coding and identification banding of equipment, ductwork, piping, and conduit.
- B. Paint shop primed equipment.
- C. Remove unfinished louvers, grilles, covers, and access panels on mechanical and electrical components and paint separately.
- D. Prime and paint insulated and exposed pipes, conduit, boxes, insulated and exposed ducts, hangers, brackets, collars and supports, in finished areas, except where items are pre-finished.
- E. Paint interior surfaces of air ducts, and convector and baseboard heating cabinets that are visible through grilles and louvers with one coat of flat black paint, to visible surfaces. Paint dampers exposed behind louvers, grilles and to match face panels.
- F. Paint exposed conduit and electrical equipment occurring in finished areas.
- G. Paint both sides and edges of plywood backboards for electrical and telephone equipment before installing equipment.
- H. Color code equipment, piping, conduit, and exposed ductwork in accord with requirements indicated. Color band and identify with flow arrows, names, and numbering.
- I. Reinstall electrical cover plates, hardware, light fixture trim, escutcheons and fittings removed prior to finishing.

3.5 FIELD QUALITY CONTROL

- A. Field inspection and testing will be performed in accord with Section 01 45 00 – Quality Control.

3.6 CLEANING

- A. Clean work under provisions of 01 74 00 – Cleaning and Waste Management.
- B. Collect cotton waste material that may constitute a fire hazard, place in closed metal containers and remove daily from site.

3.7 PAINT TYPE AND NUMBER OF COATS

- A. Painting schedules are intended to identify type of finishes which are required for various surfaces, and to identify surfaces to which each finish is to be applied. Refer to Room Finish Schedule.
- B. Requirements for quality, function, size, gauges, grades, textures, and color of materials are designated by manufacturer's brands, types, and number of coats required and other requirements that are to be furnished to conform to requirements of work.
- C. Where specific finishes are indicated by code designation, refer to identified types of coatings.

- D. Primers indicated under Material Identification is intended for particular substrate surface specified. Where same numbered finish are scheduled, but for another substrate, provide primer compatible with substrate and finish.
- E. Where substrate has compatible and satisfactory prime coat applied, prime coat specified for numbered finish may be omitted. Test prime coat for compatibility before applying additional coats.

3.9 INTERIOR PAINTING SCHEDULE

- A. Concrete Surfaces (Poured Concrete, Pre-Cast Concrete, Cast-In-Place Concrete, Tilt-Wall Concrete Panels, Concrete Beams, Ceilings, Stairs, Joists, and Columns).
 - 1. Egg Shell Finish (Low Odor/Low VOC):
 - a. 1st Coat: S-W Loxon Acrylic Masonry Primer, A24W8300 Series (8.0 mils wet/3.2 mils dry).
 - b. 2nd Coat: S-W ProGreen 200 Interior Latex Enamel, B20W3200 Series (4.0 mils wet/1.6 mils dry).
 - c. 3rd Coat: S-W ProGreen 200 Interior Latex Enamel, B20W3200 Series (4.0 mils wet/1.6 mils dry).
 - 2. Semi Gloss Finish (Low Odor/Low VOC):
 - a. 1st Coat: S-W Loxon Acrylic Masonry Primer, A24W8300 Series (8.0 mils wet/3.2 mils dry).
 - b. 2nd Coat: S-W ProGreen 200 Interior Latex Semi Gloss, B31W2200 Series (4.0 mils wet/1.3 mils dry).
 - c. 3rd Coat: S-W ProGreen 200 Interior Latex Semi Gloss, B31W2200 Series (4.0 mils wet/1.3 mils dry).
 - 3. Flat Finish (Low Odor/Low VOC):
 - a. 1st Coat: S-W Loxon Acrylic Masonry Primer, A24W8300 Series (8.0 mils wet/3.2 mils dry).
 - b. 2nd Coat: S-W ProGreen 200 Interior Latex Flat, B30W651 Series (4.0 mils wet/1.3 mils dry).
 - c. 3rd Coat: S-W ProGreen 200 Interior Latex Flat, B30W651 Series (4.0 mils wet/1.3 mils dry).
- B. Masonry (CMU- smooth, split, scored and fluted concrete units).
 - 1. Flat Finish:
 - a. 1st Coat: S-W PrepRite Block Filler, B25W25 Series (75-125 s.f./gal.).
 - b. 2nd Coat: S-W ProGreen 200 Interior Latex Flat, B30W651 (4.0 mils wet/1.8 mils dry).
 - c. 3rd Coat: S-W ProGreen 200 Interior Latex Flat, B30W651 (4.0 mils wet/1.8 mils dry).
 - 2. Egg Shell Finish:
 - a. 1st Coat: S-W PrepRite Block Filler, B25W25 Series (75-100 s.f./gal.3.6 mils).
 - b. 2nd Coat: S-W ProGreen 200 Interior Latex Eg-Shel, B20W2200 Series (4.0 mils wet/1.6 mils dry).
 - c. 3rd Coat: S-W ProGreen 200 Interior Latex Eg-Shel, B20W2200 Series (4.0 mils wet/1.6 mils dry).
 - 3. Semi Gloss Finish:
 - a. 1st Coat: S-W PrepRite Block Filler, B25W25 Series (75-125 s.f./gal.).
 - b. 2nd Coat: S-W ProGreen 200 Interior Latex Semi Gloss, B31W600 Series (4.0 mils wet/1.6 mils dry).

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- c. 3rd Coat: S-W ProGreen 200 Interior Latex Semi Gloss, B31W600 Series (4.0 mils wet/1.6 mils dry).
 - C. Metal Surfaces (Aluminum if not prefinished, Galvanized Steel metal doors, frames, railings, exposed ductwork, pipes and conduits and ferrous metal surfaces).
 - 1. Flat Finish:
 - a. 1st Coat: S-W Industrial ProCryl Universal Primer, B66-310 Series (5-10 mils wet/2-4 mils dry).
 - b. 2nd Coat: S-W ProGreen 200 Interior Latex Semi Gloss, B30W651 Series (4.0 mils wet/1.8 mils dry).
 - c. 3rd Coat: S-W ProGreen 200 Interior Latex Semi Gloss, B30W651 Series (4.0 mils wet/1.8 mils dry).
 - 2. Egg Shell Finish:
 - a. 1st Coat: S-W Industrial ProCryl Universal Primer, B66-310 Series (5-10 mils wet/2-4 mils dry).
 - b. 2nd Coat: S-W ProGreen 200 Interior Latex Eg-Shel, B20W651 Series (4.0 mils wet/1.6 mils dry).
 - c. 3rd Coat: S-W ProGreen 200 Interior Latex Eg-shel, B20W651 Series (4.0 mils wet/1.6 mils dry).
 - D. Metal (Exposed Structural Steel Columns, Trusses, Beams, Miscellaneous Ornamental Iron and Ferrous Metals).
 - 1. Flat Finish:
 - a. 1st Coat: S-W Industrial ProCryl Universal Primer, B66-310 Series (5-10 mils wet/2-4 mils dry).
 - b. 2nd Coat: S-W ProGreen 200 Interior Latex Flat, B30W651 Series (4.0 mils wet/1.8 mils dry).
 - c. 3rd Coat: S-W ProGreen 200 Interior Latex Flat, B30W651 Series (4.0 mils wet/1.8 mils dry).
 - 2. Egg Shell Finish:
 - a. 1st Coat: S-W Industrial ProCryl Universal Primer, B66-310 Series (5-10 mils wet/2-4 mils dry).
 - b. 2nd Coat: S-W ProGreen 200 Interior Latex Eg-Shel, B20W651 Series (4.0 mils wet/1.6 mils dry).
 - c. 3rd Coat: S-W ProGreen 200 Interior Latex Eg-Shel, B20W651 Series (4.0 mils wet/1.6 mils dry).
 - 3. Semi Gloss Finish:
 - a. 1st Coat: S-W Industrial ProCryl Universal Primer, B66-310 Series (5-10 mils wet/2-4 mils dry).
 - b. 2nd Coat: S-W ProGreen 200 Interior Latex Semi Gloss, B31W600 Series (4.0 mils wet/1.6 mils dry).
 - c. 3rd Coat: S-W ProGreen 200 Interior Latex Semi Gloss, B31W600 Series (4.0 mils wet/1.6 mils dry).
 - E. Wood Surfaces (Windows, Sills, Door Trim, Wall Paneling and other wood surfaces not factory finished or indicated otherwise).
 - 1. Flat Finish:
 - a. 1st Coat: S-W PrepRite ProBlock Latex, B51 Series, (4.0 mils wet/1.4 mils dry).
 - b. 2nd Coat: ProGreen 200 Interior Latex Flat, Series B30W651 (4.0 mils wet/1.8 mils dry).
 - c. 3rd Coat: ProGreen 200 Interior Latex Flat, Series B30W651 (4.0 mils wet/1.8 mils dry).

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2. Egg Shell Finish:
 - a. 1st Coat: S-W PrepRite ProBlock Latex, B51 Series, (4.0 mils wet/1.4 mils dry).
 - b. 2nd Coat: ProGreen 200 Interior Latex Eg-Shel, Series B20W651 Series (4.0 mils wet/1.6 mils dry)
 - c. 3rd Coat: ProGreen 200 Interior Latex Eg-Shel, Series B20W651 Series (4.0 mils wet/1.6 mils dry)
 3. Semi Gloss Finish:
 - a. 1st Coat: S-W PrepRite ProBlock Latex, B51 Series, (4.0 mils wet/1.4 mils dry).
 - b. 2nd Coat: ProGreen 200 Interior Latex Semi-Gloss, Series B31W600 Series (4.0 mils wet/1.6 mils dry)
 - c. 3rd Coat: ProGreen 200 Interior Latex Semi-Gloss, Series B31W600 Series (4.0 mils wet/1.6 mils dry)
 4. Stain and Varnish Satin Finish:
 - a. 1st Coat: S-W MinWax 250 VOC Oil Stain.
 - b. 2nd Coat: Wood Classics® Waterborne Polyurethane Varnish (4mils wet/1.0 mil dry).
 - c. 3rd Coat: Wood Classics® Waterborne Polyurethane Varnish (4mils wet/1.0 mil dry).
- F. Drywall and Plaster Surfaces (Walls, columns, ceilings, soffits, bulkheads, light shelves and soffits).
1. Flat Finish:
 - a. 1st Coat: ProGreen 200 Interior Latex Primer, Series B28W8200 Series (4.0 mils wet/1.5 mils dry).
 - b. 2nd Coat: ProGreen 200 Interior Latex Flat, Series B30W651 Series (4.0 mils wet/1.4 mils dry).
 - c. 3rd Coat: ProGreen 200 Interior Latex Flat, Series B30W651 Series (4.0 mils wet/1.4 mils dry).
 2. Egg Shell Finish:
 - a. 1st Coat: ProGreen 200 Interior Latex Primer, Series B28W8200 Series (4.0 mils wet/1.5 mils dry).
 - b. 2nd Coat: ProGreen 200 Interior Latex Eg-Shel, Series B30W651 Series (4.0 mils wet/1.6 mils dry).
 - c. 3rd Coat: ProGreen 200 Interior Latex Flat, Series B30W651 Series (4.0 mils wet/1.6 mils dry).
 3. Semi Gloss Finish:
 - a. 1st Coat: ProGreen 200 Interior Latex Primer, Series B28W8200 Series (4.0 mils wet/1.5 mils dry).
 - b. 2nd Coat: ProGreen 200 Interior Latex Semi-Gloss, Series B31W600 Series (4.0 mils wet/1.6 mils dry).
 - c. 3rd Coat: ProGreen 200 Interior Latex Semi-Gloss, Series B31W600 Series (4.0 mils wet/1.6 mils dry).
- G. Epoxy System (Water Base)
1. Gloss Finish
 - a. 1st Coat: S-W ProGreen 200 Interior Latex Primer, B28W600 (4-mil wet, 1.5-mil dry)
 - b. 2nd Coat: S-W Waterbased Catalyzed Epoxy, B70W211 / B60V15
 - c. 3rd Coat: S-W Waterbased Catalyzed Epoxy, B70W211 / B60V15 (2.5 - 3-mil dry per coat)

END OF SECTION

10

DIVISION

SPECIALTIES

SECTION 10 14 00
SIGNAGE

PART 1 GENERAL

1.1 RELATED DOCUMENTS

- A. The provisions of the General Conditions, Supplementary Conditions, Drawings, Specifications, and the Sections included under Division 1, General Requirements and References are included as a part of this Section as though bound herein.

1.2 SECTION INCLUDES

- A. Provide labor, materials, services, and equipment necessary to furnish and install work as indicated and as specified herein, which includes, but is not limited to:
 - 1. Tactile/raised letter plastic signs
 - 2. Individual plastic characters signs
 - 3. Signs of silk-screened characters on plastic
 - 4. Required sign type:
 - a. Interior room, space, and area ID signs
 - b. International symbols of accessibility for accessible spaces and exits
 - c. Accessible routes
 - d. Tactile "exit" signs
 - e. Hazard and safety signs
 - f. Evacuation plans

1.3 REFERENCES

- A. ANSI A117.1 – Specifications for Making Buildings and Facilities Accessible To and Usable By Physically Handicapped People
- B. FBC – Florida Building Code
- C. NFPA 101: 7.10.1.3

1.4 SUBMITTALS

- A. Submit shop drawings as specified.
- B. Indicate sign styles, lettering font, foreground and background colors, locations, overall dimensions of each sign and anchorage.
- C. Provide complete interior sign schedule showing sign type, location, and verbiage.
- D. Samples: Submit two sample signs in size illustrating type, style, letter font, and colors specified, and method of attachment.
- E. Provide manufacturer's installation instructions, templates, and attached devices.
- F. Colors shall be as selected by the Architect.

1.5 QUALIFICATIONS

- A. Manufacturer: Company specializing in manufacturing the products specified in this section with minimum three years documented experience.

1.6 REGULATORY REQUIREMENTS

- A. Conform to applicable codes for requirements for the physically handicapped, safety and egress.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Deliver, store, protect, and handle products to site.
- B. Package signs, labeled in name groups
- C. Store adhesive attachment tape at ambient room temperatures

1.8 ENVIRONMENTAL REQUIREMENTS

- A. Do not install signs when ambient temperature is lower than recommended by manufacturer.
- B. Maintain this minimum temperature during and after installation of signs.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturer shall be one of the following however products of other manufacturers will be considered for acceptance provided they equal or exceed the material requirements and functional qualities of the specified product and acceptance is provided by the architect in writing prior to bidding.
 - 1. ASI Sign Systems, Indianapolis, Indiana; Cincinnati, Ohio; Cleveland, Ohio
 - 2. Andco Industries Corp., Greensboro, North Carolina
 - 3. Baron Signs, Lake Park, Florida
 - 4. Multi-Graphics, Inc. Pelham, Georgia

2.2 FLORIDA AMERICANS WITH DISABILITIES ACT REQUIREMENTS

- A. Manufacturer shall conform to tactile, Braille, letter size, and other requirements as required by Florida Accessibility Code for Building Construction and ANSI A117.1.
- B. ADA requirements supersede technical specifications in this Section.

2.3 BUILDING SIGNAGE – GENERAL

- A. General; applies to all signs except as noted:
 - 1. Material shall be minimum 1/8" clear matte acrylic stock with 3/8" radius corners.
 - a. Interior signs – Shall be material of non-petroleum base phenolic resin using sand carving process to create the raised lettering, which is an integral part of the sign.
 - b. Paint shall be Matthews Acrylic Polyurethane system or equal.
 - i) Shall be low VOC
 - ii) Shall be UV Stable
 - iii) Shall be lead and chromate free
 - iv) Minimum life expectancy of 10-years
 - 2. Applied lettering not allowed.
 - 3. Letters and background colors selected by Architect from manufacturer's standard colors.
 - 4. Mounting:
 - a. Shall be with adhesives and non-removable oval head screws.
 - b. Mount at locations as directed by Architect.

- c. Mount at 60" above finished floor to the center of the sign.
 5. Graphic Process with Braille in one of the following, but no applied lettering method allowed:
 - a. Provide raised (photopolymer process)
 - b. Engraved letters
 - c. Sand craved process
 6. Letters:
 - a. Letters and numbers shall have width to height ratio between 3:5 and 1:1 and stroke width to height ratio between 1:5 and 1:10.
 - b. Letters and numbers to be raised $\frac{1}{32}$ " upper case sans serif font with Grade 2 Braille.
 - c. Raised characters shall be $\frac{5}{8}$ " high minimum and 2" high maximum.
 - d. Pictograms shall have the equivalent verbal description directly below the pictogram.
 7. Characters and backgrounds must be matte or other non-glaze surface and of contrasting colors.
 8. All signs shall comply with chapter 11 FBC.
- B. Room Name and Number Signs
 1. Provide a sign for each room or space to include name and room number.
 - a. Minimum size of 3" high by 6" wide for signs, longer where nomenclature demands
 2. Mount number as directed by Architect.
 3. All spaces listed in Finish Schedule plus if more than one door is to a space, additional signs will be required one by number of doors to space.
- C. Storage Signs
 1. Provide and install at mechanical and electrical rooms a sign mounted on the door to read as follows: " STORAGE NOT ALLOWED"
 2. Signs shall be matte acrylic plastic, red background with white letters 1 " high by width needed for copy and Braille, with $\frac{3}{8}$ " radius corners.
 3. Mount on doors with non-removable oval head screws verify number signs required.
- D. Toilet Room Handicapped Signs
 1. Furnish and install one sign depicting National Handicapped Symbol (wheelchair) at each toilet room, equipped with facilities for the handicapped.
 - a. Size shall be 6" by 10.5".
- E. Fire Extinguisher, No Exit and Pull Station Sign
 1. Copy to read: "No Exit", "Fire Pull Station Inside", And "Fire Extinguisher Inside"
 2. Red letters, same material, size and mounting as in A. General.
 3. NO EXIT sign shall have letter size as per NFPA 101 section 7.10.8.3.
 4. Braille sign not required for fire extinguisher.
 5. See plans for locations.
- F. Fire Rated/Smoke Partition Labeling
 1. Field label all fire rated walls above ceiling level, with fire rating shown on the construction plans.
 - a. Provide minimum $\frac{1}{2}$ " high block lettering stenciled on wall above finished ceiling, if in a storage, mechanical, electrical, or similar unfinished room, install at approximately 84 inches above floor.
 - b. *(Contractor to use rating from permit plans)* HOUR FIRE RATED WALL, PROTECT ALL OPENING AND THROUGH WALL PENETRATION PER CODE REQUIREMENTS.
 2. Field label all smoke partitions above ceiling level.
 - a. Provide minimum $\frac{1}{2}$ " high block lettering stenciled on wall above finished ceiling, if storage, mechanical, electrical, or unfinished room, install at 84" above floor.

- b. SMOKE PARTITION, PROTECT ALL OPENING AND THROUGH WALL PENETRATION PER CODE REQUIREMENTS.

G. Mechanical, Electrical, Data, and Similar Rooms

- 1. Provide a sign saying "NO STORAGE" meeting the General requirements.
- 2. If these rooms have pair of doors, provide sign saying "THIS DOOR TO REMAIN CLOSED AND LATCHED TOP AND BOTTOM, EXCEPT DURING THE TRANSFER OF EQUIPMENT".
 - a. Sign shall have 1" high block letters and be permanently attached (Attached in way as to maintain the rating of the door) to the inactive door near the latch side 60 inches from finished floor to center of sign.
 - b. Braille not required for this sign.

PART 3 EXECUTION

3.1 INSTALLATION

- A. Install all signs in strict accordance with manufacturer's instructions and FADA requirements.
- B. Room signs to be mounted 60" to center above finish floor on walls adjacent to the latch side of any door opening.

3.2 CLEANING

- A. After installation, thoroughly clean all exposed surfaces and restore all damaged material to its original condition or replaced with new material.

3.3 WARRANTY

- A. This Contractor shall fully guarantee all materials and labor under this section for a period of 5-years from date of final acceptance of the building against all defects in both workmanship and materials and he shall promptly correct and/or replace such faulty work if so notified.

END OF SECTION

12

DIVISION

FURNISHINGS

SECTION 12 48 12
ENTRANCE FLOOR MATS

PART 1 GENERAL

1.1 RELATED DOCUMENTS

- A. The provisions of the General Conditions, Supplementary Conditions, Drawings, Specifications, and the Sections included under Division 1, General Requirements and References are included as a part of this Section as though bound herein.

1.2 SECTION INCLUDES

- A. Provide labor, materials, services, and equipment necessary to furnish and install work as indicated and as specified herein, which includes, but is not limited to:
 - 1. Surface-type foot grille mats.

1.3 SUBMITTALS

- A. Submit manufacturer's specifications and installation instructions for each type of entrance mat.
- B. Include methods of installation for each type of substrate.
- C. Submit samples for each type and color of exposed entrance mat, frames, and accessories required.
- D. Provide 12" square samples of mat materials and 12" lengths of frame members.

1.4 MAINTENANCE DATA

- A. Maintenance Data: Submit manufacturer's printed instructions for cleaning, drying, maintaining, and re-handling of removable entrance mat units.

1.5 FIELD MEASUREMENTS

- A. Verify that field measurements are as indicated on shop drawings.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturer shall be the following however products of other manufacturers will be considered for acceptance provided they equal or exceed the material requirements and functional qualities of the specified product.
 - 1. Forbo Entrance Systems

2.2 MATERIALS AND FABRICATION

- A. General: Provide colors/patterns/profiles of materials, including metals and metal finishes, as indicated on drawings or by this specification or, where not indicated, as selected by Architect from manufacturer's standard colors/ patterns/ profiles.

1. Shop-fabricate the entrance mat work to greatest extent possible, in sizes as indicated on plans.
 2. Where not otherwise indicated, provide single unit for each mat installation, but do not exceed manufacturer's maximum size recommendation for units intended for removal and cleaning.
 3. Where joints in mats are necessary, space them symmetrically and away from normal traffic lanes.
 4. Miter corner joints in framing elements, with hairline joints, or provide prefabricated corner units without joints.
 5. Where possible, verify sizes by field measurement prior to shop fabrication.
- B. Entrance Mat Systems:
1. Provide model Forbo coral mats entrance system approved equal.
 2. Vinyl edge accessories to accommodate mat application as indicated per manufacturer.
 3. All building entrance doors shall have mats provided except for mechanical/electrical room doors.
 4. All entrance mats are to provide 6'-0" minimum travel length in accordance with LEED – EQ Credit 5.
 5. Color: As selected by the Architect from the manufacturer's standard color palette. Provide samples for approval.
 6. Mat size shall be 6'-0" deep and 6" wider than the door opening on each side.
 7. The Contractor is to verify quantity of mats to be provided.

PART 3 EXECUTION

3.1 INSTALLATION

- A. Install surface-type units to comply with manufacturer's instructions, at locations indicated and coordinated with entrance locations and traffic patterns.
1. Anchor the fixed surface type frame members to floor with devices spaced as recommended by manufacturer.

END OF SECTION

23

DIVISION

HEATING, VENTILATION AND AIR-CONDITIONING

SECTION 23 02 00
BASIC MATERIALS AND METHODS FOR HVAC SYSTEMS

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.
- B. Refer to Division 1 for all requirements pertaining to General Provisions.

1.2 WORK INCLUDED

- A. Access doors.
- B. Piping and equipment identification.
- C. Electrical requirements.
- D. Painting.
- E. Concrete work.
- F. Fabricated steel supports.
- G. Excavation, trenching and backfilling.
- H. Placing of equipment.

1.3 RELATED WORK

- A. DIVISION 9 - FINISHES (Access Doors - Painting).
- B. DIVISION 3 - CONCRETE.
- C. DIVISION 31- SITEWORK (Excavation).

1.4 APPLICABLE PUBLICATIONS

- A. The publications listed below form a part of this Section to the extent referenced.
 - 1. American Institute of Steel Construction (AISC) Publications
 - 2. American National Standards Institute (ANSI) Standards
 - 3. American Society for Testing and Materials (ASTM) Publications
 - 4. American Welding Society (AWS) Publications
 - 5. Underwriters Laboratories, Inc. (UL) Standards

1.5 SUBMITTALS

- A. General: Where submittals are required, comply with Division 1 requirements.
- B. Shop Drawings: Submit drawings of fabricated steel supports where proposed supports are not in accordance with details on drawings, or where drawings do not detail supports. Submittal for acceptance is required.
- C. Product Data: Submittal for other than fabricated steel supports is not required. Product data for the following shall be included in the operation and maintenance manuals. Submittal for acceptance is not required.
 - 1. Access doors.
 - 2. Piping and equipment identification.

PART 2 – PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

- A. Access Doors:
 - 1. Acudor
 - 2. Elmodor Manufacturing, Co.
 - 3. Karp Metal Associates, Inc.
 - 4. Larsen's Manufacturing Co.
 - 5. Milcor
- B. Piping and Equipment Identification:
 - 1. Communications Technology Corp.
 - 2. Craftmark Identification Systems, Inc.
 - 3. EMED Co., Inc.
 - 4. Florida Marking Products, Inc.
 - 5. Marking Services, Inc.
 - 6. Seton Name Plate Corp.
 - 7. W.H. Brady Co., Signmark Division

2.2 FABRICATION

- A. Access doors:
 - 1. Access doors: UL labeled where installed in fire rated walls, partitions, and ceilings. Door rating shall be not less than wall, partition, or ceiling rating.
 - 2. Frames: 16 gauge steel, flush trim, with corners welded and ground smooth, masonry anchor strap for masonry walls, bolt holes for mounting in framed openings.
 - 3. Non-fire rated doors: 13 gauge steel, concealed continuous piano hinge with dust flap, flush screwdriver operated lock with stainless steel cam and studs.
 - 4. Fire rated doors: 20 gauge steel welded pan type, concealed continuous piano hinge with stainless steel pins, key-operated latch bolt, interior latch release, automatic door closer, automatic door latch when door closes. The door panel shall contain 2- inch thick insulation in sandwich type construction.
 - 5. Finish of doors and frames: Prime coat of rust inhibitive baked enamel, except as specified otherwise.
 - 6. Finish of doors and frames in wet areas, and in areas with surfaces subject to wet cleaning: No. 4 satin stainless steel.
- B. Piping and Equipment Identification:
 - 1. Pipe markers: Sub-surface printed plastic, with protective undercoating. Markers shall be permanently curled for snap-on installation for pipe sizes (including insulation) up to 6" diameter. For external diameters above 8". Marker shall be secured using cable ties for indoor use and stainless steel banding or ultraviolet resistant plastic for exterior use. Markers for outdoor installation shall be over-laminated with Tedlar™ on polyester ultraviolet damage and fading. Markers shall identify the pipe contents and direction of flow through 360 degree visibility range. Marker size, letter size, letter color, wording and background color shall be in accord with ANSI A13.1 – Scheme for the Identification of Piping Systems. Based on Marking Services Inc. Model MS-970 Coiled Plastic Markers for indoor use and Model MS-995 Maxilar Marker for exterior use.
 - 2. Valve tags: Contractors Option:
 - a. Indoor:

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- 1) 19 gauge brass, 1-1/2 inch round, with 1/4 inch high black pipe service letter abbreviation above 1/2 inch high black valve number. Pipe service letter abbreviation shall be in accord with legend on drawings. Valve tag attachment shall be 4 ply 0.018 copper wire meter seal or #6 solid brass bead chain with locking link. Based on Marking Services Inc.
- 2) 1/16 inch thick plastic, 1-1/2" round, with 1/4 inch high black pipe service abbreviation above 1/2 inch high black valve number. Pipe service letter abbreviation shall be in accord with legend on drawings. Color of valve tag shall match pipe marker color. Valve tag attachment shall be 4 ply 0.018 copper wire meter seal or #6 solid brass bead chain with locking link. Based on Marking Services Inc.
- b. Outdoor Service:
 - 1) 19 gauge brass, 1-1/2 inch round, with 1/4 inch high black pipe service letter abbreviation above 1/2 inch high black valve number. Pipe service letter abbreviation shall be in accord with legend on drawings. Valve tag attachment shall be 4 ply 0.018 copper wire meter seal or #6 solid brass bead chain with locking link. Based on Marking Services Inc.
 - 2) 19 gauge Type 304 stainless steel, 1-1/2" round, with 1/4 inch high pipe service abbreviation above 1/2 inch high black valve number. Pipe service letter abbreviation shall be in accord with legend on drawings. Color of valve tag shall match pipe marker color. Valve tag attachment shall be 4 ply 0.018 stainless wire meter seal or #6 Type 304 stainless steel bead chain with locking link. Based on Marking Services, Inc.
3. Valve chart frame: Self-closing, satin-finished, extruded aluminum with glass window, 8-1/2 inch by 11 inch chart size.
4. Equipment nameplates:
 - a. Indoor: Shall be 1/16 inch thick plastic with black satin surface and white core. Lettering shall be engraved through the surface color to expose the core color. Plate size shall be a minimum of 2-1/2 inch by 4 inch, with 3/4 inch high lettering for equipment and 3/4 inch by 2-1/2 inch, with 3/16 inch high lettering for ceiling grid labeling. Equipment identifying name and number shall be in accord with schedules on the Contract Documents. Plate manufacturer shall furnish pre-drilled hole locations for pop riveting. Where pop riveting is not suitable, a suitable adhesive for permanently attaching plate to equipment shall be provided.
 - b. Outdoor: Shall be 125 Mil rigid plastic constructed of printed legend sealed between two layers of chemically-resistant plastic to resist ultraviolet damage. Plate size shall be a minimum of 2-1/2 inch by 4 inch, with 3/4 inch high lettering for equipment. Equipment identifying name and number shall be in accord with schedules on the Contract Documents. Plate manufacturer shall furnish pre-drilled hole locations for pop riveting. Where pop riveting is not suitable, a suitable adhesive for permanently attaching plate to equipment shall be provided.
 - c. Based on Marking Services Inc. Model MS-215 Max-Tex.
- C. Electrical Requirements: Product description not applicable to this Section.
- D. Painting: Product specified in Division 9 - FINISHES.
- E. Concrete Work: All work is provided under Division 3.
- F. Fabricated Steel Supports:
 1. Steel angles, channels, and plate shall be in accordance with ASTM A36.
 2. Steel members, including fasteners, exposed to weather shall be galvanized.
- G. Excavation, Trenching, and Backfilling: Product description not applicable.
- H. Placing of Equipment: Product description not applicable.

PART 3 – EXECUTION

3.1 GENERAL

- A. Installation of materials and equipment shall be in accord with the manufacturer's written instructions, except as specified.

3.2 INSTALLATION

- A. Access Doors:
 - 1. Furnish access doors for installation under Division 9 - FINISHES.
 - 2. Deliver access doors to the appropriate trade well in advance of the time they are needed so as to avoid unnecessary delay of the work.
 - 3. Access doors shall be sized as indicated on drawings. If no size is given, provide access door of size suitable for servicing equipment or valve. Unless otherwise noted, the minimum size for an access door shall be 12" x 12".
 - 4. Access doors shall be provided where indicated and if not indicated, where required.
 - 5. Access doors shall be installed so as to allow full door swing.
 - 6. Where full swing and access is not possible, removable doors shall be provided.
 - 7. Access doors not required in lay-in-tile ceilings.
- B. Piping and Equipment Identification:
 - 1. Install pipe markers adjacent to each valve and fitting, at each branch connection, on each side of wall, floor, and ceiling penetrations, where entering and leaving underground areas, and at minimum 40 foot spacing on horizontal and vertical pipe runs. Markers shall be arranged for easy reading at eye level.
 - 2. Provide valve tags on all valves exposed or concealed unless otherwise noted.
 - 3. Attach valve tag to stem of each valve to be tagged. Valve numbers shall follow in sequence the Owner's existing valve numbers, where applicable.
 - 4. Provide a marker for each valve and equipment to be tagged, located above lift-out tile ceilings. The marker shall be 1/16 inch thick plastic with a satin surface and white core. Color of the marker shall match color of piping identification system. Lettering shall be engraved through the surface color to expose the core color. Plate size shall be 3/4 inch by 2-1/2 inch, with 3/16 inch high lettering for ceiling grid labeling. Plate manufacturer shall furnish suitable adhesive for permanently attaching plate to ceiling grid.
 - 5. Provide a minimum of 4 valve charts. Chart information shall indicate job name, Contractor name, date of installation, valve number, valve location, valve type, valve purpose, and system in which installed. Mount framed chart in equipment room and insert copy of chart in each operating and maintenance manual under separate tabbed section labeled "Valve Chart". Where project drawings include a piping flow schematic, request AutoCad file from Engineer and label all of the valves according to the valve chart and frame in an 18" x 24" frame in main mechanical or pump room.
 - 6. Provide air and water flow diagrams installed in waterproof, laminated frames on the wall in each Mechanical Room. Air flow diagrams shall show locations of dampers, sensors, and exhaust fans associated with the air handling unit. Water flow diagrams shall show shut-off valves and control valve locations.
 - 7. Permanently affix nameplate to each item of equipment using stainless steel pop rivets. Where irregular surface impede direct attachment of plates, affix plate to sheet metal bracket and attach bracket to equipment with screws, bolts or suitable adhesive from nameplate manufacturer.

8. Refrigeration System - Additional Requirements:
 - a. Marking and Signage:
 - (1) Provide a permanent sign containing the following information:
 - (a) Name and address of installer.
 - (b) Kind of refrigerant.
 - (c) Lbs. of refrigerant.
 - (d) Field test pressure applied.
 - (2) Provide a permanent sign: Main electrical supply, i.e., main compr. disc.
 - (3) Provide metal tags with 0.5" letters:
 - (a) Shut-off valves to each vessel, i.e., L.P. receiver shut-off.
 - (b) Relief valve.
 - (4) Piping shall be marked as either:
 - (a) Refrigerant - High Pressure - Liquid or Hot Gas.
 - (b) Refrigerant - Low Pressure - Suction, Pumped Liquid Supply or Pumped Liquid Return.
- C. Electrical Requirements: Refer to Division 26 for electrical requirements.
- D. Painting:
 1. All equipment shall be furnished with a factory- applied galvanized, prime paint, or finish paint finish. Touch-up damaged surfaces of equipment immediately.
 2. Paint for galvanized surfaces shall be in accordance with ASTM A780 using zinc rich compound.
 3. Paint wooden mounting backboards with two coats of gray enamel prior to making attachments to the board.
 4. For quality control refer to DIVISION 9 - FINISHES.
 5. Remove all dirt, rust, scale, grease, pipe dope, solder flux, and welding slag from all surfaces to be painted.
 6. Paint immediately, under this Division, all damaged galvanized surfaces. Paint galvanized metal surfaces behind grilles with two coats of flat black paint.
 7. Apply rust inhibitive primer to ferrous surfaces of shop fabricated steel supports.
 8. Paint immediately under this division all field and shop welded joints in piping or equipment supports with 2 coats of grey metal primer.
 9. All exposed piping shall have a PVC jacket, per ANSI Standard with the following colors:
 - a. Chilled water supply Dark blue
 - b. Chilled water return Light blue
 - c. Condensate piping Orange
- E. Concrete Work:
 1. Concrete pads and curbs for supports of equipment shall be a minimum of 4" high with chamfered edges and sized for approved equipment. Furnish drawings to Division 3 Contractor.
 2. Surfaces of concrete shall be troweled smooth. When forms are removed, fill voids with cement and rub smooth with rubbing stone.
 3. Do not pour concrete when ambient temperature is less than 40°F and falling.
- F. Fabricated Steel Supports:
 1. Because of the small scale of the drawings, details of equipment support are not always shown. It shall be the responsibility of the contractor to provide supports as required for safe and adequate support.
 2. Fabricated steel supports and ladders may be shop or field-fabricated and shall be in accord with details on drawings.

3. When details are not indicated, the contractor shall submit proposed support detail for review. The contractor shall bear all cost in producing this detail in the bid. This includes but is not limited to structural engineering support.
 4. Steel members shall be saw cut, with corners ground smooth, and shall be assembled with welded or bolted connections at Contractor's option. Connections shall be in accord with specified AISC Publications.
- G. Excavation, Trenching, and Backfilling:
1. Definitions:
 - a. Satisfactory material includes all materials except those classified "unsatisfactory", "unyielding" or "unstable".
 - b. Unsatisfactory material includes those materials containing roots, organic matter, trash, debris, frozen materials, stones larger than 3 inches in any dimension, and materials classified by ASTM D 2487 as OL, OH, and PT.
 - c. Unyielding material consists of rock and gravelly soils with stones greater than 3 inches in any dimension, or as defined by the pipe or tank manufacturer, whichever is smaller.
 - d. Unstable material consists of material too wet to properly support the pipe or tank.
 - e. Select granular material consists of well-graded sand, gravel, crushed gravel, crushed stone, or crushed gravel, crushed stone, or crushed slag composed of hard, tough, and durable particles, and shall contain not more than 10 percent by weight of material passing a No. 200 mesh sieve, and no less than 95 percent by weight passing the 1 inch sieve. The maximum allowable aggregate size shall be 3 inches, or the maximum size recommended by the pipe or tank manufacturer, whichever is smaller.
 2. Excavation, trenching, and backfilling for site utility piping systems as specified in DIVISION 31 - SITEWORK.
- H. Placing of Equipment:
1. Coordinate setting of equipment with the requirements of other trades so as to avoid conflicts and to insure compatibility. Equipment shall not block access for installation of other equipment.
 2. Set base mounted equipment on permanent and finished supports. Temporary support, if any, shall be removed prior to making final pipe, duct, or electrical connections to equipment.
 3. Adjust suspended equipment to final elevation prior to making pipe, duct, or electrical connections.
 4. Exercise caution during equipment placing operations to insure that structure is not overloaded.
 5. Do not move heavy equipment across floor or roof of insufficient load bearing capacity to support such equipment. Provide bracing or shoring as required or use crane to place equipment directly on permanent and finished support.
 6. Secure all roof mounted equipment to the structure adequately to resist overturning, uplift and sliding forces for basic wind speeds indicated for this location in Figure 1609 of the Florida Building Code, Latest Edition.

7. Guards shall be provided where appliances, equipment, fans or other components that require service are located within 10 feet of a roof edge or open side of a walking surface and such edge or open side is located more than 30 inches above the floor, roof or grade below. The guard shall extend not less than 30 inches beyond each end of such appliance, equipment, fan or component and the top of the guard shall be located not less than 42 inches above the elevated surface adjacent to the guard. The guard shall be constructed so as to prevent the passage of a 21-inch-diameter sphere and shall comply with the loading requirements for guards specified in the Florida Building Code.

END OF SECTION

SECTION 23 05 00
COMMON WORK RESULTS FOR HVAC SYSTEMS

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.
- B. Comply with Sections 01 33 00 – Submittal Procedures and 01 60 00 – Material Equipment and Approved Equals.

1.2 ARTICLES INCLUDED

- A. Definitions.
- B. Permits, Fees and Notices.
- C. Applicable Publications.
- D. Code Compliance.
- E. Scope of Work.
- F. Record Drawings.
- G. Intent of Drawings and Specifications.
- H. Quality Assurance.
- I. Submittals.
- J. Product Requirements, Equals, and Substitutions.
- K. Manufacturers Instructions.
- L. Transportation and Handling.
- M. Storage and Protection.
- N. Cutting, Patching and Demolition.
- O. Cleaning Up/Removal of Debris.
- P. Operating and Maintenance Manuals.
- Q. Training of Owners Operators.
- R. Guarantee of Work.
- S. System Testing.

1.3 ARTICLES

- A. Definitions:
 - 1. The term "As indicated" means as shown on drawings by notes, graphics or schedules, or written into other portions of contract documents. Terms such as "shown", "noted", "scheduled" and "specified" have same meaning as "indicated" and are used to assist the reader in locating particular information.
 - 2. The term "Provide", means furnish and install as part of the work covered in Division 23.
 - 3. The term "Furnish" means furnish only, for installation, as part of this contract, by other Divisions.
 - 4. The term "Install only" means to install under the work of Division 23 equipment furnished by other Divisions, or by the Owner.
 - 5. The term "Owner's Representative" when referenced herein shall be the Architect or the Engineer acting as his designated representative unless otherwise noted.

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6. The term "design" as it pertains to the work of this division shall describe the basic intent, component sizing, component relationships and overall architecture of the Plumbing system. The design is generally schematic in nature and will require specific detailing after the accepted products are determined.
 7. The term "detail" as it pertains to the work of this division shall describe the work required by the contractor to assure a fully coordinated installation of the material and equipment supplied. When requested, the contractor shall produce detailed shop drawings or sketches indicating the actual placement of the equipment or material supplied; also including how the equipment or material interfaces with work of other sections or divisions within the contract documents.
 8. The term "workman-like manner" as it pertains to the work of this division shall describe a neat well organized high quality installation system (piping, etc.). Routing shall be well thought out providing adequate service clearance and maximum use of space. Equipment placement shall exhibit proper clearances for service. All lines (piping, etc.) shall be run straight and true, parallel or perpendicular to building structure neatly supported.
 9. For additional definitions refer to the General Conditions.
- B. Permits, Fees and Notices: Comply with the General Conditions.
- C. Applicable Publications:
1. Publications listed in each Section form a part of that Section to the extent referenced.
 2. When a standard is specified by reference, comply with requirements of that standard, except when requirements are modified by the Contract Documents, or applicable codes establish stricter standards.
 3. The Publication or Standard is the publication in effect as of the bid date, except when a specific date is listed.
- D. Code Compliance:
1. Life Safety Code - NFPA 101
 2. Florida Building Code 2017
 3. Florida Accessibility Code, 2017
 4. National Electric Code 2014
 5. Florida Mechanical Code 2017)
 6. State Requirements for Educational Facilities (SREF), 2014
 7. NFPA Standards, Latest Edition.
- E. Scope of Work: The work to be performed under this Division consists of the satisfactory completion of all HVAC as indicated in the Contract Documents.
- F. Record Drawings: Comply with the General Conditions.
- G. Intent of Drawings and Specifications:
1. The intent of the drawings and specifications is to establish minimum acceptable quality standards for materials, equipment and workmanship, and to provide operable HVAC systems complete in every respect.
 2. Existing conditions, dimensions, etcetera, depicted on the drawings are taken from the "as-built" drawings of the original construction supplemented by field observation. The contractor is cautioned to field verify all existing conditions, dimensions, etcetera, notifying the Owner's Representative of any discrepancies other than those minor in nature, for direction, prior to ordering or fabricating equipment or materials. Anything mentioned in the specifications and not shown on the drawings, or shown on the drawings and not mentioned in the specifications, shall be of like effect as if shown or mentioned in both. In case of difference between drawing and specifications, the more stringent shall govern, unless the discrepancy conflicts with applicable codes, wherein the code shall govern.

3. The drawings are diagrammatic, intending to show general arrangement, capacity and location of system components, and are not intended to be rigid in detail. Final placement of equipment, other system components, and coordination of all related trades shall be the contractor's responsibility.
 4. Due to the small scale of the drawings, and to unforeseen job conditions, all required offsets and fittings may not be shown but shall be provided at no additional change in contract cost.
 5. In the event of a conflict, the Owner's Representative will render an interpretation in accordance with the General Conditions.
- H. Quality Assurance:
1. All equipment furnished under this Division shall be listed and labeled by U.L., ETL or a nationally recognized testing laboratory (NRTL).
 2. Material furnished under this Division shall be standard catalogued products of recognized manufacturers regularly engaged in the production of such material and shall be the latest design.
 3. Materials shall be the best of their respective kinds. Materials shall be new except where the specifications permit reuse of certain existing materials.
 4. Work provided for in these specifications shall be constructed and finished in every part in a workmanlike manner.
 5. All items necessary for the completion of the work and the successful operation of a product shall be provided even though not fully specified or indicated on the drawings.
 6. All work to be performed by qualified and experienced personnel specifically trained in their respective field.
 7. All work of this division shall be carefully interfaced with the work of other divisions to assure a complete, functioning system or systems.
- I. Submittals:
1. In addition to all other submittal requirements elsewhere in the contract documents, the contractor shall comply with the following.
 2. Submittal for acceptance is required only on those items specifically requested in the specification section that applies.
 3. For products and equipment that do not require a submittal for acceptance, submit a separate letter for each specification section certifying that all products and equipment will be provided in compliance with the contract documents.
 4. Provide submittal data in accordance with the General Conditions and/or as listed below.
 5. Designate in the construction schedule, or in a separate coordinated schedule, the dates for submission and the dates that the submittals will be needed in order to meet construction schedule. This schedule shall be submitted prior to or in conjunction with the first submittal. Processing of submittals may be delayed pending the receipt of this schedule at the reviewer's discretion.
 6. Submittal data shall be presented in a clear and thorough manner and referenced to the specification section.
 - a. Where applicable, data shall be identified by reference to sheet and detail, schedule or room numbers, equipment or unit number as shown on Contract Drawings.
 7. Prepare performance and product data as follows:
 - a. Clearly mark each copy to identify pertinent products or models, delete non-pertinent data.
 - b. Show performance characteristic and capacities.
 - c. Show dimensions and clearances required.
 - d. Show wiring or piping diagrams and controls.

- e. Clearly list any deviation in the submittals from the requirements of the contract documents.
- f. Include installation requirements.
8. Manufacturer's standard schematic drawings and diagrams:
 - a. Modify drawings and diagrams to delete information not applicable to the work of this project.
 - b. Supplement standard information to provide information specifically applicable to the work of this project.
9. Prohibition of Asbestos and PCB:
 - a. The use of any process involving asbestos or PCB, and the installation of any product, insulation, compound of material containing or incorporating asbestos or PCB, is prohibited. The requirements of this specification for complete and operating mechanical systems shall be met without the use of asbestos or PCB.
 - b. Prior to the Final Review field visit the Contractor shall certify in writing that the equipment and materials installed in this Project under this Division 22 contain no asbestos or PCB. Additionally, all manufacturers shall provide a statement with their submittal that indicates that their product contains no asbestos or PCB. This statement shall be signed by a duly authorized agent of the manufacturer.
10. Letter of Certification: Where a submittal is not required, provide letter certifying that the work will be completed in strict accordance of the specified requirements. In the event the contractor wishes to alter the requirements of the specification for whatever reason, this should be clearly explained in this letter noting that this alteration may require additional submittal requirements.
11. Schedules: Where schedules are called for, submit schedule indicating which products will be used and to what extent by system, location, size, etc.
12. Where samples are requested, samples shall be of sufficient size and quantity to clearly illustrate:
 - a. Functional characteristics of the product, with integral related parts and attachment devices.
 - b. Full range of color, texture, and pattern.
 - c. Where a mock-up is specified, erect at the Project site, in a location acceptable to the Owner's Representative. Size or area shall be that specified or as agreed upon during pre-construction or other job site meetings.
 - d. Where mock-up is not a permanent part of the installation, remove mock-ups at conclusion of work or when acceptable to the Owner's Representative.
13. The Contractor shall:
 - a. Review Shop Drawings, Product Data and Samples prior to submission.
 - b. Determine and verify:
 - 1) Field measurements.
 - 2) Field construction criteria.
 - 3) Catalog numbers and similar data.
 - 4) Conformance with specifications.
 - 5) All submittals have been properly interfaced with the requirements of this and other divisions of work so as to assure a complete, functioning system in accordance with the contract documents.
 - 6) Provide ¼" drawings of ALL mechanical rooms, with dimensions clearly indicating equipment maintenance clearances and electrical NEC required clearances. NO mechanical room walls shall be built until the engineer and the owner have approved the shop drawings for the mechanical equipment and clearances.

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- c. Coordinate each submittal with requirements of the work and of the Contract Documents.
 - d. Clearly identify any deviations in the submittals from requirements of the Contract Documents. Any deviations not specifically disclosed in the submittal shall be solely at the risk of the Contractor and shall be subject to discovery at any time. Any undisclosed deviations shall be corrected by the Contractor to comply with the requirements of the Contract Documents at no cost to the Owner regardless of the action code accorded the submittal by the Owner's Representative.
 - e. Do not release equipment for shipment, begin fabrication or work on any items requiring submittals for acceptance until all submittals are returned with the Owner's Representative acceptance.
 - f. Make submittals promptly, and in such sequence as to cause no delay in the work or in the work of any other contractor.
14. Number of Submittals: Comply with the Division 1, Specification Section 01 33 00 – Submittal Procedures.
15. Submittals shall contain:
- a. The date of submission and the dates of any previous submissions.
 - b. The Project title and number.
 - c. Contract identification.
 - d. The names and phone numbers including personal contact of:
 - 1) Contractor.
 - 2) Supplier.
 - 3) Manufacturer.
 - e. Identification of the product, with the specification section number and contract document description clearly indicated.
 - f. Field dimensions, clearly identified as such.
 - g. Relation to adjacent or critical features of the work or materials.
 - h. Applicable standards.
 - i. Identification of deviations from Contract Documents.
 - j. Identification of revisions on re-submittals.
 - k. Contractor's stamp, initialed or signed, certifying to review of submittal, verification of products, field measurements and field construction criteria, and coordination of the information within the submittal with requirements of the work and of Contract Documents.
 - l. Each submittal shall be limited to a single specification section. Submittals shall not be grouped with other sections in common binders or under common control sheets except as defined in paragraph m. below. Each submittal shall have a cover/control sheet containing the information listed above (a thru k) and have a minimum of 8" x 3" clear space for the general contractors, engineers, and architects review stamp.
 - m. The first group of submittals shall be sent in a minimum of one (or if required) two hard cover view type 3-ring binder(s) White, sized to hold 8-1/2" x 11" sheets:
 - 1) Binder is to be adequately sized to comfortably hold required submittals. Minimum spline size to be 1", maximum spline size to be 3" (provide additional binders if 3" size is not sufficient to properly hold submittals).
 - 2) Binder cover and spline to have outer clear vinyl pockets. Provide correct designation of project in each pocket. Description sheets are to be white with black letters, minimum of 11" high and full width of pocket. Description is to describe project and match project drawing/project manual description.
 - n. Submittals not complying with these requirements may be returned with no action taken at the reviewer's discretion.

16. Re-submittals shall contain:
 - a. The date of re-submission and the dates of all previous submissions.
 - b. A copy of the Engineer's comments from the previous submittal.
 - c. An itemized response to each of the Engineer's comments specifically outlining the changes or corrections being made. As an example; this could be either noting the page(s) of the previous submission that are affected and what changes have been made or noting specific additional information being provided.
 - d. Submittals not complying with these requirements may be returned with no action taken at the reviewer's discretion.
 - e. Turnaround time and copies as indicated in Section 01 33 00 – Submittal Procedures.
17. The Owner's Representative will (if they so desire):
 - a. Review submittals promptly and where special attention is requested, review in accordance with the schedule required.
 - b. Review the submittal for general compliance with the contract documents. The contractor is responsible for quantities, dimensions, placement of the product, coordination with all other trades occupying the space, maintain service clearance, function and compliance with the written installation instructions.
 - c. Turnaround time will be per Division 1.
 - d. Review comments will be per Division 1.
18. Resubmission requirements for "as specified" products.
 - a. Make any corrections or changes in the submittals required by the Owner's Representative and resubmit until accepted.
 - b. A submittal shall only be reviewed a maximum of 3 times. If upon the second resubmission an accepted action cannot be rendered (No Exceptions Noted or Make Corrections as Noted), the contractor shall supply the basis of design product and bear all costs incurred by the Owner's Representative during the review process until an accepted submittal is achieved.
19. The Contractor shall maintain one copy of all accepted submittal data including letters of compliance in a job site file.
- J. Product Requirements, Equals and Substitutions: *Comply with the General Conditions, but the following are in addition to:*
 1. In addition to all other requirements for submittals, equals and substitutions elsewhere in the contract documents, the contractor shall comply with the following.
 2. Product Requirements:
 - a. The specifications sections under Article 2.1 "ACCEPTABLE MANUFACTURER", lists suppliers found acceptable for this project. The names listed are manufacturers who meet the minimum acceptable standards that this project dictates. The list is furnished as a guide. Even though a manufacturer is named, he must still provide the type and quality of equipment specified as well as equipment that will fit within the allotted space and within the design weight allowance, etc. Being named does not imply permission for that manufacturer to provide an alternative product or design. Other manufacturers not named will be considered to be equal providing they furnish a product of the type and quality specified.
 - b. In certain cases, foundations and/or structural supports or electrical requirements for equipment specified in this Division are provided under other divisions of the specifications. Where an alternate acceptable manufacturer's product is provided, this contractor shall coordinate the revised requirements and include an allowance for any cost differential.
 - c. If the list, under Article 2.1 "ACCEPTABLE MANUFACTURERS" names only one manufacturer followed by "No Substitutions" that product shall be supplied.

3. Substitutions: *Comply with the General Conditions, but the following are in addition to:*
- a. A substitution is defined as any product not meeting the requirements as outlined in PART 2 - PRODUCTS. A different design accomplishing the same result will be considered a substitution. The same design requiring a larger motor, or more space or a structural change to accommodate larger weight, etc., will be considered a substitution. If a manufacturer who is not listed as an "ACCEPTABLE MANUFACTURER" wants to have his product considered as an equal or as a substitution, he shall submit details to the Engineer 10 days in advance of bid date and a decision will be rendered. If necessary, a clarification will be issued in the form of an Addendum. No substitution requests shall be considered after the Bid.
 - b. Submit a separate request for each product, supported with complete data, with drawings and samples as appropriate, including.
 - 1) Comparison of the qualities of the proposed substitution with that specified in tabulated format.
 - 2) Changes required in other elements of the work because of the substitution.
 - 3) Effect on the construction schedule.
 - 4) Cost, extra credit or statement of no change in contract price.
 - 5) Any required license fees or royalties.
 - 6) Availability of maintenance service, and source of replacement materials.
 - c. The Engineer shall be the judge of the acceptability of the proposed substitution.
 - d. A request for a substitution constitutes that the Contractor:
 - 1) Has investigated the proposed product and determined that it is equal to or superior in all respects to that specified.
 - 2) Will provide the same warranties for the substitution as for the product specified.
 - 3) Will coordinate the installation of the substitution into the work and make such other changes as may be required to make the work complete in all respects.
 - 4) Waives all claims for additional costs, under his responsibility, which may subsequently become apparent.
 - 5) Will absorb all costs incurred by the substitution when affecting other trades including but not limited to electrical, structural, architectural, etc.
 - 6) Will absorb any cost incurred by the Engineer in review of the substituted product if the acceptance of the substituted item creates the need for system modification and/or redesign, or if the substituting contractor exhibits negligence in his substituting procedure thus submitting inferior, misapplied or miss-sized equipment. In the event of additional engineering costs the billing structure shall be agreed upon prior to review by all involved parties.
 - 7) Will provide drawing to prove substituted manufacturer meets all accessibility requirements.
4. Engineer will review requests for substitutions with reasonable promptness, and will issue an addendum or notify Contractor, in writing, of the decision to accept or reject the requested substitution.
5. Substitutions will not be considered when they are indicated or implied on shop drawing or product data submittals, without separate written request, or if acceptance requires revision to the contract documents.
6. The engineer will review substitution submittals for compliance a maximum of two times. If the submittal or substituted product does not comply with the contract documents on the second submittal, the submittal and product will be rejected and the specified product will be required.

7. The Contractor may request further review of the substitution after the second submittal rejection if the contractor agrees in writing to accept responsibility for the cost of additional review time and expenses by the Engineer.
 8. In the event a substitution is rejected, supply the products which constituted the basis of design at no change in the contract price.
 9. Installation of substitutions without the Owners approval shall be cause of immediate rejection and removal without extra cost to the Owner.
- K. Manufacturer's Instructions:
1. Installation of work shall comply with manufacturer's printed instructions.
 2. Should job conditions or specified requirements conflict with manufacturer's instructions, consult with Engineer for clarification. Do not proceed with work without clear instructions.
- L. Transportation and Handling: Comply with General Conditions.
- M. Storage and Protection:
1. Store products in accord with manufacturer's instructions, with seals and labels intact and legible.
 2. Store products to prevent damage by the elements. Space temperature shall be controlled as required to prevent condensation and metal corrosion or damage to electrical or electronic parts are the result of condensation.
 3. Arrange storage in a manner to provide easy access for inspection. Make periodic inspections of stored products to assure that products are maintained under specified conditions, and free from damage or deterioration.
 4. Provide protection as necessary to prevent damage after installation.
 5. Products which suffer damage due to improper storage shall not be installed and if found in place, shall be removed and replaced at the contractors expense.
- N. Cutting and Patching: Comply with the General Conditions.
- O. Cleaning Up/Removal of Debris:
1. Comply with the General Conditions.
 2. Maintain a clean work area. Construction debris shall be immediately removed from all newly erected work.
- P. Operating and Maintenance Manuals: *Comply with the General Conditions, but the following are in addition to:*
1. Quantity: Comply with the General Conditions.
 2. Format: Adequately sized for contents, minimum 1" and maximum 3" spline size, hard cover, view type, 8-1/2" x 11 loose leaf binders. Binder covers to have outer clear vinyl pocket on front cover and spline. Provide correct project designation and contents description in each pocket. Use as many as required. Do not overload binders.
 3. Content:
 - a. Cover sheet.
 - b. Table of contents (as follows):
 - 1) Description of systems.
 - 2) Design parameters.
 - c. Point by Point System Check-out: Provide tabulated results indicating compliance with contract document requirements.
 4. Detailed Preparation Requirements:
 - a. The cover sheet shall list: project name, location, architect, structure engineer, mechanical engineer and electrical engineering firm name with address, telephone number and project manager's name for this project.
 - b. Each major heading in the table of contents shall have a large distinctive, clearly marked, non-erasable, plastic encased tab.

- c. The description of systems will be provided by the design engineer for insertion at the time of review and turn-over to owner. This description of systems will be an updated version of the narrative included in this Section and will be an overview of the entire system. It will be the basis for the starting of the owner's instruction program.
 - d. Each section shall have the following sub-tabs. Sub-tabs shall be similar to the main tabs but of a different color.
 - 1) Specifications: The specification shall be copied and inserted complete with all addenda.
 - 2) Submittal: This section shall include all accepted submittal data. If submittal was not required, include technical data as specified.
 - 3) Installation Instructions: If the product, such as pipe, etc., does not have any written installation instructions, include a statement "Manufacturer's Written Installation Instructions not Available - Product Installed in Accordance with Specifications and Good Practice".
 - 4) Operation and Maintenance Instructions: These shall be the written manufacturer's data edited to omit reference to products or data not applicable to this installation.
 - 5) Parts List: These shall be edited to omit reference to items not applying to this installation.
 - 6) Equipment Supplier: This section shall include the name, address and telephone number of the manufacturer's agent and/or service agency supplying or installing and starting up of the equipment.
 - 7) System Description: This section shall include that portion of the overall description included in the beginning of the manual as it applies to each sub-section. In sections such as pipe, valves and fittings, a statement shall be included "Not Applicable to this Section." Data for this section will be added by the design engineer when the manuals are submitted for review and forwarded to the owner.
- Q. Training of Owners Operators:
1. The manufacturer shall provide a comprehensive training outline for the Owner & Engineer to review within 90 days of final completion.
 2. The manufacturer & contractor shall provide 24 hours of training on the plumbing system, plumbing fixtures and all water heating systems.
 3. The owners shall be given comprehensive training in the understanding of the systems and the operation and maintenance of each major piece of equipment.
 4. The contractor shall be responsible for scheduling the training which shall start with classroom sessions followed by hands on training on each piece of equipment. Hands on training shall include start-up, operation in all modes possible, shut-down, and any emergency procedures.
 5. The manufacturer's representative shall provide the instructions on each major piece of equipment. These sessions shall use the printed installation, operation and maintenance instruction material included in the O&M manuals and shall emphasize safe and proper operating requirements and preventative maintenance.
- R. Guarantee of Work:
1. Comply with the General Conditions.
 2. Where applicable, furnish manufacturer's written warranty for materials and equipment.
 3. Insert warranties in appropriate locations in operating and maintenance manuals.
 4. Materials and equipment having seasonal operation limitations, shall be guaranteed for a minimum of one year from date of seasonally appropriate test, and acceptance in writing by the Owner, unless specific Division 23 specifications specify a longer period.
- S. System Testing:

1. Provide all necessary labor, materials, and equipment to successfully complete all system testing necessary for building occupancy and owner acceptance.
2. Provide all necessary labor, materials, and equipment to assist contractors of other division to complete system testing necessary for building occupancy and owner acceptance, wherever an inter-relationship between Division 23 and the work of other divisions exists.
3. Tests shall be repeated as necessary until all occupancy and operation permits are granted and the owner accepts the project.
4. Testing schedule requirements per the Table below:

Training Schedule							
Div.	Training Description	Subcontractor	Demo . Date	Time	Hours	Comments	Personnel to attend training
	Energy Management System				16 hours	On the job owner training conducted by a technician fully qualified to conduct such training.	
	HVAC Systems				80 hours	Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain units. See specifications for complete list of training requirements.	

PART 2 – PRODUCTS (Not Applicable)

PART 3 – EXECUTION (Not Applicable)

END OF SECTION

SECTION 23 05 18
CONTROL WIRING

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.
- B. Refer to Division 1 for all requirements pertaining to General Provisions.

1.2 WORK INCLUDED

- A. Thermostat and temperature sensor control wiring.

1.3 DEFINITIONS

- A. Control Wiring: All wiring, high or low voltage other than power wiring, required for the proper operation of the mechanical systems.
- B. Power Wiring: All line voltage wiring to the mechanical equipment. Line voltage which also serves as a control circuit, such as a line voltage thermostat, or involves interlocking with a damper, shall be considered control wiring.

1.4 QUALITY ASSURANCE

- A. All work will be in accordance with the requirements of the National Electrical Code – Latest Edition.

1.5 SUBMITTALS

- A. Submittals are not required.

PART 2 – PRODUCTS

2.1 MATERIALS

- A. All material used in the completion of the wiring under this section will comply with the requirements of Division 26 Electrical.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Cooperate completely with the contractor for Division 26.
- B. Provide all conduit, wire, and accessories necessary to complete the control wiring as specified under WORK INCLUDED.
- C. Because of variations in requirements from manufacturer to manufacturer, all details may not be included in the Contract Documents. This sub-contractor must obtain approved coordinated wiring diagrams before proceeding with the control wiring.

- D. All control wiring shall be properly installed in an approved raceway system or when allowed, run exposed in concealed spaces. All control wiring run in exposed areas shall be in an approved raceway unless otherwise noted.
- E. Control wire run exposed shall be neatly bundled and routed parallel and/or perpendicular to building structure or equipment casing. Routing of wire shall be so that it does not interfere, chafe, or obstruct service or maintenance of the equipment served.
- F. Exposed control wire shall be properly secured and/or supported within equipment enclosures. Cable shall be secured on no greater than 18" centers.
- G. All openings made for the passing of control wire shall be properly bushed to prevent chafing. Hole size shall be suitable for the quantity of wires or tubing passing through while allowing for ease of pulling and future expansion. Oversized holes beyond these requirements are not allowed.
- H. Holes made within air handling equipment which may allow the transfer or bypassing of air shall be properly sealed after wire is pulled. Expanding foam sealant and proper backing material will be acceptable. Seal shall be suitable for maximum unit operating pressures.
- I. Attachments of control devices, raceway and cable supports shall be made with proper attachments. Self-drilling screws which result in exposed end will not be acceptable. Bolts and nuts shall be used with bolt head exposed to view. All fasteners located where exposed to weather or moisture shall be stainless steel or cadmium plated.
- J. Any opening, holes or cuts in equipment enclosures or building structure not used shall be neatly sealed. On equipment, the seal or patch shall be of similar material sealed and painted to match.
- K. The control contractor shall clean all unused or scrap material from the equipment enclosure.
- L. All control wire shall be identified by proper cable identification methods. Verify how cables shall be labeled with the Owner's Representative prior to the start of work. All termination shall be labeled and labels clearly visible.
- M. All control devices, cabinets, equipment, and raceways shall be labeled. Verify how the hardware shall be labeled with the Owner's Representative prior to the start of work.
- N. Splices in control wire are not allowed unless the length of run is too great to allow for a continuous run. When splices become necessary, they shall be solder connected with heat shrink tubing. When raceway is used, all splices shall be in junction boxes.
- O. All control devices or wiring located exposed to weather or moisture shall be in an approved raceway system. This system shall be properly supported and sealed to prohibit moisture convection or transfer. Provide flexible conduit similar to seal tight for connection to all equipment. EMT and set screw fittings are not acceptable. All exterior raceway shall be IMC (Intermediate Metallic Conduit) or better with threaded fittings.

END OF SECTION

SECTION 23 05 93
TESTING, ADJUSTING, BALANCING OF HVAC SYSTEMS

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Specification Sections, apply to this Section.

1.2 WORK INCLUDED

- A. Checking each piece of equipment for proper installation and operation.
- B. Balancing air and water distribution systems to provide design fluid quantities.
- C. Measuring and recording of fluid quantities.
- D. Electrical measurement.
- E. Verification of performance of all equipment and sequence of operation of automatic controls.
- F. Checking sound levels and vibration isolators for proper function and measurement and correction where a problem or question of acceptability exists.
- G. Recording and reporting results on sub-contractors standard report forms and on commissioning data sheets where these have been provided.
- H. Provide testing of all smoke detectors that are installed in the HVAC system.
- I. The HVAC system shall be tested and balanced twice: once in the summer cooling mode and once in the winter heating mode.

1.3 REFERENCES

- A. Air Diffusion Council (ADC) 1062R3 Equipment Test Code
- B. Associated Air Balance Council (AABC)
National Standards for Field Measurements and Instrumentation, Total Balance System Balance, Air Distribution - Hydronic Systems, Volume 1.

1.4 SUBMITTALS

- A. Submit complete description of procedures, instrument calibration and qualifications of personnel actually doing testing and balancing on this project prior to beginning of any balancing.
- B. Submit schedules of test data readings in organized, schematic, tabulated format. Include schematic drawing showing location of all readings.
- C. Submit as-built drawings showing locations of all readings.

1.5 QUALITY ASSURANCE

- A. Adjusting, balancing and testing procedures and compilation of test data shall be performed by a Certified Test and Balance Engineer or by personnel trained and supervised by a Certified Test and Balance Engineer.
- B. Test and balance personnel shall be qualified to perform testing and balancing in accordance with AABC or NEBB procedures.

1.6 TOLERANCES

- A. Balance final air and water flow to within plus or minus 5 percent of specified quantities. Caution is urged on systems where diversity has been taken and the total flow exceeds the equipment capacity. In this case, the system must be sectioned as necessary to get proper terminal flow.

1.7 GENERAL COMMENTS

- A. Water Balance: Readings from venturi flow meters, or automatic pressure independent flow control devices will be given highest priority as to accuracy. Where neither is specified pump curves and chiller or boiler pressure drops are to be correlated to establish flow. Pressure drop across coils or chillers is to be used to proportion flow. Volt and ampere readings will be used as checks. Temperature data will be used only as a performance check and not for balancing.
- B. Air Balance: Readings from a pitot tube traverse will be given highest priority as to accuracy. Terminal flow shall be as taken from the terminal DDC flow readings. Outlet flow as established by flow hood will be used to pro-rate air flow. Pressure readings as well as voltage and ampere readings will be used for check purposes only. Temperature readings will be used as a check against performance.
- C. All readings shall be cross-checked for accuracy. These cross-checks shall be tabulated within the report.

PART 2 – PRODUCTS (Not Applicable)

PART 3 – EXECUTION

3.1 INTENT OF DRAWINGS AND SPECIFICATIONS

- A. Review drawings and specifications with regard to adjusting and balancing.
- B. Additional balancing devices which, in the opinion of the TAB sub-contractor, would aid in the adjusting and balancing of the systems shall be brought to the attention of the contractor prior to bid time so that the contractor may make allowances to cover the provision of these additional devices in the original bid.
- C. Minor modifications in system design, which in the opinion of the Contractor, would aid in the adjusting and balancing of the systems may be provided subject to approval of the Owner's Representative at no additional cost to the Owner. Design modifications shall not lessen the operating efficiency of the systems.

3.2 WATER BALANCE

- A. Ascertain that piping systems have been cleaned, flushed, drained and properly refilled and that all strainer baskets have been removed, cleaned and properly reinstalled prior to beginning water balancing procedure.
- B. In the event that TAB work is started prior to the completion of the water treatment portion of work, the TAB contractor shall make a random recheck as directed by the Owner's Representative. The results of this re-check shall be included in the final report.
- C. Variable flow pumping systems having two-way control valves and using automatic pressure independent system of flow control for secondary hot water heating and chilled water systems.

1. With one pump running and all manual and automatic control valves open, record GPM stamped on each automatic flow control device and read and record the pressure drop across those which have dual pressure taps, as well as across each coil and applicable equipment.
 2. With pump running as described above and all manual and automatic control valves open read and record pressure drop across each pump. Also read and record pressure drop at shut off. Plot these points on the submitted pump curves using the sum of the flow control device GPM as the total system flow.
 3. Record the pump speed required to get the pressure drop across the flow control valve having the highest pressure drop to 6 PSI. If this is 85% or greater, no pump impeller change will be required. If less than 85%, the pump impeller will have to be trimmed. Advise the Owners Representative before proceeding.
 4. Operate lag pump to be sure performance is the same at each step.
 5. Manually set pump speed to 20% (minimum speed) and record flow and pressure difference.
- D. For constant flow systems without automatic flow control devices, using manual valves with memory stop. Before balancing the system, the following procedures shall be executed. Where multiple cooling towers and chillers are shown, all systems shall be in operation.
1. With all balancing devices and all manual and automatic control valves wide open, read and record pressure drop across each chiller.
 2. With all balancing devices and all manual and automatic control valves wide open, read and record pressure drop across each pump. Also read and record pressure drop across pump at shut off. Plot point on submitted pump curve.
 3. If pressure drop exceeds the design and the pump pressure readings indicated a flow in excess of design, the pump impeller may have to be trimmed. Submit this data to the Owners Representative for early review, before proceeding with balancing to determine if an impeller trim is warranted.
 4. In multiple unit systems, balance with all units in operation. Then record readings with each possible combination in use, i.e., in a three chiller installation, balance with all three in operation, then record each combination of two and finally each individual unit operating alone.

3.3 AIR BALANCE

- A. Check system visually and audibly for leakage and proceed with balancing as outlined by AABC or NEBB.
- B. Balance for full flow shall be based on dirty friction loss across the filters. Artificially blank-off sections on a uniform pattern as required to simulate this condition.
- C. Variable Volume Systems:
 1. With supply fan running at 100% speed and all terminals calling for full airflow, read and record flow and fan suction and discharge static pressure readings. Pressure readings shall be obtained using procedures outlined in AMCA Publication 203-90 Field Performance Measurement of Fan Systems. Plot on submitted fan curve.
 2. Set flow at each terminal for maximum values as indicated in terminal schedule using hand held operators terminal (HHOT) furnished with the terminal controls. Provide actual measured outlet flow to temperature controls sub-contractor for setting calibration constants in DDC controls. Normally diversity is taken in the fan selection. Close other terminals as required to get full flow as required for balancing. Pro-rate terminal flow to diffusers.
 3. Set minimum flow to values as indicated in terminal schedule.
 4. Where applicable, adjust return fan for specified differential flow. Record fan signal fan speed and other data at full flow and at minimum flow.

5. Record all data on terminals and supply and return fan including voltage and amperage on primary air fans and return fans at full flow.
- D. Constant Volume Systems:
1. Adjust each fan to deliver the specified quantity of air at the specified temperatures to all areas of the building served by the air system. Where the installed drive can not be adjusted to obtain the required flow, advise the contractor so that the necessary drive change can be made. Adjust speed, in direct proportion to actual vs. required cfm. Exercise caution because amps vary with the cube of speed.
 2. Determine air volume in ducts by use of pitot tube, and inclined manometer. Plug all holes in duct.
 3. Determine air quantity through air grilles or diffusers by use of flow hood with direct readout meter calibrated in CFM. If use of flow hood is not possible, use velometer nozzle as recommended by air device manufacturer. Calculate air quantity based on air device area factors provided by the air device manufacturer.
 4. Compare duct traverse to accumulated airflow at diffusers. If the two do not reconcile, examine system for leaks and, report to contractor so that he can repair and repeat.

3.4 AIR HANDLING UNIT PERFORMANCE TESTING

- A. Recognizing that it will be unlikely that the performance testing will be done on a design day, cooling and heating coil performance shall be recorded as follows.
1. With fan delivering design air flow and control valves open to deliver design water flow, read and record entering and leaving drybulb and wetbulb temperatures, air and waterside flow, pressure loss values and water temperatures.
 2. Through the contractor, request performance data from the equipment supplier based on the measured air flow and entering air temperatures and measured water flow and entering water temperature. Submit this data with test data for review.

3.6 CONTROLS ADJUSTMENT

- A. Check the automatic temperature controls to ascertain that the specified sequence of operation is occurring. Record thermostat set point and room conditions in each space. This includes checking each terminal box to ensure that supply air goes to minimum position before heat comes on.
- B. Compare temperature of space (taken with test instrument) to temperature read by thermostat or temperature sensor. Tabulate results.

3.7 TEST DATA SCHEDULES

- A. Submit typewritten schedules of test data readings.
- B. Schedules shall record the specified reading, the first reading taken and the final balanced reading for the following items.
- C. Where Commissioning Forms are provided, equipment data shall be recorded on these forms for comparison with submitted design data.
- D. In the case of off season performance testing of air handling equipment and refrigeration equipment, include manufacturer's projected performance for comparison.
- E. Pumps (Provide all parameters in the normal and ice making modes):
1. Mark number
 2. Manufacturer and model number
 3. gpm flow - specified and actual

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4. Shut-off head
 5. Pump heat and full load amperage - specified and actual
 6. Motor hp - specified and actual
 7. Voltage, phase, and cycles - specified and actual
- F. Fans:
1. Mark number
 2. Manufacturer and model number
 3. Total cfm supply and rpm - specified and actual
 4. Static pressure (discharge static - suction static)
 5. Full load amperage - specified and actual
 6. Voltage, phase, and cycles - specified and actual
- G. Air Devices (Grilles, Registers, Diffusers, and Louvers):
1. Mark number
 2. Room number
 3. cfm - specified and actual
 4. Size
 5. Effective area
 6. Velocity FPM - specified and actual
- H. Chiller (Provide all parameters in the normal and ice making modes):
1. Mark number
 2. Unit manufacturer and model number
 3. Total chilled water and condenser water gpm - specified and actual
 4. Chilled water entering and leaving temperature - specified and actual - one hour log
 5. Cooler and condenser pressure drop - specified and actual
 6. Compressors full load amperage - specified and actual
 7. Voltage, phase, and cycle - specified and actual
 8. Ambient temperature, DB/WB, time of day, and weather conditions at time of test
 9. Cooler tons, condenser tons, and operating kW compared to specified conditions
- I. Variable Volume Boxes:
1. Mark number
 2. Unit manufacturer and model number
 3. Location and room number
 4. Air handler number
 5. Maximum / minimum and heating supply cfm - specified and actual
 6. For DDC controls: measure and record computer readout and calibration factor at design conditions.
 7. Electric heat, KW – specified and actual
 8. Voltage, phase and cycles – specified and actual
- J. Air Monitor:
1. Mark number
 2. Unit manufacturer and model number
 3. Duct size/monitor size factor
 4. Cfm - specified and actual.
 5. Velocity or velocity pressure
- K. Direct Expansion Cooling Coil:
1. Designation.
 2. Nameplate data.
 3. Entering air DB (F).
 4. Entering air WB (F).
 5. Leaving air DB (F).

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6. Leaving air WB (F).
 7. Evaporative pressure (PSIG).
 8. Air flow (CFM).
 9. Load calculation (tons).
- L. Heat Exchangers:
1. Designation.
 2. Nameplate data.
 3. Pressure, entering and leaving ice water.
 4. Calculated/measured flow (GPM) ice water.
 5. Temperature, entering and leaving chilled water.
 6. Pressure, entering and leaving chilled water.
 7. Calculated/measured flow (GPM) chilled water.
 8. Temperature, entering and leaving chilled water.
 9. Heat balance: ice water tons vs. chilled water tons.
- M. Kitchen Exhaust Hoods:
1. Designation.
 2. Nameplate data.
 3. Exhaust air CFM, from pilot tube traverse.
 4. CFM and velocity in capture area.
 5. All final readings used to determine cfm.
- N. Motors:
1. Designation.
 2. Nameplate HP, voltage, and full load amperes.
 3. RPM.
 4. Motor amperes and voltage under operating conditions.
 5. For belt drive applications, motor amperes and voltage under no load condition.
- O. Fans:
1. Designation.
 2. Nameplate data.
 3. RPM.
 4. Static pressure, inlet, and discharge.
 5. CFM from pitot tube traverse of discharge duct.
 6. Final pitot tube traverse sheets showing all readings.
- P. Main and Sub-main Ducts:
1. Designation and location.
 2. CFM from pitot tube traverse.
 3. Final pitot tube traverse sheets showing all readings.
- Q. Air Handlers:
1. Mark number
 2. Unit manufacturers and model number
 3. Total supply air cfm and rpm - specified and actual
 4. Return air cfm - specified and actual
 5. Outside air cfm - specified and actual
 6. Unit static pressure profile, including total fan static
 7. Specified total and external static pressure
 8. Water gpm flow, coil pressure drop, and entering and leaving temps - specified and actual
 9. Coil - entering and leaving air DB/◆F and WB/◆F - specified and actual
 10. Outside air DBF and WBF at time of test
 11. Voltage, phase, and cycle specified load conditions

12. Hand calculations of the BTUh at test conditions of Total cooling, Latent cooling and Sensible cooling.
13. Btu per hour when converted to specified load conditions gpm by means of heat transfer test.

3.8 OPERATING TESTS

- A. Operate systems to demonstrate that systems have been properly adjusted and balanced, and to demonstrate that the systems' performance conforms with the intent of the specifications and drawings.
- B. The balancing contractor shall make available to the Owner's operating personnel a Certified Test and Balance Engineer for a minimum of 16 hours, two working days, not necessarily consecutive, with all necessary equipment to demonstrate that all systems operate as intended and that the balancing reports are accurate.
- C. This demonstration will occur after the balancing contractor has submitted his reports to confirm that all systems or portions of the systems that coincide with the building's occupancy schedule, are adjusted and balanced.
- D. Conduct tests with natural building heating and/or cooling loads for a minimum 4 hours duration.

END OF SECTION

SECTION 23 07 00
HVAC INSULATION

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.
- B. Refer to Division 1 for all requirements pertaining to General Provisions.

1.2 WORK INCLUDED

- A. Duct Systems Insulation.
- B. Piping Systems Insulation.
- C. Equipment Insulation.
- D. Underground Pipe Insulation.
- E. Cold Pipe Hanger Support Blocks.
- F. Accessories.

1.3 QUALITY ASSURANCE

- A. All products within the conditioned air stream or active plenums shall comply with the NFPA 90A Flame/Smoke rating of 25/50 and comply with UL 181 erosion limitations. Fire hazard ratings shall be as determined by NFPA-255, "Method of Test of Surface Burning Characteristics of Building Materials" - ASTM E84 or UL 723.
- B. All adhesives, cements, finishes, jackets, etc., shall be UL listed or labeled for use as applied to insulation and designed specifically for use in the installation.
- C. All insulation shall be installed in accordance with National Commercial & Industrial Insulation Standards (NCIA).
- D. Kitchen hood exhaust duct fireproofing system shall have specific acceptance by ICBO, and SBCCI. Material shall be non-hazardous and contain no asbestos or toxic materials. Suitable for 2 hour fire rating.

1.4 SUBMITTALS

- A. Submit schedule indicating type of insulation, thickness, vapor barrier or coating by system and size.
- B. Product data, along with installation operation and maintenance instructions, shall be included in the operation and maintenance manuals.
- C. Submit details of insulated removable covers using the actual equipment dimensions, concrete base sizes and piping arrangements.
- D. Submit in accordance with Division 1 requirements.

1.5 GENERAL REQUIREMENTS

- A. Factory-applied insulation is specified under the applicable equipment Section of these specifications. It is listed here for reference only.
- B. Acoustical duct liner is specified under Section 23 31 01 - Shop Fabricated Ductwork. It is listed here for reference only.

- C. Packages and standard containers of materials shall be delivered unopened to job site and shall have the manufacturer's label attached giving a complete description of the material.

1.6 DEFINITIONS

- A. The term "exposed" means exposed to view in finished spaces, in equipment rooms, in fan rooms, in closets, in utility corridors, in tunnels, on roof, in storage rooms, and in other spaces as indicated.
- B. The term "concealed" means concealed from view, and includes all spaces not defined as exposed.
- C. The term "unconditioned" space shall mean all places where the temperature surrounding the pipe or duct has not been conditioned consistent with conditioned spaces, and shall include mechanical equipment rooms, non-active ceiling plenums, and non-accessible chases. This term shall also include conditioned spaces where the humidity levels are allowed to rise above 65% RH.

PART 2 – PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

- A. Fiberglass Insulation:
 - 1. Owens-Corning Fiberglas
 - 2. Knauf Fiberglass
 - 3. CertainTeed
 - 4. Johns Manville
- B. Closed Cell Elastomeric Insulation:
 - 1. Armacell LLC
 - 2. Johns Manville
 - 3. Rubatex
- C. Foamglass Insulation:
 - 1. Pittsburgh Corning
 - 2. Cell-U-Foam Corp.

2.2 DUCT INSULATION AND FIREPROOFING REQUIREMENTS

- A. Refer to the drawings for insulation size and type requirements. Please contact the engineer prior to bid with any questions regarding the insulation requirements.

2.3 PIPE INSULATION REQUIREMENTS

- A. Refer to Section 23 02 00 for PVC jacket color specifications requirements on all piping exposed or concealed.

2.4 MATERIALS

- A. Duct Insulation: Blanket Fiberglass: Flexible fibrous glass, flame retardant factory laminated foil-skrim-kraft (FSK) vapor barrier, 2" stapling flange, maximum vapor permeance of .02 perm/in., minimum density of 1.5 lb/cf, maximum conductivity per 1" thickness of .28 at 75°F mean temperature. Based on Knauf Duct Wrap.

B. Pipe Insulation (to 450°F):

1. Rigid Fiberglass: Resin bonded fibrous glass, flame retardant, factory applied all service jacket vapor barrier with self sealing pressure sensitive lap joints, molded to accommodate pipe, maximum vapor permeance of .02 perm/in. and a puncture resistance of 50 units, minimum density 4.0 lb/cf, maximum conductivity per 1" thickness of .23 at 75°F, .29 at 200°F and .43 at 400°F mean temperature. Based on Knauf Pipe Insulation.
2. Closed Cell Elastomeric (Small Pipe Sizes up to 5 Inches): Flexible, elastomeric, closed cellular, tubular molded to accommodate piping, smooth outer surface suitable for painting with vinyl lacquer type coating, water resistant, non absorbent, ozone resistant, minimum density of 4 lb/cf, maximum conductivity per 1" thickness of .27 at 75°F mean temperature. Based on Armacell LLC AP Armaflex and Self-seal Armaflex 2000.
3. Closed Cell Elastomeric (Large Pipe Sizes, 6" and Larger): Sheet type, flexible, elastomeric, closed cellular, smooth outer surface suitable for painting with vinyl lacquer type coating, water resistant, non absorbent, ozone resistant, minimum density of 4 lb/cf, maximum conductivity per 1" thickness of 2.7 at 75°F mean temperature. Based on Armacell LLC Armaflex II.
4. Foamglas: Rigid, preformed sections of 100% rigid cellular glass dimensionally complying with ASTM C585 standards, non-absorptive of moisture after immersion, water vapor permeability 0.00 perm/in. impervious to common acids (except hydrofluoric), non-combustible, 100 PSI compressive strength when capped with hot asphalt, 8.5 #/cu.ft. density, thermal conductivity 0.33 BTU-In./Hr./Sq.Ft./F @ 50°F. Based on Pittsburgh Corning Foamglas.

C. Equipment Insulation:

1. Closed Cell Elastomeric Sheet type, flexible, elastomeric, closed cellular, smooth outer surface suitable for painting with vinyl lacquer type coating, water resistant, non absorbent, ozone resistant, minimum density of 6 lb/cf, maximum conductivity per 1" thickness of .27 at 75°F mean temperature. Based on Armacell LLC Armaflex II.
2. Foamglas: Sections of 100% rigid cellular glass, non-absorptive of moisture after immersion, water vapor permeability 0.00 perm/in., impervious to common acids (except hydrofluoric), non-combustible, 100 PSI compressive strength when capped with hot asphalt, 8.5 #/cu.ft. density, thermal conductivity 0.32 BTU-In./Hr./Sq.Ft./F @ 50°F. Based on Pittsburgh Corning Foamglas.

D. Insulation Accessories: Aluminum Pipe Jacket and Fitting Covers: Jacket shall be 0.016" thick (26 gauge) embossed aluminum, sized to provide a 2" (min.) lap joint both longitudinally and circumferentially, with 3/4" min. wide x 0.015" min. (30 gauge) thick draw bands. Fitting covers shall be aluminum, 0.025" (22 gauge), min., thickness.

E. Cold Pipe Hanger Support Blocks: Lightweight, rigid, closed cell material having 100 lb/sq.in. compressive strength when capped with hot asphalt according to ASTM C240. Based on Pittsburgh Corning Foamglas.

F. Accessories:

1. Aluminum Pipe Jacket and Fitting Covers: Jacket .016" thick (28 ga.) embossed aluminum sized to provide a minimum 2" lap joint both longitudinal and circumferentially, minimum 3/4 inch x .015 inch thick (30 ga) draw bands. Covers .024 inch thick.
2. PVC pipe jacket and fitting covers used with insulation for pipe, elbows, tees, couplings, 25/50 flame/smoke ratings, suitable for temperatures to 500°F.
3. Glass Cloth Pipe, Duct and Equipment Jacket: Glass lagging cloth, 8 oz/sy treated weight. Secure with elastomeric insulating adhesive on elastomeric insulation, for fiberglass insulation use appropriate mastic finish as recommended by the insulation manufacturer with the perm rating of the mastic equal to or less than that of the insulation it is sealing.

4. Corner angles shall be minimum 28 gauge, 1 inch by 1 inch aluminum adhered to 2 inch by 2 inch heavy kraft paper.
5. Glass tape shall be a minimum density of 1.6 ounces per square yard, 4 inch wide with a 10 x 10 thread count per inch of width. Glass cloth shall be untreated.
6. Staples shall be outward clinching type, Type 304 or 316 stainless steel in accord with ASTM A 167 or Monel® coated.
7. Wire shall be soft annealed galvanized, or copper, 16 gauge, or nickel copper alloy.
8. Closed cell elastomeric insulated finish shall be a white water based flexible, acrylic latex enamel equal to WB Armaflex finish.
9. Insulation Tape: Closed cell elastomeric insulation: 2" wide x 1/8" thick.
10. Elastomeric Insulation Adhesive: Air drying contact adhesive for securing sheets to flat or curved metal surfaces and joining seams and butt joints of elastomeric insulation. Suitable for temperatures to 180°F, dried film not to exceed 25 for flame spread and 50 for smoke development when tested per ASTM E 84-84A method.
11. Vapor Barrier Mastic: Air drying flexible water based mastic used for applying a vapor barrier joint with glass cloth at insulation joints. Suitable for temperatures to 180°F, wet and dried film not to exceed 25 for flame spread and 50 for smoke development when tested per ASTM E 84-84A method. Maximum Perm rating of 0.08. , Childers Products Company, Inc. CP-35 Chil Therm® WB, Foster Products Corp. Product Data 30-80 Foster Vapor Safe® Coating, Marathon Industries, Inc. 590 LO-PERM, Richard's Paint Manufacturing CO., Inc. VBM-4, Vimasco Corp. 749 Vapor-Blok, or equal.
12. Acrylic Latex Finish and Sealers:
 - a. Elastomeric Insulations: Air drying flexible water based finish used for finishing flexible elastomeric insulation. Suitable for temperatures to 180°F, wet and dried film not to exceed 25 for flame spread and 50 for smoke development when tested per ASTM E 84-84A method. Armacell LLC WB Armaflex finish.
 - b. Foamglass Insulation: Air drying flexible water based sealer used for applying a vapor barrier seal over microscopic cracks that develop in the insulation. Suitable for temperatures to 180°F, wet and dried film not to exceed 25 for flame spread and 50 for smoke development when tested per ASTM E 84-84A method. Maximum Perm rating of 0.08. , Childers Products Company, Inc. CP-35 Chil Therm® WB, Foster Products Corp. Product Data 30-80 Foster Vapor Safe® Coating, Marathon Industries, Inc. 590 LO-PERM, Richard's Paint Manufacturing CO., Inc. VBM-4, Vimasco Corp. 749 Vapor-Blok, or equal.

PART 3 – EXECUTION

3.1 GENERAL REQUIREMENTS

- A. Install all insulation in strict accordance with the manufacturers written installation instructions.
- B. Provide a PVC jacket on all exposed rain leader piping, including but not limited to the Gym.
- C. All insulation work shall be performed by skilled mechanics regularly engaged in the insulation trade.
- D. Properly coordinate the insulation work with the other trades so that installation is performed with a minimum of conflict.
- E. Insulation shall not be applied on any piping or duct system requiring testing until testing is completed and approved by Engineer.
- F. Insulation shall not be applied until all systems are clean, dry, free of dirt, dust, or grease.

- G. The finished installation shall present a neat and acceptable appearance which includes but is not limited to: all jackets smooth, all vapor barriers sealed properly, no evidence of "ballooning" of the jackets, or sagging insulation, all valves, dampers, gauges, unions, etc. accessible. The Engineer shall be the final judge of acceptance of workmanship.
- H. All equipment nameplates on hot equipment shall be left uncovered. All equipment nameplates on cold equipment shall have a removable section sized to expose the nameplate. This section shall be clearly marked "NAMEPLATE".
- I. If proper maintenance procedures require access to the insulated equipment removable panels, sections or covers shall be provided to accomplish this. These access devices shall be constructed in a manner to assure easy access and sturdy construction. The contractor shall assume the responsibility to coordinate all equipment requiring insulation to be either factory or field insulated.
- J. Insulation and accessories shall be applied only at suitable application temperature and conditions as recommended by the manufacturer. Do not apply insulation to any surface while it is wet.
- K. Insulation shall be protected from moisture and weather during storage and installation.
- L. Insulation which has sustained moisture damage, torn jackets, or other damage due to improper storage or other reasons shall not be used. If evidence of this is sighted the Owner's representative reserves the right to require the insulating contractor to remove any and/or all insulation until the Engineer is satisfied that there is no longer any inferior insulation installed on this project.
- M. Insulation, fabric, and jacketing shall be protected from damage during construction. Damage by the insulator shall be repaired without cost to the Owner. Damage by others shall be reported in writing to the contractor.
- N. The insulation subcontractor is responsible for proper material storage at the work site.
- O. Work performed prior to receipt of approved documents or submittals, which later proves to be incorrect or inappropriate, shall be promptly replaced by the contractor without cost to the purchaser.
- P. Insulation shall not be installed until adequate access and clearances at control mechanisms, dampers, sleeves, columns, and walls have been provided.
- Q. All insulation at handholes, access doors or other openings, and adjacent to flanges and valves shall be neatly finished where exposed to view.
- R. All materials, accessories and methods of installation and fabrication are subject to the Owner's Representatives inspection and approval during any phase of the work.
- S. The insulation subcontractor shall prevent the accumulation of insulation debris in the buildings and on the premises of the Owner.
- T. The insulation subcontractor shall be responsible for his own safety program at the work site and shall provide instruction on safe practices for his workers assigned to the project. All employees are subject to the work rules at the job site.
- U. The insulation subcontractor shall familiarize himself with the progress and execution of the job and notify the proper parties of interferences and any problems with the proper installation of his materials.

3.2 INSTALLATION

- A. Duct Insulation:
 - 1. General:
 - a. Insulate or internally line all flexible duct connectors equal to or greater than adjacent insulation thickness.

- b. The tops of all diffusers shall be insulated same as connecting ductwork to prevent condensation.
 - c. Duct insulation at fire dampers shall be extended over supporting angle iron and sealed to wall.
2. Blanket Fiberglass Insulation:
- a. Insulation shall be tightly wrapped on the ductwork with all circumferential joints butted and longitudinal joints lapped 2 inches and stapled. Joints shall be finished with two coats of an approved vapor barrier mastic, reinforced with glass cloth extending 2 inches onto adjacent insulation. One coat of mastic shall be applied to the insulation prior to the application of the glass cloth, which shall be embedded in the mastic to ensure complete adhesion of the cloth. Additionally secure insulation to bottom of rectangular ducts over 24 inches wide with weld pins at no more than 18 inches on center.
 - b. Insulation shall be butted with facing overlapping all joints shall be finished with two coats of an approved vapor barrier mastic, reinforced with glass cloth extending 2 inches onto adjacent insulation. One coat of mastic shall be applied to the insulation prior to the application of the glass cloth, which shall be embedded in the mastic to ensure complete adhesion of the cloth. Breaks, punctures, pin penetrations in facing shall be sealed with vapor barrier tape and vapor barrier adhesive.
3. Rigid Fiberglass Insulation:
- a. Use boards in largest possible size to minimize seams. Do not use "scraps".
 - b. Shall be installed in all non-public exposed areas up to 10'-0" above finished floor.
 - c. Provide corner angles where insulation is subject to harm.
 - d. All fasteners shall be non corroding.
 - e. The insulation shall be applied by use of cup head weld pins. Such fasteners shall be spaced in accordance with NCIA recommendations, where NCIA standards do not address exact dimensions, cup head weld pins shall be spaced on 12" centers. Pin caps shall be covered with a round vapor seal patch that matches the jacket on the ASJ board. On cold ducts, these shall be coated so as to not cause condensation.
 - f. Ducts having sharp bends shall have the insulation scored as required to conform to the curved surfaces to provide a neat and acceptable appearance when finished.
 - g. Insulation edges and joints shall be finished with two coats of an approved vapor barrier mastic, reinforced with glass cloth extending 2 inches onto adjacent insulation. One coat of mastic shall be applied to the insulation prior to the application of the glass cloth, which shall be embedded in the mastic to ensure complete adhesion of the cloth.
 - h. Generally, rigid fiberglass material will only be used in finished or exposed areas, and it is intended that the finish present a neat and uniform appearance as to color and workmanship.
 - i. In finished areas, molded glass fiber insulation shall be used to insulate round ducts where commercially available sizes can be used.
 - j. Fittings on round ducts in finished areas shall be covered with premolded fiberglass fitting insulators equal to Insul-Coustic where sizes are available. For sizes where premolded fittings are not available use miter-cut segments of molded pipe insulation, wired in place, with all joints sealed with adhesive and smoothed out with a coat of insulating cement.

- k. On cold ducts, the fittings shall be finished with two coats of an approved vapor barrier mastic, reinforced with glass cloth extending 2 inches onto adjacent insulation. One coat of mastic shall be applied to the insulation prior to the application of the glass cloth, which shall be embedded in the mastic to ensure complete adhesion of the cloth. Hot ducts shall be finished in a similar manner, except the mastic need not be of the vapor barrier type.
- B. Pipe Insulation:
- 1. General:
 - a. All locations where the insulated surface is supported by hangers, the insulation shall be protected by shields or saddles properly skimmed to maintain a smooth outer surface, and proper insulation thickness. Chilled water piping, 3" and over shall have a section of foamglas insulation installed between the pipe and shield. 3 and 4" to be 12" long, 5" and 6" to be 18" long and 8" and over, 24" long. If the possibility exists that the hanger may conduct the temperature of the conveyed medium and thus cause condensation or personal injury due to high temperature, the hanger shall also be insulated. Joints between foamglas and pipe insulation shall be properly sealed.
 - b. All devices connected to or in line with the piping system shall be insulated greater than or equal to the connecting piping. This includes but is not limited to valves, air separators, expansion tanks, control valves, control devices, gauge connections, thermometer stems, chemical feed equipment, piping flexible connectors, etc. This is particularly important on ice water and refrigerant lines.
 - c. The insulation at threaded unions in steam and hot water piping shall be tapered and terminated with cement and glass lagging cloth and lagging adhesives.
 - d. Insulate exterior surfaces of all anchors and guides for chilled water and dual temperature piping systems.
 - e. A complete moisture and vapor barrier shall be installed wherever insulation is penetrated by hangers or other projections through insulation and in contact with cold surfaces for which a vapor seal is specified.
 - f. Cover fittings, flanges, unions, valves, anchors, and accessories with premolded or segmented insulation of the same thickness and material as the adjoining pipe insulation. Where nesting size insulation is used overlap pipe insulation 2 inches or one pipe diameter. Fill voids with insulating cement and trowel smooth. Elbows shall have not less than 3 segments per elbow. Secure insulation with wire or tape until finish is applied. Blanket inserts in lieu of premolded or segmented insulation is not allowed. Cover fittings with preformed PVC fitting covers.
 - g. Wrap all pressure gauge taps, thermometer wells and all other penetrations through insulation with closed cell insulation tape so as to prevent condensation.
 - h. Seal all raw edges of insulation.
 - i. For piping supported by hangers outdoors, apply a rainshield to prevent water entry.
 - 2. Rigid Fiberglass:
 - a. Provide PVC fitting covers for all fittings.
 - b. Align all jacket seams.
 - c. Assure all vapor barriers are properly sealed.
 - d. Provide PVC jacket over all exposed insulation in the equipment room.
 - e. All corner angles below 6'-10" shall have padded insulation and be marked with yellow stripes.
 - 3. Closed Cell Elastomeric:
 - a. All joints shall be sealed with adhesives.
 - b. Where the thickness is to be obtained by use of two layers of insulation, install with staggered joints.

- c. Finish:
 - 1) Concealed Indoors: No additional finish.
 - 2) Exposed Indoors: Provide PVC jacket over all insulation.
 - 3) Concealed Indoors: Provide PVC jacket over fittings fabricated from insulation sections or sheet.
 - 4) Outdoors: Provide aluminum pipe jacket.
- 4. Foamglas:
 - a. All joints, both longitudinal and circumferential shall be sealed with a vapor barrier mastic.
 - b. Thickness shown for refrigeration pipe to be obtained by use of two layers of insulation with staggered joints.
 - c. Finish:
 - 1) Exposed Indoors: Provide PVC jacket over all insulation that shall be sealed with an acrylic latex finish.
 - 2) Concealed: Provide PVC jacket over fittings fabricated from insulation sections or sheet. Provide ASJ over all other.
 - 3) Exposed Outdoors: Provide acrylic latex finish and aluminum pipe jacket.
- C. Equipment Insulation:
 - 1. Vessel and Large Pipe Insulation:
 - a. Insulation shall be of the same material as the piping which serves it and it shall be layered to obtain the required thickness. Maximum of 1-1/2" thick per layer.
 - b. All joints shall be staggered to avoid thermal gaps.
 - c. Sheet size shall be as large as possible to minimize seams. Do not use "scraps".
 - d. Securing shall be by welded studs and/or non-corrosive banding wire. Do not weld brackets, clips, or other devices to ASME coded pressure vessels or piping. Insulation pins or studs shall be as specified and installed in accordance with NCIA standards.
 - e. Finish shall be with PVC jacket or galvanized steel mesh wire and a finish coat of insulating cement minimum of 1/4" thick. After cement has cured apply glass lagging cloth and proper coating as directed by manufacturer. All corners shall have metal corner beads and provide acrylic latex finish.
 - 2. Removable Covers:
 - a. Equipment specified to have removable covers shall have insulation as specified in Paragraph 2.4, fastened to the inside surfaces of a 20 gauge galvanized sheet metal equipment cover.
 - b. The covers shall be of a sectionalized design and shall be custom-fitted around each piece of equipment. For ease of removal, joints between sections shall coincide with the splits or joints in the equipment. Joints between sections of the cover shall be held together with quick-connect trunk latches, and shall be gasketed to form a vapor-tite seal cover (for the passage of pipes, etc.) shall be provided with closed cell elastomeric collars to ensure a tight fit.
 - c. The box shall be fitted around each piece of equipment and split for removal to coincide with the split in the casing. The sections of the box shall be held together with quick disconnect trunk latches. Joints between box sections shall be gasketed to form a vapor seal. Void spaces in the box shall be packed with flexible fiberglass insulation. Openings around pump casing shall be provided with closed cell elastomeric collar to ensure tight fit.
 - d. Provide acrylic latex finish.

- e. Coordinate the piping of the drain, vent, gauge, and control lines to exit through the base or back section of the removable cover. The insulation of these pipes shall be totally independent of the removable cover.
3. Chilled Water Compression Tank and Filtering Systems: Surfaces shall be insulated with 1 inch thick closed cell elastomeric insulation board or pipe insulation, as applicable. Finish as specified for vessel and large pipe insulation.
- D. Cold Pipe Hanger Support Blocks:
 1. Provide on all chilled fluid systems pipe hangers and supports.
 2. Apply Pittcote 404 acrylic latex mastic filler over insulation and on ends.
 3. Apply Pittseal 444 butyl joint and penetration sealant at joint between foamglas and adjacent insulation.
 4. Provide vapor barrier system to match the vapor barrier on the adjacent system.
 5. Provide 20 gauge (min.) galvanized shield between the insulation and the hanger or support.
- E. PVC Jacket:
 1. Provide PVC sheet jacket over all exposed, indoor piping or insulation.
 2. Provide PVC pipe jacket over all exposed, indoor foamglas or elastomeric pipe insulation.
 3. Provide PVC fitting covers over all fittings fabricated from insulation sections or sheet material.
 4. PVC pipe jacket shall be applied with special attention given to achieving positive seal at all longitudinal and circumferential joints using a welding solvent on the longitudinal joint as recommended by the manufacturer. Slip joints to have 4" minimum lap and no welding solvent.
- F. Glass Cloth Jacket:
 1. Provide where specified.
 2. Provide acrylic latex finish.
- G. Flexible Acrylic Latex:
 1. Apply two coats to glass cloth jacket, concealed foamglas and closed cell elastomeric insulation.
 2. Refer to Division 9 for color to be used. If no instructions are given, provide a white finish.

3.3 MISCELLANEOUS ITEMS

- A. General: Provide insulation of any portion of a system or piece of equipment not previously discussed where ambient operating conditions will allow condensation to occur or whose surface temperature exceeds 115°F. Insulation materials and method shall be as directed by the Designer.
- B. Final Inspection: At final inspection, the finished surfaces of all exposed insulation shall be clean and without stains or blemishes. Repair and clean the insulation surfaces and, if necessary, to obtain a new appearance, shall coat discolored surfaces with off-white latex water-base semi-gloss paint or lagging adhesive, without a change in the contract price.

END OF SECTION

SECTION 23 31 00
HVAC DUCTS AND CASINGS

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.
- B. Refer to Division 1 for all requirements pertaining to General Provisions.

1.2 WORK INCLUDED

- A. Single Wall Round Ductwork and Fittings.
- B. Single Wall Round Snaplock Seam Galvanized Steel Ductwork and Fittings.
- C. Double Wall Round Ductwork and Fittings.
- D. Round Stainless Steel Ductwork and Fittings.
- E. Single Wall Round Flexible Ductwork.
- F. Insulated Round Flexible Ductwork.

1.3 QUALITY ASSURANCE

- A. All ductwork shall be fabricated within the guidelines established by the Sheet Metal and Air Conditioning Contractors National Association, Inc. (SMACNA) HVAC Duct Construction Standards - Metal and Flexible, latest edition.
- B. All ductwork shall be fabricated to withstand the pressure and velocity required on this project.
- C. All components, fasteners, sealants, adhesives, etc. in the conditioned air stream or exposed in active or non- active plenums shall conform to the NFPA 90A Standard for the Installation of Air Conditioning and Ventilating Systems and Standard for Flame/Smoke/Fire Contribution of 25/50/0.
- D. All ductwork shall conform to UL standard UL 181 Factory Made Air Duct Materials and Duct Connectors, latest edition. Applicable sections shall apply to shop fabricated ductwork.
- E. After fabrication and installation of all shop fabricated ductwork the fabricator and installer, if not the same, shall certify in writing to the Owner's representative that all shop fabricated ductwork and installation of same meets or exceeds the quality standards established by SMACNA.

1.4 SUBMITTALS

- A. Submission for acceptance is required.
- B. Product data, along with installation operation and maintenance instructions, shall be included in the operation and maintenance manuals.
- C. Submit in accordance with Division 1 requirements.

1.5 SHOP DRAWINGS

- A. Shop Drawings: Provide shop drawings of ductwork as follows:
 - 1. Draw to a scale of not less than 1/4 inch to one foot on the same size sheets as the contract drawings.
 - 2. Show duct sizes.

3. Show fitting details.
4. Show lighting and ceiling diffusers.

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

- A. Single Wall Round Ductwork and Fittings:
 1. Autoduct, Inc.
 2. Eastern Sheetmetal
 3. Hamlin Sheetmetal, Inc.
 4. Impulse Air.
 5. Lindab
 6. Semco Manufacturing, Inc.
 7. United McGill
- B. Single Wall Round Snaplock Seam Galvanized Steel Ductwork and Fittings:
 1. Alco Manufacturing Company.
 2. Crown Products Company.
 3. Hughes.
- C. Double Wall Round Ductwork and Fittings:
 1. Autoduct, Inc.
 2. Eastern Sheetmetal
 3. Hamlin Sheetmetal, Inc.
 4. Impulse Air.
 5. Lindab
 6. Semco Manufacturing, Inc.
 7. United McGill
- D. Round Stainless Steel Ductwork and Fittings:
 1. Autoduct, Inc.
 2. Eastern Sheetmetal
 3. Hamlin Sheetmetal, Inc.
 4. Impulse Air.
 5. Lindab
 6. Semco Manufacturing, Inc.
 7. United McGill
- E. Single Wall Round Flexible Ductwork:
 1. ATCO Rubber Products, Inc.
 2. Flexmaster USA, Inc.
 3. Flexible Technologies - Thermaflex®
- F. Insulated Round Flexible Ductwork:
 1. ATCO Rubber Products, Inc.
 2. Flexmaster USA, Inc.
 3. Flexible Technologies - Thermaflex®

2.2 FABRICATION

- A. Single Wall Round Ductwork and Fittings:
 1. Materials: Hot rolled, continuously annealed, hot dipped galvanized steel minimum of G-90, 0.90 oz/sf coating, conforms to ASTM A653.

2. Metal Gauges: Conform to the Sheet Metal and Air Conditioning Contractor's National Association, Inc. (SMACNA) HVAC Duct Construction Standards - Metal and Flexible, latest edition. The following table shall establish a minimum guideline unless the manufacturer has U.L. Standard 181 test results that show that lighter gages (thinner wall thickness) with intermediate corrugations (ribs) allow the gage reduction:

Pipe Diameter	Positive Internal Static Pressure in W.G.					
	0" - 2.0"		2.1" - 4.0"		4.1" - 10.0"	
	Spiral		Spiral		Spiral	
	Pipe	Fittings	Pipe	Fittings	Pipe	Fittings
6" - 10"	28	26	28	24	28	24
12"	28	26	28	24	26	24
14"	28	26	26	24	26	24
16"	26	24	26	22	24	22
18" - 26"	26	24	24	22	24	22
27" - 36"	24	22	22	20	22	20
37" - 50"	22	20	20	20	20	20
51" - 60"	20	18	18	18	18	18
61" - 84"	18	16	18	16	18	16

3. Duct Construction: Spiral wound, lockseam construction, slip joint or flanged connections as noted below under couplings.
4. Fitting Construction:
- a. 90 Deg. and 45 Deg. Ells: Solid - welded seam construction for dust collector use, Solid - welded seam or spot welded and bonded for general use. Radiused ells to be full radiused unless otherwise noted, mitered ells to have single thickness, turning vanes, slip joint or flanged connections.
 - b. Tees or Crosses: Solid - welded seam construction for dust collector use, Solid - welded seam or spot welded and bonded for general use. Tangential, unless otherwise noted or detailed, conical take off or reduction, slip joint or coupled ends. 180 Deg. or 45 Deg. as indicated.
 - c. Bellmouth: Solid - welded seam construction for dust collector use, Solid - welded seam or spot welded and bonded for general use. Spun metal, smooth converging bellmouth, round, gauge equal or greater than connecting duct.
 - d. Access Section:
 - 1) 7" Diameter and Less: Minimum 12" long flanged section, minimum four bolts per flange.
 - 2) 8" Diameter and Larger: Round or rectangular access cover, on welded raised section, pressure sensitive release suitable for manual release or emergency vacuum release, chain retainer, (see Para. 3.5: Schedules for Sizes).
 - e. Couplings:
 - 1) Joints 36" or less shall have 2" slip coupling.
 - 2) 38" or over shall be spiral mate.
 - f. Based on United McGill
- B. Single Wall Round Snaplock Seam Galvanized Steel Ductwork and Fittings:
- 1. Materials: Hot rolled, continuously annealed, hot dipped galvanized steel minimum of G-90, 0.90 oz/sf coating, conforms to ASTM A653.

2. Metal Gauges: Minimum of 26 gauge, with remaining sizes conforming to the Sheet Metal and Air Conditioning Contractor's National Association, Inc. (SMACNA) HVAC Duct Construction Standards Metal and Flexible, latest edition. The following table shall establish a minimum guideline:

Round Ducts:

<u>Duct Diameter</u>	<u>Spiral Pipe</u>	<u>Fittings and Longitudinal Seam Pipe</u>
3" thru 14"	26	24
15" thru 26"	24	22
27" thru 30"	22	20

3. Duct Construction: Snaplock seam construction, slip joint or flanged connections.

4. Fitting Construction:

- a. 90 Deg. and 45 Deg. Ells: Adjustable ells to be full radiused unless otherwise noted, slip joint or flanged connections.
- b. Tees or Crosses: Adjustable, unless otherwise noted or detailed, conical take off or reduction, slip joint or coupled ends. 180 Deg. or 45 Deg. as indicated.

- C. Double Wall Round Ductwork and Fittings:

1. Materials:

- a. Outer Duct: Hot rolled, continuously annealed hot dipped galvanized steel, minimum G- 90, 0.90 oz/sf (.001 inch thick/side) coating, conforms to ASTM 653.
- b. Liner: 1" thickness flexible fibrous glass minimum density 1.5 lb/cf, maximum conductivity per 1" thickness of .27 at 75°F mean temperature with a mylar coating.
- c. Inner Duct: Hot rolled continuously annealed, perforated hot dipped, galvanized steel, minimum G-90, 0.90 oz/sf (.001 inch thick/side) coating, conforms to ASTM 653.

2. Metal Gauges:

- a. Outer Duct: Conform to the Sheet Metal and Air Conditioning Contractor's National Association, Inc. (SMACNA) Duct Construction Standards, Metal and Flexible, latest edition. The following table shall establish a minimum guideline unless the manufacturer has U.L. Standard 181 test results that show that lighter gages (thinner wall thickness) with intermediate corrugations (ribs) allow the gage reduction:

Round Ducts:

<u>Spiral Pipe Inside Dia.</u>	<u>Shell</u>	<u>Perf. Liner</u>	<u>Fittings and Seam Pipe</u>	
			<u>Longitudinal Shell</u>	<u>Perf. Liner</u>
3" thru 8"	24	26 Non-Ribbed	24	24
9" thru 12"	24	28 Ribbed	24	24
13" thru 24"	22	28 Ribbed	22	24
25" thru 34"	20	28 Ribbed	20	24
35" thru 48"	20	28 Ribbed	20	22
49" thru 52"	18	28 Ribbed	18	22
53" thru 58"	18	26 Ribbed	18	22
59" thru 62"	16	26 Ribbed	16	22
63" thru 82"	16	22 Non-Ribbed	16	22

3. Duct Construction:

- a. Outer Duct: Spiral wound, lockseam construction, slip joint or flanged connections as noted below under couplings.
- b. Inner Duct: Spiral wound, lockseam construction, slip joint connections, mechanically bound to outer duct for vertical installation.

4. Fitting Construction:
 - a. 90 Deg. and 45 Deg. Ells: Die formed or welded segmented construction, radiused ell to be full radiused unless otherwise noted, mitered ell to have single thickness turning vanes, liner, and inner duct continuous.
 - b. Tees or Crosses: Tangential unless otherwise noted, conical take off or reduction coupled ends, 180 Deg. or 45 Deg. as indicated.
 - c. Bellmouth: Spun metal smooth converging bellmouth, round, single wall gauge equal to or greater than connecting duct.
 - d. Access Section:
 - 1) 7" Diameter and Less: Flanged section, minimum four bolts per flange. Double wall section.
 - 2) 8" Diameter and Larger: Round or rectangular access cover, on welded raised sections, pressure sensitive release suitable for manual release or emergency vacuum release, chain retainer, (see Para. 3.5 - Schedules for Sizes).
 - e. Couplings:
 - 1) Joints 36" or less shall have 2" slip coupling.
 - 2) 38" or over shall be spiral mate.
 - f. Based on United McGill.
- D. Round Stainless Steel Ductwork and Fittings:
 1. Materials: Exhaust duct shall be constructed of 304 or 316 stainless steel as scheduled with a 2B mill finish.
 2. Metal Gauges: Conform to the Sheet Metal and Air Conditioning Contractor's National Association, Inc. (SMACNA) Duct Construction Standards, Metal and Flexible, latest edition. The following table shall establish a minimum guideline unless the manufacturer has U.L. Standard 181 test results that show that lighter gages (thinner wall thickness) with intermediate corrugations (ribs) allow the gage reduction:

Pipe Diameter	Negative Internal Static Pressure in W.G.					
	0" - 2.0"		2.1" - 6.0"		6.1" - 10.0"	
	Pipe	Fittings	Pipe	Fittings	Pipe	Fittings
9" - 15"	26	24	24	22	24	22
16" - 26"	24	22	22	20	20	18
28" - 36"	22	20	20	18	18	16
38" - 50"	20	18	18	16	18**	16
52" - 60"	18	16	16	14	18**	16*

* Companion angle rings required.
 ** Girth rings required 60" O.C.

3. Duct Construction: Round and oval ducts shall be of the spiral lockseam or all welded construction.
4. Fitting Construction: Fittings shall be factory fabricated with all seams continuously welded.
5. Fitting Type: Refer to Section 2.2.A.4.
6. Joints:
 - a. Joints 36" or less shall have 2" slip coupling.
 - b. 38" or over shall be spiral mate.

- E. Uninsulated Round Flexible Ductwork:
1. High Pressure Application: Factory fabricated assembly of a trilaminate of aluminum foil, fiberglass, and polyester with a perm rating of .02 high tear strength and properties to resist temperature change, mildew, and age hardening. It shall be mechanically locked, without adhesives, into a formed aluminum helix on the ducts outside surface and be U.L. listed 181 Class 1 and comply with NFPA 90A and 90B. The material shall have a pressure rating of 12" w.g. positive pressure and -5" w.g. negative pressure through a temperature range of -20°F to +250°F. Based on Type NI-35 as manufactured by Flexmaster U.S.A., Inc., ATCO Rubber Products UPC #7 or Flexible Technologies – Thermaflex S-LP-10.
- F. Insulated Round Flexible Ductwork:
1. High Pressure Application:
 - a. Factory fabricated assembly of a trilaminate of aluminum foil, fiberglass, and polyester with a perm rating of .02, high tear strength and properties to resist temperature change, mildew and age hardening. It shall be mechanically locked, without adhesives, into a formed aluminum helix on the ducts outside surface and be U.L. listed 181 Class 1 and comply with NFPA 90A and 90B. The material shall have a pressure rating of 12" w.g. positive pressure and -5" w.g. negative pressure through a temperature range of -20°F to +250°F.
 - b. The duct material shall be factory wrapped in a blanket of fiberglass insulation with a C factor of .23 or less. The insulation shall be encased in a fire retardant reinforced aluminum material vapor barrier with a perm rating of not over .05 grains per square ft. per hour per inch of mercury.
 - c. Based on Type 3M as manufactured by Flexmaster U.S.A., Inc., ATCO Rubber Products UPC #036 or Omni Air 1200, or Flexible Technologies – Thermaflex M-KF.
 2. Low Pressure Application:
 - a. Factory fabricated assembly of a tri-laminate of aluminum foil, fiberglass and polyester with a perm rating of .02, high tear strength and properties to resist temperature change, mildew and age hardening. It shall be mechanically locked, without adhesives, into a formed aluminum helix on the ducts outside surface. It shall be U.L. listed 181 Class 1 and comply with NFPA 90A and 90B. The material shall have a pressure rating not less than 6" w.g. positive pressure and -3" w.g. negative pressure through a temperature range of -20°F to +250°F.
 - b. The duct material shall be factory wrapped in a blanket of fiberglass insulation with a C factor of .23 or less. The insulation shall be encased in a fire retardant reinforced aluminum material vapor barrier with a perm rating of not over .05 grains per square ft. per hour per inch of mercury.
 - c. Based on Type 5M as manufactured by Flexmaster U.S.A., Inc., ATCO Rubber Products UPC #036 or Omni Air 1200, or Flexible Technologies – Thermaflex M-KF.
- G. Ductwork, General: Each duct section shall have both ends covered with polyethylene or other suitable material to protect against the entrance of dirt, debris or water during shipment and storage prior to installation.
- H. DUCT SEALANT: Water-Based Joint and Seam Sealant: Flexible, adhesive sealant, used indoors or outdoors. Foster 32-19 Duct Fas, Childers CP-146 Chil Flex or Duro Dyne SAS.

PART 3 – EXECUTION

3.1 GENERAL REQUIREMENTS:

- A. Install in strict accordance with the manufacturer's written installation instructions.
- B. The drawings, due to their small scale, are diagrammatic in nature and are not necessarily complete in all details. For this reason not all necessary offsets, rises or falls are shown. Coordinate the installation of the ductwork with all other trades and to provide all necessary offsets, etc. as required for completion of this project without any additional cost to the Owner, Architect or Engineer.
- C. All ductwork shall be run parallel or perpendicular to building structure and seams or spirals shall be aligned whenever possible.
- D. All sizes indicated on the drawings are inside clear dimensions.
- E. All ductwork shall be properly sealed in a neat clean manner with all excess sealer wiped clean.
- F. Coordinate the location of, provide the necessary access and install all devices provided in other specification sections within Division 23, including but not limited to fire, smoke and/or balancing dampers, access and mounting for control devices, air flow measuring stations, etc., as apply to this project.
- G. All ducts passing through partitions or walls shall be properly and neatly sealed. If partition or wall carries a fire rating (fire damper indicated or if architectural plans indicate a rated wall) the duct shall be sleeved with the space between the sleeve and duct properly sealed with firestopping material (Refer to Division 7 for firestopping material). The sleeve shall be permanently affixed to the wall.
- H. Coordinate the proper duct pressure classification with the system served and to provide the proper ductwork to withstand these pressures. (See Para. 3.5 Schedules: System Pressure Classification and Duct Material Schedule.)

3.2 CLEANING AND PROTECTION

- A. During construction, ductwork shall be cleaned of dirt and debris internally section by section as it is installed. At end of each day, ductwork not finally connected to equipment shall be provided with a temporary closure of polyethylene film or other covering material that will prevent entrance of dust, debris, or water. Clean exterior surfaces of any material which might cause corrosion or if the duct is to be painted, it shall be cleaned suitable for painting. After substantial completion of the ductwork system the system shall be operated with filters in place to blow-out any remaining dust from the system. Protect all equipment and property from damage or fouling during this cleaning. All prefilters used during cleaning shall be replaced prior to turning the system over to the Owner.

3.3 LEAK TESTING

- A. Duct Leakage Report: The Contractor shall make all the supply, return, outside air, and exhaust duct systems (limited to 1,500 cfm and greater) operationally air-tight, with no more than 2% leakage for duct systems rated at 2" w.c. pressure class, and 1% leakage for systems exceeding 2" w.c. pressure class. Leakage test to be performed by Contractor with all air device openings and fan connections sealed airtight. Test the systems prior to applying any insulation or concealing in soffits or chases. Use a portable fan capable of producing a static pressure equal or greater than the duct test pressure. This fan to have a flow measuring assembly consisting of a straight section of duct with an orifice plate, pressure taps, and a calibrated performance curve for determining leakage rates.

1. Test each section equal to the external static pressure indicated for that fan or air handler with the portable fan assembly. After the fan achieves that steady state design pressure, record the air flow quantity across the orifice and the percent of design air flow. If the test fails, the Contractor shall reseal and retest at no additional cost to the Owner.
2. Repair all duct leaks that can be heard or felt, even if the system has passed the leakage test.
3. Submit duct leakage reports to the Balancer and the Engineer for their review and approval.
4. Refer to specification section 23 05 93 for more information.

3.4 INSTALLATION

A. General:

1. Install generally as indicated.
2. Conceal ductwork in finished spaces unless indicated otherwise.
3. Do not install ductwork in or allow to enter or pass through electrical rooms, elevator machine room, or spaces housing switchboards, panelboards, or distribution boards, except ductwork that serves electrical rooms, elevator machine rooms or spaces.
4. Exercise special care to provide tight fitting well fabricated, well braced ductwork systems.
5. Field assemble rectangular, round, or flat oval ductwork as follows:
 - a. Use slip joints, couplings, etc. sealed with adhesive pre-applied to couplings or duct mate spiralmate or oval mate on duct sizes 1" and larger.
 - b. Isolate dissimilar metals with elastomeric sealant tape or fiber gaskets and gaskets and washers for bolts.
6. In high pressure ductwork (above 2" w.g.), do not use 2 piece mitered 90 degree elbows with or without vanes unless approved by engineer.
7. Make duct connections from hoods, openings, fans, and other devices.

B. Double Wall Round Ductwork and Fittings:

1. Coordinate the liner and/or exterior insulation requirements to assure a continuous vapor barrier and uniform thermal resistance. See Para. 3.5 Schedules for liner/insulation thickness requirements.
2. In unconditioned, non-accessible areas such as chases and dry wall ceiling the lined ducts shall also have an additional layer of duct wrap (See Section 23 07 00 – HVAC Insulation) at all joints to assure condensation control, wrap will extend a minimum of 6" on either side of joint.

C. Uninsulated Round Flexible Ductwork:

1. Provide where indicated or required on return air duct connections only.
2. Maximum length shall be 5'-0".
3. Maximum turn or bend shall be no more than 90 Deg. Provide rigid elbows where 90 Deg. turns are indicated on the drawings.
4. Flexible ductwork shall be cut to the proper length. Coiling or unnecessary offsets will not be permitted.
5. Secure inner liner to terminal collar or duct coupling with duct sealer and sheet metal screws. Wrap with three wraps of duct tape following helix path.
6. Rigid round ductwork may be substituted in lieu of flex unless the flex duct is used for vibration isolation or otherwise detailed.

D. Insulated Round Flexible Ductwork:

1. Provide where indicated or required on supply air ducts.

2. Coordinate the insulation requirements as to assure a continuous and consistent thermal resistance and vapor barrier.
3. Maximum length shall be 5'-0".
4. Maximum turn or bend shall be no more than 90 Deg. Provide rigid elbows where 90 Deg. turns are indicated on the drawings or more than one 90 Deg. turn is required.
5. Flexible ductwork shall be cut to the proper length. Coiling or unnecessary offsets will not be permitted.
6. Secure inner liner to terminal collar or duct coupling with duct sealer and sheet metal screws. Provide Stainless steel draw band to seal inner liner tight to connecting duct. Pull insulation over inner liner and fold vapor barrier over end of insulation. Secure with two coats of an approved vapor barrier mastic, reinforced with glass cloth extending 2 inches onto adjacent insulation. One coat of mastic shall be applied to the insulation prior to the application of the glass cloth, which shall be embedded in the mastic to ensure complete adhesion of the cloth.
7. High pressure flexible duct to be provided upstream of all terminal boxes. Low pressure flexible duct may be used downstream of terminal box.
8. Rigid round ductwork may be substituted in lieu of flex unless the flex duct is used for vibration isolation or otherwise detailed. If omitted, external insulation must be provided per Section 23 07 00 – HVAC Insulation.

3.5 SCHEDULES

A. System Pressure Classification and Duct Material Schedule:

<u>System I.D. No.</u>	<u>System</u>	<u>Section</u>	<u>Maximum Pressure</u>	<u>Duct Material</u>
1.	Supply	AHU to Terminal	4" pos.	A
2.	Supply	Terminal to Diffuser	2" pos.	A
3.	Return	Terminal to AHU	2" neg.	A
4.	Emergency Exhaust	Exhaust Fan		

Schedule Legend:

Duct Material

- A Galvanized Steel
- B PVC Coated Galvanized Steel
- C 304 Stainless Steel
- D. Access Door Schedule:

1. Round Duct:

<u>Duct Size</u>	<u>Access Door Size</u>
a. up to 7" dia.	12" long removable section
b. 8" to 12" dia.	8" x 12"
c. 13" to 18" dia.	12" x 12"
d. 19" dia. and up	14" x 20"

END OF SECTION

SECTION 23 31 01
SHOP FABRICATED DUCTWORK

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.
- B. Refer to Division 1 for all requirements pertaining to General Provisions.
- C. Refer to Division 7 for all requirements pertaining to firestopping materials.

1.2 WORK INCLUDED

- A. Galvanized Steel Rectangular Ductwork.
- B. Aluminum Ductwork.
- C. Stainless Steel Ductwork.
- D. Duct Liner.

1.3 QUALITY ASSURANCE

- A. All ductwork shall be fabricated within the guidelines established by the Sheet Metal and Air Conditioning Contractors National Association, Inc. (SMACNA) HVAC Duct Construction Standards - Metal and Flexible, latest edition.
- B. All ductwork shall be fabricated to withstand the pressure and velocity required on this project.
- C. All components, fasteners, sealants, adhesives, etc. in the conditioned air stream or exposed in active or non- active plenums shall conform to the NFPA 90A Standard for the Installation of Air Conditioning and Ventilating Systems and Standard for Flame/Smoke/Fire Contribution of 25/50/0.
- D. All ductwork shall conform to UL standard UL 181 Factory Made Air Duct Materials and Duct Connectors, latest edition. Applicable sections shall apply to shop fabricated ductwork.
- E. After fabrication and installation of all shop fabricated ductwork the fabricator and installer, if not the same, shall certify in writing to the Owner's representative that all shop fabricated ductwork and installation of same meets or exceeds the quality standards established by SMACNA.

1.4 SUBMITTALS

- A. Submission for acceptance is required.
- B. Product data, along with installation operation and maintenance instructions, shall be included in the operation and maintenance manuals.
- C. Submit in accordance with Division 1 requirements.

1.5 SHOP DRAWINGS

- A. Shop Drawings: Provide shop drawings of sheet metal ductwork as follows:
 - 1. Draw to a scale of not less than 1/4 inch to one foot on the same size sheets as the contract drawings.
 - 2. Show duct sizes.
 - 3. Show fitting details.

4. Show lighting and ceiling diffusers.
- B. Floor Plans: Provide sheet metal floor plans drawn to the same scale as the contract drawings.
 1. Use contract drawing sheet size.
 2. Show on each floor plan the floor penetrations, fire dampers, and access doors, ducts with sized and bottom elevations, terminal types, and air quantities.

PART 2 – PRODUCTS

2.1 MATERIALS

- A. Galvanized Steel Ductwork:
 1. Interior, exposed, or concealed: Hot rolled steel continuously annealed and hot dipped galvanized sheet or coil, minimum G-90, 0.90 oz/sf coating suitable for forming without flaking or peeling, suitable for welding or soldering. Zinc coating shall not be impaired from double seaming, breaking or roll forming. 14 ga. and lighter conforming to ASTM A653. 13 ga and heavier conforming to ASTM A653.
 2. Exterior or Areas Requiring Painting: Hot rolled steel continuously annealed and hot dipped galvanized sheet or coil, minimum G-90, 0.90 oz/sf (.001 inch thick/side) coating with a mill applied phosphate film suitable for insulating the paint from the drying action of the zinc, capable of forming without flaking or peeling, suitable for welding or soldering. Zinc coating shall not be impaired from double seaming, breaking or roll forming. 14 ga. and lighter conforming to ASTM A653. 13 ga. and heavier conforming to ASTM A653.
 3. Double Wall Galvanized Steel Ductwork:
 - a. Outer Duct: Hot rolled, continuously annealed hot dipped galvanized steel, minimum G- 90, 0.90 oz/sf (.001 inch thick/side) coating, conforms to ASTM 653.
 - b. Liner: 1” thickness flexible fibrous glass minimum density 1.5 lb/cf, maximum conductivity per 1" thickness of .27 at 75°F mean temperature with a mylar coating.
 - c. Inner Duct: Hot rolled continuously annealed, perforated hot dipped, galvanized steel, minimum G-90, 0.90 oz/sf (.001 inch thick/side) coating, conforms to ASTM 653.
- B. Aluminum Ductwork: Interior or Exterior: Non heat treatable (common) alloy 1100, commercially pure (99.00% minimum). Corrosion resistant, suitable for welding, shows no signs of cracking when seaming, braking or roll forming, tensile strength range: 14,000 to 24,000 psi tensile strength, conforming to Federal Specification QQ-A-250/1.
- C. Stainless Steel Ductwork:
 1. Interior Concealed or Exterior: Type 304, finish No. 2D conforming to ASTM A 240 and Federal Specification QQ-S-766.
 2. Interior Exposed: Type 304, finish No. 4, conforming to ASTM A 240 and Federal Specification QQ-S-766.

2.2 FABRICATION

- A. Galvanized Steel Ductwork:
 1. Fabricate ductwork as indicated on the drawings. Sizes given are inside clear dimensions. Allowances must be made for duct liner if indicated. Unless otherwise indicated on the drawings, the metal gauge shall be in accordance with SMACNA-HVAC Duct Construction Standards - Metal and Flexible, Latest Edition.
 2. Elbow Fabrication:
 - a. 90 deg. elbows 12" or less in width shall be radiused whenever possible.
 - b. All radiused elbows shall be full radiused (R=1.5).

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- c. All mitered 90 deg. elbows shall have turning vanes. Ducts with a width/depth ratio of 1 or more shall have double thickness turning vanes; single thickness is permissible for less than 1.
 3. Tee or Take-off Fabrication:
 - a. Take-off to round run-outs shall be conical or bell mouth. Where conical or bellmouth fittings can not be used due to take-off size to main, provide factory fabricated side takeoff fitting equal to Flexmaster U.S.A., Inc. Type "STO". Provide with handle extension for insulated ducts to clear the insulation thickness specified.
 - b. Take-off to square or rectangular shall be 45 deg. clinch collar or proportional divisions.
 - c. A volume damper shall be located downstream of each take off on square and rectangular take-offs, and integral to round run-outs.
 4. Transitions:
 - a. Concentric Transition: Maximum angle 45 deg. diverging, 60 deg. converging (SMACNA Fig. 2-7).
 - b. Eccentric Transition: Maximum angle 30 deg. diverging or converging (SMACNA Fig. 2-7).
 5. At the Contractor's option, ductwork may be joined at the transverse joints with prefabricated galvanized Ductmate Industries, Inc. ("25" or "35") or Ward Industries, Inc. sections, or with fabricated TDF or TDC T-24 type flanged transverse joints with bolted corners, gaskets, and sealants, constructed in accordance with the SMACNA HVAC Duct Construction Standards - Metal and Flexible, latest edition, Table 1-12. Ductmate "25" may be used only on ductwork with a pressure classification of 2" w.g. or less on the discharge side of air handling units or fan power terminal units. Plastic joint clips are not acceptable. Flanged and prefabricated joints by different manufacturers shall not be jointed. Formed on flanges shall not be used.
- B. Aluminum Ductwork:
 1. Fabricate ductwork as indicated on the drawings. Sizes given are inside clear dimensions. Allowances must be made for duct liner if indicated. Unless otherwise indicated on the drawings, the metal gauge shall be in accordance with SMACNA-HVAC Duct Construction Standards - Metal and Flexible, Latest Edition.
 2. Elbow Fabrication:
 - a. 90 deg. Elbows 12" or less in width shall be radiused whenever possible.
 - b. All radiused elbows shall be full radiused (R=1.5).
 - c. All mitered 90 deg. Elbows shall have single thickness turning vanes.
 3. Tee or Take Off Fabrication:
 - a. Take off to round run-outs shall be conical or bell mouth.
 - b. Take off to square or rectangular shall be 45 deg. clinch collar or proportional divisions.
 - c. A volume damper is to be located downstream of each take off.
 4. Transitions:
 - a. Concentric Transition: Maximum angle 45 deg. diverging, 60 deg. converging (SMACNA Fig. 2-7).
 - b. Eccentric Transition: Maximum angle 30 deg. diverging or converging (SMACNA Fig. 2-7).
 5. All seams shall be welded or sealed to provide watertight construction and all joints to be flanged and gasketed.
 6. All attachment of turning vane, balancing dampers, etc. shall be welded whenever possible.
 7. Access doors when required, will be installed on the side of the duct, not the bottom.
 8. Provide welded tabs for hanging, spacing as required.

- C. Stainless Steel Duct:
 - 1. Fabricate ductwork as indicated on the drawings. Sizes given are inside clear dimensions. Allowances must be made for duct liner if indicated. Unless otherwise indicated on the drawings, the metal gauge shall be in accordance with SMACNA-HVAC Duct Construction Standards - Metal and Flexible, Latest Edition.
 - 2. Elbow Fabrication:
 - a. All elbows shall be full radiused whenever possible.
 - b. All elbows required to be mitered shall have single thickness turning vanes. Vanes shall be welded in place. No protruding screws will be permitted.
 - 3. All seams shall be welded with interior weld ground smooth and all slag and/or splatter removed.
 - 4. All joints shall be constructed using Ductmate DM35 or equal stainless steel flange connections of the same grade as the duct material. All joints shall be sealed completely (externally or internally) with United Duct Sealer or an approved equal. No duct leakage will be allowed.
 - 5. Unless otherwise noted all material shall be 18 gauge.
 - 6. Provide welded tabs for hanging. Spacing as required.
- D. Ductwork, General: Each duct section shall have both ends covered with polyethylene or other suitable material to protect against the entrance of dirt, debris or water during shipment and storage prior to installation.

PART 3 – EXECUTION

3.1 GENERAL REQUIREMENTS

- A. Install in strict accordance with the Sheet Metal and Air Conditioning Contractor's National Association, Inc.'s (SMACNA) recommendations.
- B. The drawings, due to their small scale, are diagrammatic in nature and are not necessarily complete in all details. For this reason not all necessary offsets, risers or falls are shown. Coordinate the installation of the ductwork with all other trades and to provide all necessary offsets, etc. as required for completion of this project without any additional cost to the Owner, Architect and/or Engineer.
- C. All ductwork shall be run parallel or perpendicular to building structure whenever possible.
- D. All ductwork shall be properly sealed.
- E. Coordinate the location, provide the necessary access and install all devices provided in other specification sections within Division 23. Including but not limited to fire, smoke and/or balancing dampers, access and mounting for control devices, air flow measuring stations, etc. as apply to this project.
- F. All ducts passing through partitions or walls shall pass through at a 90 degree angle. The duct shall be sleeved with the space between the sleeve and duct properly sealed with firestopping material (Refer to Division 7 for Firestopping materials). The sleeve shall be permanently affixed to the wall (see Section 23 05 29 - Hangers and Supports for HVAC Systems for sleeve specifications).
- G. Coordinate the proper duct pressure classification with the systems served and to construct the ductwork to withstand these pressures. (See 3.6 Schedules; System Pressure Classification and Duct Material Schedules.)
- H. All ducts located outdoors and not of welded construction shall have seams and transverse joints sealed water tight with duct sealer, arranged to shed water and finished with insulating duct coating as specified in Section 23 33 00 – Air Duct Accessories.

3.2 CLEANING AND PROTECTION

- A. During construction, ductwork shall be cleaned of dirt and debris internally section by section as it is installed. At end of each day, ductwork not finally connected to equipment shall be provided with a temporary closure of polyethylene film or other covering material that will prevent entrance of duct, debris, or water. Clean exterior surfaces of any material which might cause corrosion or if the duct is to be painted, it shall be cleaned suitable for painting. After substantial completion of the ductwork system, the system shall be operated with filters in place to blow-out any remaining dust from the system. Protect all equipment and property from damage or fouling during this cleaning. All prefilters used during cleaning shall be replaced prior to turning the system over to the Owner.

3.3 DUCT SEALING REQUIREMENTS

- A. All ducts shall have SMACNA Seal Class A (all transverse joints, longitudinal seams and duct wall penetrations).

3.4 LEAK TESTING

- A. Ductwork rated at over 3" positive pressure shall be leak tested using a test rig as described in the SMACNA Balancing Manual.
- B. Test ductwork that is rated over 3" positive pressure at 25% above specified operating pressure. Ductwork to be tested in segments and CFM leakage shall be limited to 5% of the system airflow for that section.
- C. Leaks must be located and sealed. All audible leaks, regardless of size, must be sealed.
- D. Duct Leakage Report: The Contractor shall make all the supply, return, outside air, and exhaust duct systems (limited to 1,500 cfm and greater) operationally air-tight, with no more than 2% leakage for duct systems rated at 2" w.c. pressure class, and 1% leakage for systems exceeding 2" w.c. pressure class. Leakage test to be performed by Contractor with all air device openings and fan connections sealed airtight. Test the systems prior to applying any insulation or concealing in soffits or chases. Use a portable fan capable of producing a static pressure equal or greater than the duct test pressure. This fan to have a flow measuring assembly consisting of a straight section of duct with an orifice plate, pressure taps, and a calibrated performance curve for determining leakage rates.
 - 1. Test each section equal to the external static pressure indicated for that fan or air handler with the portable fan assembly. After the fan achieves that steady state design pressure, record the air flow quantity across the orifice and the percent of design air flow. If the test fails, the Contractor shall reseal and retest at no additional cost to the Owner.
 - 2. Repair all duct leaks that can be heard or felt, even if the system has passed the leakage test.
 - 3. Submit duct leakage reports to the Balancer and the Engineer for their review and approval.
 - 4. Refer to specification section 23 05 93 for more information.

3.5 INSTALLATION

- A. Galvanized Steel Ductwork:
 - 1. Install ductwork as indicated on the drawings. If any conflict occurs notify the Owner's Representative prior to any extensive rerouting.
 - 2. Install ductwork to allow clearance for the installation of duct insulation.
 - 3. Provide duct liner as specified and/or detailed. (See 3.6 Schedule for liner requirements.)

- B. Aluminum Ductwork:
 1. Connect to equipment served with a solid duct connection.
 2. Slope horizontal runs to inlets at a minimum of 1/4" -/10 LFT. If not possible, slope away from the inlet and provide a continuous drain at the first rise. Coordinate the trapping and drain piping requirements.
 3. All joints shall be sealed water tight.
 4. Do not use penetrating screws or rivets for hanging. Support duct from welded clips or from flanges.
- C. Stainless Steel Ductwork:
 1. Connect to equipment served with a solid connection.
 2. Slope horizontal runs to inlet at a minimum of 1/4 inch per one (1) linear foot.
 3. All joints shall be sealed air and water tight.
- D. Duct Liner:
 1. Coordinate the proper duct liner thickness with the liner thickness schedule included in Para. 3.6 - Schedules.
 2. The liner shall be applied with fire resistant adhesive and weld pin mechanical fasteners on a maximum of 15" centers for velocities less than 1500 FPM and 12" centers for velocities above 1501 FPM. Adhered or clinched pinched type pins not permitted. When installed, fastener heads shall not compress the insulation more than 1/8" based on the nominal insulation thickness.
 3. The liner shall be butted and sealed at all joints, seams, and exposed edges to ensure continuous thermal resistance, and condensation control. In unconditioned, non-accessible areas such as chases and dry wall ceilings, the lined duct shall also have an additional layer of duct wrap at the joints for a minimum of 6" either side of the joint to assure condensation control.

3.6 SCHEDULES

- A. Ductwork shown to be round or oval is to be provided under Section 23 31 00 - Pre-Fabricated Ductwork.
- B. System Pressure Classification and Duct Material Schedule for Shop Fabricated Ductwork:

	<u>System</u>	<u>Section</u>	<u>Maximum Pressure</u>	<u>Duct Material</u>
1.	Outside Air Plenum	All	2" neg.	A
2.	Outside Air Duct	All	2" neg.	A
3.	Supply	AHU to terminal	3" pos.	A
4.	Supply	Terminal to Diffuser	2" pos.	A
5.	Return	All AHU Return	2" neg.	A
6.	Gen. Exhaust	Inlet to Unit	2" neg.	A
7.	Kit. Hood Exhaust	All	3" neg.	C
8.	Locker/Shower.	All	2" neg.	B
9.	Laundry Rm. Exh.	All	2" neg.	B
10.	Air Transfer Duct	All	2" neg.	A
11.	Laboratory	Inlet Grille	2" neg.	C
	General Exhaust	To Air Valve		

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Schedule Legend:

Duct Material

- A. Galvanized Steel
- B. Aluminum
- C. Stainless Steel - Type 304

END OF SECTION

SECTION 23 33 00
AIR DUCT ACCESSORIES

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.
- B. Refer to Division 1 for all requirements pertaining to General Provisions.

1.2 WORK INCLUDED

- A. Duct access doors.
- B. Fire doors.
- C. Fire dampers.
- D. Smoke dampers.
- E. Smoke/Fire dampers.
- F. Backdraft dampers.
- G. Volume dampers.
- H. Prefabricated casing panels.
- I. Flexible duct connectors.
- J. Roof mounted air outlets and inlets.
- K. Louver (Exhaust).
- L. Louver (Outside Air Intake).
- M. Hardware Cloth.
- N. Aluminum Brick vent.
- O. Install miscellaneous control devices.

1.3 QUALITY ASSURANCE

- A. All products provided for enhancement of Life Safety shall be UL listed and bear the appropriate label stating compliance.
- B. All Products to have a Florida Product Approval Number, as required by the Florida Building Code.
- C. All products located in the conditioned air stream or located in return air plenums shall conform to the NFPA 90A Flame/Smoke/Fuel Contribution of 25/50/0 and all other applicable requirements of NFPA 90A.
- D. Smoke and Smoke/Fire dampers shall be provided with a 60 month from the date of shipment parts only warranty, including freight for all components, including damper operators.
- E. Quality Assurance for Louvers:
 - 1. Source Limitations: Obtain louvers and vents through one source from a single manufacturer where indicated to be of same type, design, or factory-applied color finish.
 - 2. Welding: Qualify procedures and personnel according to the following:
 - a. AWS D1.2, "Structural Welding Code--Aluminum."
 - b. AWS D1.6, "Structural Welding Code - Stainless Steel."
 - 3. SMACNA Standard: Comply with recommendations in SMACNA's "Architectural Sheet Metal Manual" for fabrication, construction details, and installation procedures.

1.4 PERFORMANCE REQUIREMENTS FOR LOUVERS

- A. Structural Performance: Louvers shall withstand the effects of gravity loads and the following loads and stresses within limits and under conditions indicated without permanent deformation of louver components, noise or metal fatigue caused by louver blade rattle or flutter, or permanent damage to fasteners and anchors. Wind pressures shall be considered to act on vertical projection of louvers.
 - 1. Wind Loads: Determine in accordance with Florida Building Code (current edition).

1.5 SUBMITTALS

- A. Submission for acceptance is required.
- B. Product data, along with installation operation and maintenance instructions, shall be included in the operation and maintenance manuals.
- C. Submit in accordance with Division 1 Requirements.
- D. Submittals for Louvers:
 - 1. Product Data: For each type of product indicated.
 - 2. Shop Drawings: For louvers and accessories. Include plans, elevations, sections, details, and attachments to other Work. Show blade profiles, angles, and spacing.
 - a. For installed louvers and vents indicated to comply with design loads, include structural analysis data signed and sealed by the qualified professional engineer responsible for their preparation. Include summary of forces and loads on walls and jambs.
 - 3. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency or by manufacturer and witnessed by a qualified testing agency, for each type of louver.
 - a. Wind-Driven Rain.
 - b. Air-Performance.

1.6 PROJECT CONDITIONS FOR LOUVERS

- A. Field Measurements: Verify louver openings by field measurements before fabrication and indicate measurements on Shop Drawings.
 - 1. Established Dimensions: Where field measurements cannot be made without delaying the Work, establish opening dimensions and proceed with fabricating louvers without field measurements.

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

- A. Duct Access Doors:
 - 1. Air Balance, Inc.
 - 2. Cesco Products
 - 3. Greenheck, Inc.
 - 4. Nailor Industries, Inc.
 - 5. Nystrom
 - 6. Prefco Products, Inc.

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7. Ruskin Manufacturing, Co.
8. Safe Air Inc.
- B. Fire Doors:
 1. Air Balance, Inc.
 2. Cesco Products
 3. Greenheck, Inc.
 4. Nailor Industries, Inc.
 5. Nystrom
 6. Prefco Products, Inc.
 7. Ruskin Manufacturing, Co.
 8. Safe Air Inc.
- C. Fire Dampers:
 1. Air Balance, Inc.
 2. Cesco Products
 3. Greenheck, Inc.
 4. Nailor Industries, Inc.
 5. Prefco Products, Inc.
 6. Ruskin Manufacturing, Co.
 7. Safe Air Inc.
- D. Smoke Dampers:
 1. Air Balance, Inc.
 2. Cesco Products
 3. Greenheck, Inc.
 4. Nailor Industries, Inc.
 5. Prefco Products, Inc.
 6. Ruskin Manufacturing, Co.
 7. Safe Air Inc./Dowco
- E. Smoke/Fire Dampers:
 1. Air Balance, Inc.
 2. Cesco Products
 3. Greenheck, Inc.
 4. Nailor Industries, Inc.
 5. Prefco Products, Inc.
 6. Ruskin Manufacturing, Co.
 7. Safe Air Inc./Dowco
- F. Backdraft Dampers:
 1. Air Balance, Inc.
 2. Cesco Products
 3. Greenheck, Inc.
 4. Nailor Industries, Inc.
 5. Prefco Products, Inc.
 6. Ruskin Manufacturing, Co.
 7. Safe Air Inc./Dowco
- G. Volume Dampers:
 1. Greenheck, Inc.
 2. Air Balance, Inc.
 3. Arrow United Industries, Inc.
 4. Cesco Products
 5. Nailor Industries, Inc.
 6. Prefco Products, Inc.

7. Ruskin Manufacturing, Co.
8. Safe Air Inc./ Dowco
- H. Prefabricated Casing Panels:
 1. IAC
 2. Ruskin
 3. Semco
 4. United Sheetmetal
 5. Vibro Acoustics
- I. Flexible Duct Connectors:
 1. Ductmate Industries, Inc.
 2. Duro-Dyne
 3. Elgen
 4. Ventfabric
- J. Roof Mounted Air Outlets and Inlets:
 1. Air Balance, Inc.
 2. Cesco Products
 3. Greenheck, Inc.
 4. Leader, Inc.
 5. Loren Cook
 6. Ruskin Manufacturing Company
- K. Louvers (Exhaust)- No Substitutions Accepted:
 1. Greenheck, Inc.
 2. Ruskin Company; Tomkins PLC.
 3. United Enertech
- L. Louvers (Outside Air Intake)- No Substitutions Accepted:
 1. Greenheck, Inc.
 2. Ruskin Company; Tomkins PLC.
 3. United Enertech
- M. Hardware Cloth:
 1. McNichols Co.
 2. or equal.
- N. Aluminum Brick Vent
 1. Greenheck, Inc.
 2. Ruskin Manufacturing Company
 3. United

2.2 FABRICATION

- A. Duct Access Doors:
 1. Low Pressure Ductwork:
 - a. Rating up to 2" wg positive or negative.
 - b. Frame: Minimum 22 gauge galvanized steel or aluminum, minimum 5/8" knock over edge, neoprene gasket between frame and duct and frame and door.
 - c. Door: Minimum 24 gauge galvanized steel or aluminum, continuous hinge and cam latches or minimum 2 cam latches, double wall construction, fiberglass insulated thickness to match ductwork.
 - d. Based on Ruskin Manufacturing Co. ADH24. High Pressure Ductwork:
 - a. Rating: Up to 10" wg positive pressure.
 - b. Frame: Minimum 16 gauge galvanized steel with "Z" shaped reinforced corners, polyurethane gasket between frame and duct and frame and door.

- c. Door: Minimum 16 gauge galvanized steel or aluminum, minimum 2 spring latches, double wall construction, fiberglass insulated with thickness to match ductwork.
 - d. Based on Ruskin Manufacturing Co. ADHP-3.
- B. Fire Doors:
1. Rating: 3 hours (UL approved for installation in Class "A" wall construction).
 2. Minimum 24 gauge galvanized steel frame suitable for connection to ductwork without transition, minimum 24 gauge galvanized steel curtain type blades located out of the airstream, thickness coordinated with wall construction. Where an active smoke control system exists the damper shall be capable of closing in an airstream moving at a minimum of 2000 feet per minute and operating at 4" w.g. pressure (dynamic damper).
 3. Sleeves: UL listed minimum gauge galvanized steel with welded construction corners. Rollformed sleeves will not be acceptable unless contractor guarantees in writing to seal voids in sleeve with UL approved sealer to limit air leakage. Length of sleeve shall be coordinated with the wall or floor.
 4. Operation: Stainless steel constant force closure spring.
 5. Link Setting: 160°F or 165°F
 6. Based on Ruskin Manufacturing Co., IBD23 Style B (Static Systems).
 7. Based on Ruskin Manufacturing Co., DIBD23 Style B (Active smoke control systems only).
- C. Fire Dampers:
1. Rating: 1-1/2 hours (UL approved for installation in 2 hour walls).
 2. Construction: Minimum 24 gauge galvanized steel frame suitable for connection to ductwork without transition, minimum 24 gauge galvanized steel curtain type blades located out of the airstream, thickness coordinated with wall construction. Where an active smoke control system exists the damper shall be capable of closing in an airstream moving at a minimum of 2000 feet per minute and operating at 4" w.g. pressure (dynamic damper).
 3. Sleeves: UL listed minimum gauge galvanized steel with welded construction corners. Rollformed sleeves will not be acceptable unless contractor guarantees in writing to seal voids in sleeve with UL approved sealer to limit air leakage. Length of sleeve shall be coordinated with the wall or floor.
 4. Operation: Stainless steel constant force closure spring.
 5. Link Setting: 160°F or 165°F.
 6. Based on Ruskin Manufacturing Co. IBD2 Style B. (Static Systems).
 7. Based on Ruskin Manufacturing Co., DIBD2 Style B. (Active smoke control systems only).
- D. Smoke Dampers:
1. Low and Medium Pressure Ductwork:
 - a. UL labeled under UL 555S low leakage rated, no more than 10 CFM/SF @ 1" w.g. (UL Class II) after exposure to 1000°F for 1 hour (non-degradable). Classified for both horizontal and vertical mounting.
 - b. Construction:
 - 1) Frame 16 galvanized steel.
 - 2) Damper Blades: 14 gauge true airfoil design constructed of galvanized steel of low leakage non-heat degradable design with friction free silicone rubber edge type for a smoke seal to 450°F incorporated into blade and frame shapes. Blade shall be suitable for installation in systems with a maximum velocity of 4,000 FPM and 8" w.g. pressure at closure.

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- c. Damper operation by means of an electric actuator 120V AC, 24V AC or signal from smoke detector alarm circuit. Electric motor actuator to be UL listed with damper assembly for power open, spring closed operation with a maximum travel time of 15 seconds. Motor furnished with all connecting linkage and mounting hardware.
 - d. Damper and actuator shall be provided with a 60 month warranty as described in Paragraph 1.3.C.
 - e. Based on Ruskin Manufacturing Co., SD60-II.
- E. Smoke/Fire Dampers:
- 1. Low and Medium Pressure Ductwork:
 - a. UL labeled under the following standards:
 - 1) UL 555 - 1-1/2 hr. fire endurance.
 - 2) UL 555S - Low leakage rated, no more than 10 CFM/SF @ 1" w.g. (UL Class II) after exposure to 1000°F for 1 hour (non-degradable).
 - 3) Classified for both horizontal and vertical mounting.
 - b. Construction: Single damper designed and rated for combination smoke/fire duty.
 - 1) Frame: 16 ga. galvanized steel.
 - 2) Damper Blades: 14 gauge true airfoil design constructed of galvanized steel of low leakage non-heat degradable design with friction free inflatable silicone coated fiberglass material to maintain smoke leakage rating to a minimum of 450°F and galvanized steel for flame seal to 1900°F. Blade shall be suitable for installation in systems with a maximum velocity of 2,000 FPM and 4" w.g. pressure at closure.
 - 3) Duct sleeve provided by others.
 - c. Operation:
 - 1) Smoke/fire damper operation by means of an integral resettable and re-useable UL listed electric-ambient temperature link, UL listed releasing device and mechanical lock assembly. Link activated by either electric, 120V AC or 24V AC signal from smoke detector alarm circuit or 350°F duct ambient temperature. Damper shall be capable of being reopened by remote signal when the duct temperature drops to 150°F. Electric motor actuator shall be UL listed with the damper assembly for power open/spring closed operation. Motor actuator shall be factory furnished with all connecting linkage and mounting hardware and shall be factory tested for proper operation.
 - 2) Damper and actuator shall be provided with a 60 month warranty as described in Paragraph 1.3.C.
 - d. Based on Ruskin Manufacturing, Co., FSD60-2.
- F. Backdraft Dampers:
- 1. Low Pressure Ductwork:
 - a. Rating: Up to 1" wg positive or negative.
 - b. Frame: Minimum 16 gauge (.064") galvanized steel or extruded aluminum.
 - c. Blades: Minimum 16 gauge (.064") galvanized steel or extruded aluminum parallel blade action, brass bearing, non-ferrous or de-iron pivot pins, gasketed blades.
 - d. Accessories: Counterbalance and weights suitable for assisting or retarding as indicated on the drawings.
 - e. Based on Ruskin Manufacturing, Co. CBD4.
- G. Volume Dampers:
- 1. Provide volume dampers where indicated, in all branch ductwork and construct as follows:
 - a. Provide single blades to a maximum of 10 inch blade width.

- b. Provide inside end synthetic bearings and locking quadrants with wing nuts.
- c. Friction locks are not permitted.
- d. Break damper blades on both edges for stiffness.
- e. Provide multi-blades on dampers 12 inches and larger with inside pins and molded synthetic bearings, and 2 inches wide by 1/8 inch thick structural galvanized channel frame.
- f. Provide galvanized connecting bar with molded synthetic bearings on multi-blade dampers.
- g. Provide stand off bracket for installation in externally insulated duct.
- h. Based on Ruskin Manufacturing, Co. MD35 for rectangular ducts (MDSR25 for round ducts) with velocities up to 1500 feet per minute.
- i. Based on Ruskin Manufacturing, Co. CD30AF1 for rectangular ducts (CDR82 for round ducts) with velocities over 1501 feet per minute.

H. Prefabricated Casing Panels:

1. Panel sections shall consist of an outer sheet of 18 gauge and an inner sheet of 22 gauge galvanized steel. Inside panel surfaces shall have 3/32 inch diameter perforations on 3/16 inch centers.
2. Panels shall be completely metal enclosed; shall be minimum (2) (4) inches thick; and the space between inner and outer surfaces shall be filled with acoustic material which will not settle, shed or dust.
3. Housing shall be factory fabricated and field assembled with joining members serving to provide structural rigidity to 10 inches water pressure differential, either positive or negative. Structure shall be tested and rated for known structural deflection.
4. The joining members shall be fabricated from galvanized sheet steel, minimum 20 gauge, and shall be arranged to provide a pressure tight air seal against 10 inches pressure differential, either positive or negative. Use Sealing Mastic when joining parallel panels, roof to wall panels, joints, and corner joints. Housing shall be fabricated to withstand floor and roof loads of 40 pounds per square foot plus any concentrated loads.
5. Assembly shall be secured against the separation forces of air pressure with cadmium plated metal fasteners.
6. The panel shall have minimum airborne sound transmission loss when tested according to ASTM E90-70.

Transmission Loss in DB

Octave

Band HZ	63	125	250	500	1K	2K	4K
Loss	30	16	24	35	45	52	58

7. The thermal conductivity of the panel shall not exceed 0.07 Btu/hr-square foot-degrees F.
8. Insulated access doors shall be provided. Doors shall be constructed of 20 gauge galvanized steel, adequately hinged. Doors shall open against the pressure force and be equipped with safety features such as latches operable from both sides of door and wire glass double pane windows not less than 6 inches x 6 inches square. Doors shall seat against neoprene gaskets. Doors shall have Ventfabrics No. 260 "Ventlok" latches.
9. All openings in the casing for ductwork connections shall be cut and framed at the factory by the panel manufacturer. All openings shall be sealed to prevent air leakage and condensation in accordance with the manufacturer's instructions.
10. All joints, corners, etc., in the panels and floor shall be so designed that no direct path for sound or air leakage can occur.
11. The casing manufacturer shall guarantee that the casings, doors, and housings shall meet the acoustical, thermal and air pressure performance specified, when installed in accordance with the manufacturer's recommendations and as noted herein.

- I. Flexible Duct Connectors (Required on all duct transitions from AHU to ductwork):
 1. Indoor Applications:
 - a. Material: Heavy glass fabric double - Coated with neoprene, Minimum of 30 oz/sy, Resistant to abrasion and damage due to repeated flexing, waterproof and air tight, minimum 26 gauge galvanized steel or .032" aluminum edge a minimum of 2-1/2" wide each side. Coordinate the flex width with the schedule in 3.3 - Schedule.
 - b. Rating:
 - 1) Temperature: -10°F to 200°F
 - 2) Pressure: 10" positive
10" negative
 - c. Based on Ventfabric and Ventglass
 2. Outdoor Applications:
 - a. Heavy glass fabric double - Coated with neoprene, Minimum of 30 oz/sy, resistant to abrasion and damage due to repeated flexing, water proof, airtight and resistant to damage from direct sunlight, minimum 26 gauge galvanized steel or .032" aluminum edge at minimum of 2-1/2" wide each side. Coordinate the flex width with the schedule in 3.3 - Schedule.
 - b. Rating:
 - 1) Temperature: -10°F to 250°F
 - 2) Pressure: 10" positive
10" negative
 - c. Based on Ventfabrics Ventlon.
- J. Louvers (Exhaust):
 1. Subject to compliance with requirements, provide either of the following unless a specific orientation is indicated:
 2. Horizontal Storm-Resistant Louver.
 3. Frame and Blade Nominal Thickness: As required to comply with structural performance requirements, but not less than 0.080 inch (2.0 mm).
 4. Performance Requirements:
 - a. Wind-Driven Rain Performance: Not less than 99 percent effectiveness when subjected to a rainfall rate of 3 inches (75 mm) per hour and a wind speed of 29 mph (13 m/s) at a core-area intake velocity of 700-fpm (3.6-m/s).
 - b. Air Performance: Not more than 0.10-inch wg (25-Pa) static pressure drop at 600-fpm (3.0-m/s) free-area intake velocity.
 - c. Free Area: Not less than 7.0 sq.ft. (0.65 sq.m) for 48-inch-(1220-mm-) wide by 48-inch-(1220-mm-) high louver.
 5. AMCA Seal: Mark units with AMCA Certified Ratings Seal.
 6. Acceptable Products – Horizontal:
 - a. Greenheck EHH-501-X.
 - b. Ruskin EME-520-MD.
 - c. UEC SED-5.
Must be Miami Dade NOA approved and also have a Florida Product Approval Number.
 7. EHPA Acceptable Products – Vertical:
 - a. Based on Ruskin Manufacturing, Co. EME6325D /CD-50 Miami Dade/Hurricane Tested & Missile Impact Tested and approved. (Vertical Blade). This louver shall be used on ALL EHPA Buildings as specified on the Architectural Drawings.

- K. Louvers (Outside Air Intake):
1. Subject to compliance with requirements, provide either of the following unless a specific orientation is indicated:
 - a. Horizontal Storm-Resistant Louver.
 2. Frame and Blade Nominal Thickness: As required to comply with structural performance requirements, but not less than 0.080 inch (2.0 mm).
 3. Performance Requirements:
 - a. Wind-Driven Rain Performance: Not less than 99 percent effectiveness when subjected to a rainfall rate of 3 inches (75 mm) per hour and a wind speed of 29 mph (13 m/s) at a core-area intake velocity of 700-fpm (3.6-m/s).
 - b. Air Performance: Not more than 0.10-inch wg (25-Pa) static pressure drop at 600-fpm (3.0-m/s) free-area intake velocity.
 - c. Free Area: Not less than 7.0 sq.ft. (0.65 sq.m) for 48-inch-(1220-mm-) wide by 48-inch-(1220-mm-) high louver.
 4. AMCA Seal: Mark units with AMCA Certified Ratings Seal.
 5. Acceptable Products – Horizontal:
 - a. Greenheck EHH-501-X.
 - b. Ruskin EME-520-MD.
 - c. UEC SED-5.
Must be Miami Dade NOA approved and also have a Florida Product Approval Number.
 6. EHPA Acceptable Products – Vertical:
 - a. Based on Ruskin Manufacturing, Co. EME6325D /CD-50 Miami Dade/Hurricane Tested & Missile Impact Tested and approved. (Vertical Blade).
This louver shall be used on ALL EHPA Buildings as specified on the Architectural Drawings.
- L. Hardware Cloth: 4 mesh galvanized steel, plain weave with .035 wire.
- M. Aluminum Brick Vent
1. Extruded aluminum, 0.100” minimum wall thickness for frame and blades. Frame depth 4”.
 2. 8-1/8”W x 7-3/4”H with 1-1/2 flanged frame and aluminum mesh screen.
 3. Finish to be “Kynar 500” fluopolymer coating having dry thickness of approximately 1.2 mils when baked at 450°F. Color to be selected by Architect.
 4. Minimum free area shall be 39% of nominal size.
 5. Based on Ruskin Manufacturing, Co. BV100 or Greenheck Model BVF.

2.3 MATERIALS FOR LOUVERS

- A. Aluminum Extrusions: ASTM B 221 (ASTM B 221M), alloy 6063-T5 or T-52.
- B. Aluminum Sheet: ASTM B 209 (ASTM B 209M), alloy 3003 or 5005 with temper as required for forming, or as otherwise recommended by metal producer for required finish.
- C. Aluminum Castings: ASTM B 26/B 26M, alloy 319.
- D. Stainless-Steel Sheet: ASTM A 666, Type 304, with No. 4 finish.
- E. Fasteners: Of same basic metal and alloy as fastened metal or 300 Series stainless steel, unless otherwise indicated. Do not use metals that are incompatible with joined materials.
 1. Use types and sizes to suit unit installation conditions.
 2. Use Phillips flat-head, hex-head, or Phillips pan-head screws for exposed fasteners, unless otherwise indicated.

- F. Postinstalled Fasteners for Concrete and Masonry: Torque-controlled expansion anchors, made from stainless-steel components, with capability to sustain, without failure, a load equal to 4 times the loads imposed, for concrete, or 6 times the load imposed, for masonry, as determined by testing per ASTM E 488, conducted by a qualified independent testing agency.
- G. Bituminous Paint: Cold-applied asphalt emulsion complying with ASTM D 1187.

2.4 FABRICATION, GENERAL FOR LOUVERS

- A. Assemble louvers in factory to minimize field splicing and assembly. Disassemble units as necessary for shipping and handling limitations. Clearly mark units for reassembly and coordinated installation.
- B. Vertical Assemblies: Where height of louver units exceeds fabrication and handling limitations, fabricate units to permit field-bolted assembly with close-fitting joints in jambs and mullions, reinforced with splice plates.
- C. Continuous Vertical Assemblies: Fabricate units without interrupting blade-spacing pattern.
- D. Maintain equal louver blade spacing to produce uniform appearance.
- E. Fabricate frames, including integral sills, to fit in openings of sizes indicated, with allowances made for fabrication and installation tolerances, adjoining material tolerances, and perimeter sealant joints.
- F. Frame Type: As indicated.
- G. Include supports, anchorages, and accessories required for complete assembly.
- H. Provide vertical mullions of type and at spacings indicated, but not more than recommended by manufacturer, or 72 inches (1830 mm) o.c., whichever is less.
- I. Provide subsills or extended sills made of same material as louvers where indicated or required for drainage to exterior and to prevent water penetrating to interior.
- J. Provide with optional wire mesh filter rack and filters.
- K. Join frame members to each other and to fixed louver blades with fillet welds, threaded fasteners, or both, as standard with louver manufacturer, concealed from view, unless otherwise indicated or size of louver assembly makes bolted connections between frame members necessary.

2.5 LOUVER SCREENS

- A. General: Provide screen at each exterior louver.
 - 1. Screen Location for Fixed Louvers: Interior face.
 - 2. Screening Type: Insect screening, unless otherwise indicated; bird screening where indicated.
- B. Secure screens to louver frames with stainless-steel machine screws, spaced a maximum of 6 inches (150 mm) from each corner and at 12 inches (300 mm) o.c.
- C. Louver Screen Frames: Fabricate with mitered corners to louver sizes indicated.
 - 1. Metal: Same kind and form of metal as indicated for louver to which screens are attached. Reinforce extruded-aluminum screen frames at corners with clips.
 - 2. Finish: Same finish as louver frames to which louver screens are attached.
 - 3. Type: Rewirable frames with a driven spline or insert for securing screen mesh.
- D. Louver Screening for Aluminum Louvers:
 - 1. Insect Screening: Aluminum, 18-by-16 (1.4-by-1.6-mm) mesh, 0.012-inch (0.30-mm) wire.
 - 2. Bird Screening: Aluminum, 1/2-inch- (12.7-mm-) square mesh, 0.063-inch (1.6-mm) wire.

2.6 CLOSURE ANGLES AND CLOSURE PLATES FOR LOUVERS

- A. Fabricate from minimum 0.074-inch (2 mm) thick stainless steel or aluminum.
- B. Provide continuous closure angles and closure plates on inside head, jambs, and sill of exterior wall louvers.
- C. Secure angles and plates to louver frames with screws, and to masonry or concrete with fasteners as specified.
- D. Provide minimum 0.032-inch (0.8 mm) thick stainless steel or aluminum sleeves in cavity walls and elsewhere as shown.

2.7 BLANK-OFF PANELS

- A. Uninsulated, Blank-Off Panels:
 - 1. Aluminum sheet for aluminum louvers, not less than 0.050-inch (1.2-mm) nominal thickness, unless otherwise indicated.
 - 2. Panel Finish: Same finish applied to louvers.
 - 3. Attach blank-off panels to back of louver frames with clips or stainless-steel, sheet metal screws.
- B. Insulated, Bland-off Panels: Laminated metal-faced panels consisting of insulating core surfaced on back and front with Metal sheets:
 - 1. Thickness: 2 Inch (50 mm).
 - 2. Metal Facing Sheets: Aluminum sheet, not less than 0.032-inch (0.8-mm) nominal thickness.
 - 3. Insulating Core: Foamed-plastic rigid insulation board.
 - 4. Edge Treatment: Trim perimeter edges of blank-off panels with louver manufacturers standard extruded-aluminum-channel frames, not less than 0.080-inch (2.0-mm) nominal thickness, with corners mitered and with same finish as panels.
 - 5. Seal perimeter joints between panel faces and louver frames with 1/8-by-1-inch (3.2-by-25-mm) PVC compression gaskets.
 - 6. Panel Finish: Same finish applied to louvers.
 - 7. Attach blank-off panels to back of louver frames with clips or stainless steel, sheet metal screws.

2.8 ALUMINUM FINISHES

- A. Finish louvers after assembly.
- B. High-Performance Organic Finish: 2-coat fluoropolymer finish complying with AAMA 2605 and containing not less than 70 percent PVDF resin by weight in color coat. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers written instructions.
 - 1. Color and Gloss: As selected by School Board from manufacturers full range if not indicated as part of the Design Build Package.

PART 3 – EXECUTION

3.1 GENERAL REQUIREMENTS

- A. Install all products in strict accordance with the manufacturer's written installation instructions.
- B. Coordinate the installation of products provided within other sections of Division 23 including but not limited to control dampers, airflow measuring stations, etc.

3.2 INSTALLATION

- A. Duct Access Doors:
 - 1. Coordinate the proper class access door with the system requirements.
 - 2. Duct access doors shall be mounted so as to allow maximum access and/or door swing while also providing easy access from the floor or other personal accessible structures.
 - 3. Duct access doors shall be provided wherever required for proper maintenance of equipment, access to duct mounted control devices, or visual inspection and setting of dampers, etc. All doors, due to the small scale of the drawings, may not be shown, it is the contractor's responsibility to coordinate with all trades concerned to provide the necessary quantity and properly locate all doors.
- B. Fire Doors:
 - 1. Fire doors shall be provided where indicated.
 - 2. Review the architectural drawings to determine the wall construction rating so as to provide the proper rated damper.
 - 3. All fire doors shall be mounted within a 16 gauge steel sleeve permanently affixed to the wall by means of perimeter retaining angles.
 - 4. The fire door shall be permanently attached to the sleeve. All voids around the sleeve and damper and sleeve and wall shall be properly firestopped under Division 07 Section "Firestopping."
 - 5. Ductwork shall be attached to the fire door by means of a UL approved break away connection.
 - 6. Access doors or access sections shall be provided at all fire door locations.
- C. Fire Dampers:
 - 1. Fire dampers shall be provided where indicated.
 - 2. Review the architectural drawings to determine the wall construction rating so as to provide the proper rated damper.
 - 3. All fire dampers shall be mounted within a UL approved thickness galvanized steel sleeve permanently affixed to the wall by means of perimeter retaining angles.
 - 4. The fire damper shall be permanently attached to the sleeve. All voids around the sleeve and damper and sleeve and wall shall be properly firestopped under Division 07 Section "Firestopping."
 - 5. Ductwork shall be attached to the fire damper by means of a UL approved break away connection.
 - 6. Access doors or access sections shall be provided at all fire damper locations.
- D. Smoke Dampers:
 - 1. Provided where indicated. See combination smoke/fire damper for assemblies in fire rated barriers.
 - 2. Review the architectural drawings to determine the wall construction rating so as to provide the proper rated damper.
 - 3. Provide access doors or access sections at all damper locations.
 - 4. Coordinate the provision of the smoke damper actuator with the automatic temperature control and fire alarm system and ensure adequate space for the mounting of the actuator during installation of the damper and ductwork.
- E. Smoke/Fire Damper:
 - 1. Provided where indicated. All smoke dampers in fire rated barriers to be combination type.
 - 2. Review the architectural drawings to determine the wall construction rating so as to provide the proper rated damper.

3. All smoke/fire dampers shall be mounted within a UL approved thickness galvanized steel sleeve permanently affixed to the wall by means of perimeter retaining angles.
 4. The smoke/fire damper shall be permanently attached to the sleeve. All voids around the sleeve and damper and sleeve and wall shall be properly firestopped under Division 07 Section "Firestopping."
 5. Ductwork shall be attached to the smoke/fire damper by means of a UL approved break away connection.
 6. Access doors or access sections shall be provided at all smoke/fire damper locations.
 7. Coordinate the provision of the smoke damper actuator with the Building Control System and assure adequate space for the mounting of the actuator during installation of the smoke/fire damper and ductwork.
- F. Backdraft Damper:
1. Securely attach backdraft damper to wall with a suitable sleeve and retaining angles and seal all voids between damper and wall.
 2. Adjust damper to open or close under the design conditions.
- G. Volume Dampers: Install at all branch take-offs.
- H. Prefabricated Casing Panels:
1. Casing shall be constructed as detailed on drawings. All necessary structural steel bracing required but not shown shall be provided.
 2. Casing shall be sealed air tight both positive and negative to ± 10 in. w.g.
 3. Install in accordance with SMACNA duct construction standards for the pressure indicated.
 4. Set access doors minimum 6 inches above floor as detailed on drawings. Arrange door swings so that fan static pressure holds door in closed position.
 5. In casing sections subject to collection of water, where deep seal traps are shown, coordinate with other trades to be certain that traps are properly located.
 6. All openings in casing shall be framed. All pipes shall be sleeved and area between pipe and sleeve sealed.
- I. Flexible Duct Connectors:
1. Flexible duct connectors shall not be omitted where air handling units are provided with internally isolated fans and internal isolation.
 2. Provide flexible duct connectors immediately adjacent to all in-line or ductwork connected fans and/or fan equipped units with or without internal vibration isolation.
 3. Flexible duct connectors shall be properly selected and installed to ensure against collapsing under negative pressure and unacceptable ballooning under positive pressure. Leakage is not permissible. See width schedule in 3.3 - Schedules.
- J. Roof Mounted Air Outlets and Inlets:
1. Install in accordance with manufacturers written installation instructions.
 2. Coordinate installation requirements with roofing sub-contractor.
- K. Hardware Cloth: Install over all open ended ducts. Provide sheet metal pocket over raw edges and secure with sheet metal screws through the metal edge cover.
- L. Aluminum Brick Vent: Receive an unload louvers and deliver to general contractor at jobsite for storage and installation by general contractor.
- M. Install Miscellaneous Control Devices:
1. Install dampers. Provide necessary blank off sections where dampers are installed in factory fabricated mixing box openings.
 2. Install air flow measuring stations. Coordinate size and location with proper access before approving release of units for fabrication and shipment.
 3. Install duct smoke detectors provided under Division 26.

3.3 INSTALLATION FOR LOUVERS

- A. Locate and place louvers level, plumb, and at indicated alignment with adjacent work and in accordance with manufacturer's recommendations to meet requirements of article titled "Performance Requirements".
- B. Use concealed anchorages where possible. Provide brass or lead washers fitted to screws where required to protect metal surfaces and to make a weather-tight connection.
- C. Form closely fitted joints with exposed connections accurately located and secured.
- D. Install closure angles and closure plates.
- E. Provide perimeter reveals and openings of uniform width for sealants and joint fillers, as indicated.
- F. Repair finishes damaged by cutting, welding, soldering, and grinding. Restore finishes so no evidence remains of corrective work. Return items that cannot be refinished in the field to the factory, make required alterations, and refinish entire unit or provide new units.
- G. Protect galvanized and nonferrous-metal surfaces from corrosion or galvanic action by applying a heavy coating of bituminous paint on surfaces that will be in contact with concrete, masonry, or dissimilar metals.
- H. Install concealed gaskets, flashings, joint fillers, and insulation as louver installation progresses, where weather-tight louver joints are required. Comply with Division 7 Section "Joint Sealants" for sealants applied during louver installation.

3.4 ADJUSTING AND CLEANING FOR LOUVERS

- A. Clean exposed surfaces of louvers and vents that are not protected by temporary covering, to remove fingerprints and soil during construction period. Do not let soil accumulate until final cleaning.
- B. Before final inspection, clean exposed surfaces with water and a mild soap or detergent not harmful to finishes. Thoroughly rinse surfaces and dry.
- C. Restore louvers and vents damaged during installation and construction so no evidence remains of corrective work. If results of restoration are unsuccessful, as determined by Architect, remove damaged units and replace with new units.

3.5 SCHEDULES

- A. Access Door Schedule: Square or Rectangular Duct work: Access Door Mounting

	<u>Surface Max. Dim.</u>	<u>Access Door Size</u>
1.	6"	12" long Remov. Section
2.	7" to 8"	6" x 6"
3.	9" to 12"	8" x 8"
4.	13" to 18"	12" x 12"
5.	19" and up	16" x 16"
6.	Special Situations	See Plans

B. Flexible Duct Connector Schedule: Indoor and Outdoor Material Width Schedule

	<u>Duct Size</u> <u>(Max. Dim.)</u>	<u>Pressure</u> <u>(Max.)</u>	<u>Width</u>
1.	12" and less	positive	3"
2.	13" and up	positive	6"
3.	12" and less	negative	3"
4.	13" and up	negative	3"

END OF SECTION

SECTION 23 37 13
GRILLES, REGISTERS AND DIFFUSERS

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.
- B. Refer to Division 1 for all requirements pertaining to General Provisions.

1.2 WORK INCLUDED

- A. Grilles.
- B. Registers.
- C. Diffusers.

1.3 QUALITY ASSURANCE

- A. Manufacturer shall certify cataloged performance and ensure correct application of all air outlet types.
- B. All components within the conditioned air stream or exposed in active or non-active plenums shall conform to the NFPA 90A standard for Flame/Smoke/Fire Contribution of 25/50/0.
- C. Manufacturers shall fully comply with LEED IEQ Prerequisite 3 minimum acoustical performance.

1.4 SUBMITTALS

- A. Submit schedule and product data for acceptance. Coordinate submittal by "G" number and include construction details, capacity ratings including airside pressure drops and NC levels.
- B. Product data, along with installation operation and maintenance instructions, shall be included in the operation and maintenance manuals.
- C. Submit in accordance with Division 1 requirements.

PART 2 – PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

- A. Grilles:
 - 1. Titus
 - 2. Anemostat
 - 3. Krueger
 - 4. Metal Aire Division of Metal Industries, Inc.
 - 5. Nailor
 - 6. Price
 - 7. Trox
- B. Registers:
 - 1. Air Concepts
 - 2. Anemostat
 - 3. Krueger

4. Metal* Aire Division of Metal Industries, Inc.
 5. Nailor
 6. Price
 7. Titus
 8. Trox
- C. Diffusers:
1. Anemostat
 2. Krueger
 3. Metal* Aire Division of Metal Industries, Inc.
 4. Nailor
 5. Price
 6. Titus
 7. Trox.

2.2 FABRICATION

- A. Grilles:
1. Sidewall or Ceiling Mounted Return/Exhaust Grille:
 - a. Construction: Heavy gauge aluminum border. Size as indicated.
 - b. Baked enamel finish.
 - c. Based on Titus Model 272FL.
 2. Sidewall Double Deflection Supply Grille:
 - a. Construction: Aluminum frame with aluminum shaped blades having long blades on front. Size as indicated.
 - b. Baked enamel finish.
 - c. Based on Titus Model 7DCA-AA.
 3. Ceiling Mounted Return Air Filter Grille:
 - a. Construction: Heavy gauge aluminum border. Concealed hinged core with integral filter frame and start-up plus spare filter. Border suitable for use in ceiling specified in Contract Documents. Size as indicated.
 - b. Baked enamel finish.
 - c. Based on Titus Model 4FL.
- B. Registers:
1. Sidewall or Ceiling Mounted, Return Register (G-5 & G-6):
 - a. Construction: Heavy gauge frame and horizontal bars. Bars set at 45° fixed deflection. Allen key operated opposed blade damper.
 - b. Baked enamel finish.
 - c. Based on Titus Model 350FL (aluminum) with/without Model AG-35AA opposed blade aluminum damper (refer to schedule and drawings for requirements).
- C. Diffusers:
1. Square Ceiling Diffuser (G-1):
 - a. Construction: Surface or lay-in mounted, 3 cone diffuser. Round collar size as indicated. Aluminum construction only.
 - b. Baked enamel finish.
 - c. Based on Titus TMS-AA (aluminum).

PART 3 - EXECUTION

3.1 GENERAL

- A. Install all devices in strict accordance with the manufacturer's written installation instructions.
- B. Coordinate the proper grille style and frame style with the final approved ceiling construction and install grilles, registers, and diffusers in accordance with the requirements of the architectural reflected ceiling plan.
- C. Due to the small scale of the drawings the contractor shall assume the responsibility to coordinate the air outlet and inlet locations with the reflected ceiling plans, lighting plans, sections and or details.
- D. Any unlined or otherwise exposed parts beyond the grille, register or diffuser face exposed to sight shall be painted black.
- E. Coordinate the color requirements for all grilles, registers, and diffusers with the Owner's Representative.
- F. Insulate the back pans of all diffusers per the requirements of Specification Section 23 07 00.
- G. Air distribution devices installed in lay-in ceilings shall have a 24"x24" extended panel.
- H. Devices installed in sheetrock or other hard ceilings shall be surface mount type.

END OF SECTION

26

DIVISION

ELECTRICAL

SECTION 26 00 00
SCOPE OF WORK

PART 1: GENERAL

1.1 DESCRIPTION OF SYSTEMS

- A. The work included consists of all supervision, labor, materials, equipment, facilities and installation required for the complete and approved electrical system installation and modifications as indicated on the Contract Documents and called for in this Specification, or as may be reasonably implied by and for the installation of this project.
- B. All notes on the drawings pertaining to the work of this trade shall be considered as part of this specification and contract.
- C. In general, the Electrical Contractor shall make final line voltage connections to equipment furnished by other trades or by Owner. Miscellaneous equipment is to be provided by the Owner, installed, and utilities connected by the Contractor.
- D. Refer to entire Contract Documents for coordination and demolition. The Contractor shall coordinate phasing and staging of all work with all affected trades. Provide demolition as necessary to completely remove all electrical items within the area of work.
- E. Contractor shall confirm existing utilities are capped or shutdown prior to excavation or demolition.
- F. It is the Contractor's responsibility to visit the job site to inspect and confirm field conditions and systems. Advise Consultant of inconsistencies prior to bidding.
- H. The Contractor shall install complete and operating electrical systems as required for the scope of work, including but not limited to, the following:
 - 1. New power feeds to electrical terminal devices and equipment.
 - 2. Installation/relocation of miscellaneous lighting, power, and systems components as required for the renovation/completion.
 - 3. Where indicated, an empty raceway system for telecommunications. Outlet devices, cabling, and hardware to be provided and installed by the Owner.
 - 4. Where indicated, and fire alarm system, including all raceways, conductors, devices, equipment start-up and testing, as required for the proposed space modifications.
 - 5. Miscellaneous items required for complete and operating systems, but not specifically called for on the drawings or in the specifications, such as fastening devices, supports, scaffolding, welding, drilling, etc.
 - 6. Miscellaneous raceways, junction boxes, and interconnections to medical equipment provided by third party vendors.

PART 2 - PRODUCTS Not Applicable

PART 3 - EXECUTION Not Applicable

END OF SECTION

SECTION 26 00 01
BASIC ELECTRICAL REQUIREMENTS

PART 1 GENERAL

1.1 SECTION INCLUDES:

- A. Basic Electrical Requirements specifically applicable to Division 16 in addition to Division 1 -General requirements.

1.2 QUALITY ASSURANCE

- A. Electrical supervision shall have a current Local County Journeyman Electricians Certificate of Competency, be licensed to do work in the project location, and be present on site while work is being performed.
- B. Coordinate with other trades to provide adequate working clearance about equipment.
- C. Materials, where applicable, shall bear the label of an approved testing agency, such as:
 - 1. E.T.L. (Electrical Testing Laboratories).
 - 2. U.L. (Underwriters Laboratories, Inc.)
 - 3. F.M. (Factory Mutual).
- D. Materials subject to corrosion shall be protected.

1.3 RELATED WORK

- A. Continuity of Service:
Service or circuits shall not be interrupted or changed without authorization from the Architect and the Owner. Written authorization shall be obtained before work is started.
- B. Demolition:
 - 1. Equipment to be removed and turned over to the Owner shall be delivered to the Owner at a place and time mutually agreed upon.
 - 2. Materials to be turned over to the Owner or reused and installed, shall be maintained in the condition equal to that existing before work began. Repair or replace damaged materials or equipment at no additional cost to the Owner.
- C. Outdoor equipment to be secured to wall surface shall be mounted on stainless steel channel or supports.

1.4 TEMPORARY WIRING

- A. New Construction: Install according to National Electrical Code.
- B. Remodel: Remove temporary wiring upon completion of project. Install according to National Electrical Code.
- C. Grounding: Equipment grounding conductors shall be bonded to available electrodes at each building.

1.5 EQUIPMENT

- A. Equipment of a similar nature shall be identical and of the same manufacturer.

- B. Equipment shall be set level. Where grouped, shall be mounted at the same height, properly aligned, bolted together in sections and fastened in place. Tighten screws, bolts, nuts, clamps, fittings, or other fastening devices. Install all covers, plates, fittings, and accessories.

PART 2 PRODUCTS

Not Applicable

PART 3 EXECUTION

3.1 COMMISSIONING SUPPORT

Not applicable

END OF SECTION

SECTION 26 01 27
CODES, FEES, AND STANDARDS

PART 1: GENERAL

1.1 CODES AND STANDARDS

- A. Unless specifically noted to the contrary, the Contractor shall furnish all equipment, materials, labor, and install and test in accordance with these specifications.
- B. The Contractor shall comply with the latest applicable editions of the following:
 - Florida State Fire Marshall's Rule Chapter 69A-3.012 FAC and Rule Chapter 69A-60 (FAC)
 - NFPA 101 (2015 Edition)
 - Florida Building Code 6th Edition
 - NFPA-70 - National Electrical Code (2014)
 - NFPA-72 - National Fire Alarm Code (2013)
 - U.L. - Underwriter's Laboratories
 - NEMA - National Electrical Manufacturer's Association
 - ASTM - American Society for Testing and Materials
 - IEEE - Institute of Electrical and Electrical Engineers
 - ANSI - American National Standards Institute
 - ADA - Americans with Disabilities Act
 - NFPA-780 – Lightning Protection (2011)
 - Florida Statute Section 633.022
 - Florida Administrative Code 69A – 43.004 and 69A-3.012
- C. Reference to standards shall mean and intend the latest edition of such standards adopted and published at the date of bidding documents.
- D. Materials and installation, as a minimum, shall conform with local and state codes and ordinances.

1.2 FEES, CHARGES, COSTS

- A. It is the contractor's responsibility to contact the appropriate Utility Company and/or Building Department to determine if any fees, charges, or costs will be due to them. This fee, charge or cost shall be included in this contractor's bid price.

END OF SECTION

SECTION 26 05 00
BASIC MATERIALS AND METHODS

PART 1 – GENERAL

1.1 WORK INCLUDES

- A. Contractor shall provide:
 - 1. Work shown on the drawing and specified herein.

1.2 RELATED WORK

- A. Specified Elsewhere
 - 1. Division 1 - Drawings and general provisions of Contract, including, but not limited to, General, Special, and Supplementary Conditions and other Division-1 Specification Sections, apply to the work of this Section.
 - 2. Division 21, & 23 - applicable sections.
 - 3. Division 26, & 28 - applicable sections.

1.3 QUALITY ASSURANCE

- A. All work and materials shall be in accordance with the requirements and codes of the State of Florida, and all other applicable bodies having jurisdiction.
- B. If, in the opinion of the Contractor, any part of the specification or plans do not comply with the laws, codes and regulations, that matter shall be referred in writing to the attention of the Engineer for a decision before proceeding with that part of the work. There shall be no changes in the drawings or specifications made without approval of the Engineer. Where a discrepancy exists between the drawings and this specification, the more stringent shall apply.
- C. This Contractor shall secure and pay for all permits required by local authorities and shall provide the Owner with satisfactory interim and final inspection certificates.
- D. Bidders shall visit the site and familiarize themselves with existing conditions and satisfy themselves as to the nature and scope of the work and the difficulties that attend its execution. The submission of a bid will be construed as evidence that such an examination has been made and that the existing conditions have been allowed for in hid bid.
Before opening any material or doing any work, examine Architectural, Structural, Electrical and Mechanical and Equipment drawings, verify all conditions of project. Any differences which occur between drawings or between them and specifications, or between both of these and actual field measurements shall be reported in writing to Consultant and written instructions for changes obtained before proceeding with work.

1.4 SUBMITTALS

- A. In accord with Division One.
 - 1. Product Data
 - a. Fire Stopping Material
 - b. Conduit seals.
 - 2. Corrections or comments made on the shop drawings during the review do not relieve this Contractor from compliance with requirements of contract documents, plans and specifications. Shop drawings will be checked for general conformance with the design concept of the project and general compliance with information given in the contract documents. Review of the shop drawings shall not relieve the Contractor from

responsibility for details and accuracy, confirming and correlating all quantities and dimensions, selecting fabrication processes, for techniques of assembly and construction, coordinating his work with that of all other trades, and performing his work in a safe and satisfactory manner. Review of shop drawings shall not permit any deviation from plans and specifications.

3. Contractor shall submit point to point wiring diagram for all signal and control systems, control panels, terminal cabinets, etc., for complete systems to be provided under this contract. Shop Drawings shall indicate terminal identification, and barrier strip layout.
- B. Coordination drawings shall be provided showing routing of ALL trades and systems above ceilings and in chases. Objective of coordination drawings is to identify any conflicts and provide resolution, prior to the start of construction. Division 26 subcontractor shall coordinate with the General Contractor for requirements relating to this submittal. This requirement shall not conflict with requirements for coordination drawings as mandated in any other sections of this specification.
- C. In accord with Division One, at the completion of the project, Contractor shall submit operating instructions and maintenance manuals. Submit model number, catalog information, technical data sheets, shop drawings, test reports, wiring diagrams, parts lists, and maintenance instructions where applicable for each of the following items of equipment:
 1. Fire Alarm System
- D. Throughout the progress of construction, keep a complete and detailed record of all deviations in the electrical installation from that indicated on the Drawings, specifications and/or shop drawings. At the completion of the project and prior to final payment this marked set of drawings shall be submitted to Engineer. As-Builts shall be legible and clearly indicating depths, dimensions of raceways from unknown points. Provide one mylar set of reproducibles to the Owner, certified and signed, by the Contractor as to their accuracy.
- E. Comply with the following for all work specified in Division 26. As-built information shall be shown to scale, using standard symbols listed in the legend. As a minimum show the following:
 1. Location of stub-outs, dimensioned from permanent building lines.
 2. All routing of raceways, dimensions from building, depths.
 3. Corrected panelboard and equipment schedules.
 4. Corrected circuit numbers as they appear on panelboard directories.
 5. Number, size, type of insulation and number of wires in each conduit or multi-conductor cable whether in conduit or exposed.
 6. Location of junction boxes and splices.
 7. Location of access panels.

1.5 GUARANTEE

- A. Guarantee all materials and workmanship for a period of one year in accord with the General Conditions.

1.6 DELIVERY, STORAGE AND HANDLING

- A. Materials shall be suitably packaged by manufacturer to prevent damage during shipment. Damaged materials will not be acceptable for use.
- B. Store materials on site in clean, dry storage area; when outside, elevated above grade and enclosed with durable watertight wrapping.
- C. Handle all materials carefully to prevent damage. Minor scratches, marks or blemishes to finish shall be repaired by Contractor.

PART 2 – PRODUCTS

2.1 MATERIALS

A. General

1. All equipment and material for permanent installation shall be new unless specifically indicated otherwise. In addition, material shall:
 - a. Be without blemish or defect.
 - b. Not be used for temporary power or lighting without prior written authorization from the Owner.
 - c. Be in accordance with NEMA Standards.
 - d. Bear Underwriter's Label where subject to U.L. label service.
 - e. U.L. listed for its intended service and application.
2. Equipment and materials of the same type of classification and used for the same purposes, shall be products of the same manufacturer.
3. Materials and equipment shall conform in all respects to the requirements set forth in these specifications and the accompanying drawings. However, wherever a product is identified by name, equal products which meet the Consultants written approval may be used (per contract document procedures).
4. Except as otherwise specified, materials and equipment shall be new and bear the approval label of Underwriter's Laboratories, Inc., where applicable.
5. Where equipment and materials are specified or designated on drawings by trade names and catalog numbers, the intent is to establish a standard of quality, appearance, performance, and dimension. Material and equipment of other manufacturers will be considered, provided they are equal in all respects to that specified. However, it will be the Contractor's responsibility to demonstrate equality of substituting with materials or equipment specified by the Consultant. Compensations for "as-built" drawings or contract documents requiring additional engineering services due to Contractor substitutions shall be paid directly by the Contractor to the Consultant. The Consultant shall be compensated by the Contractor for multiple reviews (more than two) of any shop drawing submission.

B. Fire Stopping Material

1. Fire stopping materials shall consist of commercially manufactured products capable of passing ASTM E-814 (UL 1479) Standard Method of Fire Test for Through Penetration Fire Stops.
2. Fire stopping materials shall maintain the rating of the wall, partition or floor opening that penetration is made.
3. Fire stopping materials shall be U.L. classified.
4. Acceptable Products
 - a. 3M - Fire Barrier
 - b. Thomas & Betts - Flame Safe
 - c. Nelson Electric - Flameseal

C. Water Seal

1. Seal penetrations of perimeter walls or floors below grade to prevent entry of water. Use materials compatible with wall or floor construction.
2. Seal penetrations of roof, with flashings compatible with roof design.

D. Nameplates

1. General: Furnish and install nameplates wherever indicated as "required" in these specifications. Wording shall be submitted to the Engineer for review prior to purchase of nameplates.
2. Material: Refer to Section 26 05 53 for requirements.

PART 3 – EXECUTION

3.1 INSTALLATION

- A. All equipment and materials shall be installed and completed in a first-class workmanlike manner. The right is reserved to direct the removal and replacement of any item, which in the opinion of the Owner's Representative and/or Engineer does not present an orderly and reasonably neat or workmanlike appearance, provided such items can be properly installed in an orderly way by usual methods in such work.
- B. Electrical drawings are diagrammatic but shall be followed as closely as actual construction of the building and the work of other trades will permit. Do not scale drawings. Consult Architectural drawings and details for exact location of fixtures and equipment and building element dimensions. Because of the small scale of drawings, it is not possible to indicate all of the offsets, fittings and accessories required. This Subcontractor shall investigate the structural and finish conditions affecting his work and shall arrange such work accordingly, providing fittings, bends, junction boxes, pull boxes, access panels and accessories required to meet such conditions.
- C. No deviations for the plans and specifications shall be made without the full knowledge and consent of the Consultant. Should the Contractor find at any time during the progress of the work that, in his judgment, a modification of the requirements of any particular item is needed, he shall report such item promptly to the Consultant for his decision and instruction.
- D. Discrepancies in Electrical and Mechanical Drawings - it is recognized that locations of piping, ductwork, etc., shown on Mechanical and Electrical drawings are diagrammatic, except for figured dimensions, and that field conditions may arise that will prevent their being installed as noted on drawings, such as runs of pipe crossovers, risers, panelboards, electric outlets, machinery, etc. within limits established by figures on Architectural Drawing. It is the duty of each and all subcontractors to consult with each other, verifying existing conditions and in each case where there is any questions or doubt as to space conditions or location of outlets, etc., to submit a workable solution to the Consultant for their approval before installing any work which is questionable.
- E. The Contractor is specifically directed to the mechanical section of the contract documents for coordination.
- F. The Contractor shall refer to the entire set of contract documents for bidding purposes and completeness of proposal. Items not shown on the electrical project documents, but shown on mechanical requiring wiring, components, raceways, etc., must be included in bid proposal to provide a complete working system. Systems and devices shown on one portion of documents shall be included as if they are shown on all portions of the contract documents.
- G. The Contractor shall, prior to rough-ins, confirm location of all devices with Owner Representative and Architect. Coordinate with architectural drawings and interior elevations for exact locations, mounting heights, and dimensions for installation of all items. Coordinate with wall coverings, furniture, etc.
- H. Install all equipment in accord with manufacturer's recommendations.
- I. Provide all necessary anchoring devices and supports.
 - 1. Use structural supports suitable for equipment, or as indicated.
 - 2. Check loadings and dimensions of equipment with shop drawings.
 - 3. Do not cut or weld to building structural members.
- J. Verify that equipment will fit support layouts indicated.
 - 1. Where substitute equipment is used, revise indicated supports to fit.
- K. Arrange for necessary openings to allow for admittance of equipment.
 - 1. Where equipment cannot be installed as structure is being erected, provide and arrange for building-in of boxes, sleeves or other devices to allow later installation.

- L. Make all penetrations through roofs prior to installation of roofing. For penetrations required after installation of roofing:
 - 1. In built-up roofing (BUR), provide all curbs, cants, and base flashings.
 - 2. In elastic sheet roofing (ESR), arrange and pay for base flashing work by authorized roofer.
- M. Install rain hoods and metal counter flashings as indicated and to make all penetrations of electrical work through walls and roof water- and weather-tight.
 - 1. Furnish all clamps, waterproofing material, and labor necessary.
 - 2. Where metal flashings are applied over concrete, paint concrete with 1/8 IN of mastic cement first.
 - 3. Set flashing in mastic cement, watertight.
- N. Repair and replace roof construction, damaged by this work, in manner which will not nullify roof guarantee.
- O. Provide equipment guards at all belts, couplings, moving machinery and equipment provided under this division in accord with OSHA.
 - 1. Use suitable structural frames with 12 ga, 3/4 inch maximum opening galvanized mesh, or expanded metal mesh.
 - 2. Attach to equipment by removable clips and bolts with wing nuts, or other approved connectors.
- P. Install equipment to permit easy access for normal maintenance.
 - 1. Maintain easy access to switches, motors, drives, pull boxes, receptacles, etc.
 - 2. Relocate items which interfere with access.
- Q. Provide concrete foundations or pads required for electrical equipment, as indicated or as follows:
 - 1. Where drawings do not show special foundations, install 4 IN high concrete pads.
 - 2. Use 3,000 PSI concrete.
 - 3. Reinforce with 6 x 6 x 10 x 10 mesh, with short dowels into floor at 12 IN OC around perimeter.
 - 4. Chamfer top edges 3/4 IN.
 - 5. Rub all faces smooth with carborundum block.
 - 6. Set anchor bolts for equipment.
- R. All connections shall be tightened to the torque values recommended by that device manufacturer's instructions. If these values are not listed, tighten to pound-inch or pound-foot values recommended in UL Standard 486B, a summary of which may be found in Section 110-4 of the National Electric Code Handbook. Record the torques values of all main pieces of equipment and include in the maintenance manuals.

3.2 LOCATION OF EQUIPMENT

- A. The approximate location of all equipment and devices is shown on the Drawings. The Owner's Representative and/or Engineer reserves the right to change the location of all equipment or devices 8 feet in any direction at no additional cost provided such changes are requested before final installation.
- B. Install all equipment with ample space allowed for removal and repair. Provide ready accessibility to removable parts of equipment and to all wiring without moving equipment which is installed or which is already in place. Provide access panels for all devices installed above non-accessible ceilings and/or within walls or partitions.
- C. In mechanical and electrical equipment spaces, expose ceiling outlets and conduit with due consideration to ventilating ducts and mechanical piping. Where numerous ducts occur, install conduits and outlets after the ventilating ducts. Puncturing of duct work or hanging equipment such as light fixtures, ceiling hangers and conduits from duct work is prohibited unless specifically noted otherwise.

- D. Electrical equipment shall be installed to maintain minimum clearances per Article 110 of NEC and ANSI C2 (National Electrical Safety Code and recommendations of manufacturer/vendor).
- E. Dimensions indicated on documents are limiting dimensions. Do not provide equipment exceeding dimensions indicated or equipment arrangements that reduce required clearances or exceed specified maximum dimensions.

3.3 COORDINATION

- A. Provide day-to-day coordination with the work of other contractors engaged in this project. Execute the work in a manner not to interfere with other contractors.
- B. Coordinate with other contractors regarding the location and size of pipes, raceways, ducts, openings, and devices, so that there may be no interferences between installations or of the progress of any contractor.
- C. If conflict arises in the installation of work, the following preference schedules shall be followed:
 - 1. Recessed lighting fixtures.
 - 2. Sanitary drainage.
 - 3. Chilled water piping.
 - 4. Low pressure ductwork.
 - 5. Domestic water, storm, and vent lines.
 - 6. Electric conduits.
- D. This Contractor shall notify all other contractors of any deviations or special conditions necessary for the installation of his work. Interferences between the work of various contractors shall be resolved prior to installation. Work installed not in compliance with the plans and specifications and without properly checking and coordinating as specified above shall, if necessary, be removed and properly reinstalled by this Contractor without additional cost to the Owner. The Consultant or his representative shall be the mediating authority in all deviation and confliction disputes arising on the project.
- E. Insofar as it is possible to determine in advance, this Contractor shall consult with the masonry contractor and others as to leaving the proper chases and openings for his work; and he shall place all of his outlets, anchors, sleeves and supports prior to pouring concrete or masonry work. Should this Contractor neglect doing this, any cutting and/or patching shall be done at this Contractor's expense.
- F. Contractor must notify owner prior to excavation and exercise due caution with regard to disturbance of utilities and services.
- G. Contractor shall be held responsible for any damage and restoration to utilities and services. Restoration shall be made immediately with methods and materials that are approved for the intended use. Provide written report to the Owner detailing occurrence and corrective action.
- H. The locations of existing underground utilities are not shown and have not been independently verified by the Owner or it's representative. The Contractor shall determine the exact location of all existing utilities before commencing work in the vicinity and agree to be fully responsible for any and all damage which might be occasioned by the Contractor's failure to exactly locate and preserve any and all utilities.

3.4 WALL, ROOF AND FLOOR PENETRATIONS AND SLEEVE INSTALLATION

- A. Provide sleeves for all electrical raceways, and wiring passing through walls and floors and roof. Sleeves shall be of sufficient length to extend through the wall, roof, and floors. Wall sleeves shall have ends flush with finished thickness of walls and floor sleeves shall extend 1 inch above finish floor. Interior diameter of sleeves shall provide 1/2 inch clearance all around conduit.

- B. Below grade wall and roof penetration shall be made watertight. Below grade wall penetration shall be sealed with compression type conduit sealing bushings. Roof penetration shall be sealed and flashed per roof manufacturers published recommendations.
- C. Where cutting is required to facilitate construction, this contractor shall patch and repair cut items to the original state. However, structural work shall not be cut without the written approval of the Engineer or his representative.
- D. Holes through concrete and masonry in new and existing structures shall be cut with a diamond core drill or concrete saw. Pneumatic hammer impact, electric hand or manual hammer type drills, shall not be allowed, except where permitted by Engineer as required by limited working space.
- E. Cutting and Patching
 - 1. Any damage caused by cutting or in any other way caused by this Contractor in the performance of his contract shall be repaired or replaced under the separate heading for the type material required in a manner satisfactory to the Engineer/Owner.
 - 2. Any unnecessary damage caused by this Contractor, due to installation of the electrical work, brought about through carelessness or lack of coordination, shall be corrected under the heading for the type of materials involved, and shall be paid for by this Contractor.
- F. Access Panels
 - 1. The Contractor's attention is called to access panels. It is a requirement of these specifications that all access panels required in architectural finishes or surfaces to provide access to junction boxes, smoke detectors, strip heaters, ballasts or other devices be provided and installed by this Contractor. Advise Consultant of locations and size of all panels.

3.5 FIRESTOPPING

- A. Where conduits, wireway, bus duct and other electrical raceways pass through fire partitions, fire walls or floors, install a firestop that provides an effective barrier against the spread of fire, smoke, and gases. Fire-stop material shall be packed tight, and completely fill clearances between raceways and openings. Fire-stop material shall conform to the following:
 - 1. Fire-stopping material shall maintain its dimension and integrity while preventing the passage of flame, smoke and gases under conditions of installation and use when exposed to the ASTM #119 time-temperature curve for a time period equivalent to the rating of the assembly penetrated. Cotton waste shall not ignite when placed in contact with the non-fire side during the test. Fire-stopping material shall be non-combustible as defined by ASTM E136, and, in addition, for insulation materials, melt point shall be a minimum of 1700° F for 2-hour protection.
 - 2. Unused, spare sleeves in electrical closets shall be sealed with threaded steel caps on each end.
- B. Fire stopping materials shall be installed in accordance with manufacturers written instructions.

3.6 PROTECTION OF WORK

- A. Protect work from injury by keeping all conduit and boxes capped and plugged or otherwise protected. This includes damage by water and/or stoppage from building materials, sand, dirt, or concrete.
- B. Protect all equipment and fixtures from damages during the project, provide all tarpaulins, drop cloths, barricades, or auxiliary equipment.
- C. All materials or equipment damaged during construction shall be repaired or replaced with new items to the satisfaction of the Engineer.

3.7 IDENTIFICATION

- A. Electrical Identification shall be in accordance with Section 26 05 53.

3.8 PAINTING

- A. Finish painting shall be as specified in Division 9.
- B. Provide touch-up painting of all electrical equipment marred in any way during shipment or installation.

3.9 CONNECTIONS TO EQUIPMENT

- A. Equipment: The Contractor shall make final electrical connections to all items of equipment. All power wiring from power source through starters, disconnects and control panels to equipment shall be provided.

3.10 SAMPLES

- A. Physical samples of material and equipment proposed for installation in this project shall be submitted to the Consultant upon request.
- B. Samples shall be submitted through the General Contractor with all shipping and handling charges prepaid. Any expense incurred in securing, delivery and return of samples, is the responsibility of Contractor. Samples shall be delivered to location designated by Consultant.
- C. Samples shall remain the possession of the Contractor except as follows:
 - 1. Approved samples, without physical damage, may be installed on the project.
 - 2. Samples not called for within 14 days after notification will be disposed of by the Consultant.

3.11 SPARE PARTS AND TOOLS

- A. Furnish to Owner and obtain receipt for same, the following:
 - 1. One spare set of fuses for each size and type installed on project; including overload relays for magnetic starters.
 - 2. One set of special tools required for equipment furnished, spare keys, etc.
 - 3. See other sections for spare parts relative to specific systems.

3.12 FINAL INSPECTION AND TESTS

- A. As precedent to final inspection and acceptance, the Contractor shall have all previously listed defects corrected, complete all work, test all systems and submit results of such tests to the Engineer, install all directories, and labels and post all instructions and comply with applicable paragraphs of this section. Refer to Section 26 05 70 for additional information.

3.13 PERFORMANCE

- A. The Contractor shall employ a competent foreman on the job throughout the entire period of construction to see that his work will not conflict with other trades and that it is properly performed/

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- B. The foreman shall have a thorough knowledge of the work to be installed under this contract, be a skilled mechanic who has had a minimum of four (4) years previous successful experience on projects of comparable sizes and complexity. Foreman shall be present at all times that work under this Division is being installed or affected. Foreman shall be a State of Florida licensed Journeyman and shall have a valid Palm Beach County Electrical Journeyman Certificate of Competency.

END OF SECTION

SECTION 26 05 01
WORK INCLUDED

PART 1 GENERAL

1.1 DESCRIPTION OF SYSTEMS

- A. The work required under this Division shall include all materials, labor and auxiliaries required to install, start up and test a complete and properly operating electrical system. The electrical systems required under this Division consist basically of, but are not limited to, the following:
1. Complete distribution system for power including service entrance, main switchboards and distribution panels, feeders, branch circuits, convenience outlets and connections to motors and other power loads.
 - a. The Contractor shall submit at the shop drawing submittal stage, 2-inch scale, dimensioned drawings of actual electrical equipment layouts in all electrical and mechanical rooms, based on the equipment being provided. Any conflicts shall be resolved between the General Contractor and the respective subcontractors to provide for the equipment location and required working clearances.
 - b. Conduit routing is not shown on the documents. It shall be the Contractors responsibility to field route all raceways and coordinate such routing with all disciplines to resolve any conflicts, as necessary to provide the intended connections. It shall be assumed that the design was based on the shortest possible route. Where conduit or duct routing follows other than direct paths, the conductors and raceways shall be adjusted accordingly to account for voltage drop.
 2. Complete distribution system for lighting including the necessary feeders, branch circuits, lighting fixtures, control switches and receptacles.
 3. Complete system of empty raceways (with pull lines) and cabinets for telephones and data network structured cabling.
 4. Complete fire alarm system.
 5. Complete power distribution system for HVAC equipment including wiring, conduits, and disconnect switches.
 6. Complete system of empty raceways (with pull lines) and terminal cabinets and power requirements for EMCS (Energy Management and Control System), security systems, and cable TV.
 7. Furnishing and installing all necessary access panels.
 8. Concrete work for equipment pads or encased raceways.
 9. Painting (of special equipment).
 10. Temporary power.
 11. Contractor shall check site and existing conditions thoroughly before bidding. Advise Architect of discrepancies or questions note.
 12. Whether indicated on the drawings or not, if a requirement is listed, mentioned, or described in this specification, the cost for its provision and complete installation and connection, shall be included in the Contractor=s bid.

13. The Contractor is cautioned to consult drawings of all disciplines to ascertain electrical requirements for systems that may not be on the electrical plans. Specific attention is directed to special systems such as fire alarm, security, EMCS, etc. The Contractor shall include in his bid, the cost for providing and installing all electrical provisions for a complete, operating system.

END OF SECTION

SECTION 26 05 13
BUILDING WIRE AND CABLE

PART 1: GENERAL

1.1 SECTION INCLUDES

- A. Building wire and cable.
- B. Wiring connectors and connections.

1.2 REFERENCES

- A. ANSI/NFPA 70 - National Electrical Code.

1.3 SUBMITTALS

- A. Submit under provisions of Division One.
- B. Product Data: Provide for each cable assembly type.
- C. Test Reports: Indicate procedures and values obtained.
- D. Manufacturer's Installation Instructions: Indicate application conditions and limitations of use stipulated by product testing agency specified under Regulatory Requirements.

1.4 QUALIFICATIONS

- A. Manufacturer: Company specializing in manufacturing products specified in this Section with minimum three years documented experience.

1.5 REGULATORY REQUIREMENTS

- A. Conform to requirements of ANSI/NFPA 70.
- B. Furnish products listed and classified by Underwriters Laboratories, Inc., as suitable for purpose specified and shown.

1.6 FIELD SAMPLES

Where required, provide as per the following:

- A. Provide under provisions of Division One.
- B. Submit one length, each 18 inches of cable assembly from each reel.
- C. Select each length to include complete set of manufacturer markings.
- D. Attach tag indicating cable size and application information.

1.7 PROJECT CONDITIONS

- A. Verify that field measurements are as shown on Drawings.
- B. Conductor sizes are based on copper.
- C. Wire and cable routing shown on Drawings is approximate unless dimensioned. Route wire and cable as required to meet Project Conditions.
- D. Where wire and cable routing is not shown, and destination only is indicated, determine exact routing and lengths required.

1.8 COORDINATION

- A. Coordinate Work under provisions of Division One.
- B. Determine required separation between cable and other work.
- C. Determine cable routing to avoid interference with other work.

PART 2: PRODUCTS

2.1 BUILDING WIRE AND CABLE

- A. Description: Solid or stranded insulated wire.
- B. Conductor: Copper.
- C. Insulation Voltage Rating: 600 volts.
- D. Insulation: ANSI/NFPA 70, Type THW, THWN.

2.2 WIRING CONNECTORS

- A. Solderless Pressure Connectors:
 - 1. IlSCO Model PDB.
 - 2. Substitutions: Under provisions of Division One.
- B. Spring Wire Connectors:
 - 1. Ideal
 - 2. Scotchloc
 - 3. Holub
 - 4. Substitutions: Under provisions of Division One.
- C. Compression Connectors:
 - 1. Panduit
 - 2. Burndy
 - 3. 3M
 - 4. Substitutions: Under provisions of Division One.
- D. Split-bolt, insulation piercing or push-in type connectors shall not be used.

PART 3: EXECUTION

3.1 EXAMINATION

- A. Verify that mechanical work likely to damage wire and cable has been completed.

3.2 PREPARATION

- A. Completely and thoroughly swab raceway before installing wire.

3.3 INSTALLATION

- A. Install products in accordance with manufacturer's instructions.
- B. All wire shall be installed in conduit unless specifically noted otherwise.
- C. Use stranded conductors for control circuits.
- D. Use conductor not smaller than 12 AWG for power and lighting circuits.

- E. Use conductor not smaller than 12 AWG to supply a single fixture.
- F. Use conductor not smaller than 16 AWG for control circuits.
- G. Conductors of the essential electrical system shall be run in separate raceways and be isolated from conductors of the normal power system.
- H. Use 10 AWG conductors for 20 ampere, 120 volt branch circuits longer than 75 feet.
- I. Pull all conductors into raceway at same time.
- J. Use suitable wire pulling lubricant for installing all building wire.
- K. Protect exposed cable from damage.
- L. Use suitable cable fittings and connectors.
- M. Neatly train and lace wiring inside boxes, equipment, and panelboards.
- N. Clean conductor surfaces before installing lugs and connectors.
- O. Make splices, taps, and terminations to carry full ampacity of conductors with no perceptible temperature rise.
- P. Use antioxidant compound on splices and termination of 2 AWG and larger.
- Q. Use sealed weatherproofing kits for underground splices.
- R. Provide 8 inches of free conductor at outlet, switch, pull and junction boxes.
- S. Use insulated spring wire connectors with plastic caps for copper conductor splices and taps, 8 AWG and smaller.
- T. Use Ilsco or Polaris type bolted lugs with covers for copper conductor taps, and hy-press type sleeves with shrink-sleeve insulation, 6 AWG and larger. Do not splice in underground hand holes.
- U. In new conduit installation, do not install more than five wires in the same conduit unless specifically noted otherwise. Conduits containing control wires or switch legs may contain more than 5 wires to a maximum fill of 40%.
- V. All bushings shall be installed prior to pulling wire. Any wire pulled-in prior to installation of bushings will be required to be removed and replaced at the Contractor's expense.
- W. Each current carrying phase conductor of 120v branch circuits and 277V lighting circuits shall have a dedicated neutral conductor paired with it. Do not "share" neutral conductors among alternate phase conductors.

3.4 INTERFACE WITH OTHER PRODUCTS

- A. Identify wire and cable under provisions of Division One.
- B. Identify each conductor with its circuit number or other designation indicated on Drawings.

3.5 FIELD QUALITY CONTROL

- A. Perform field inspection and testing under provisions of Division One.
- B. Inspect wire and cable for physical damage and proper connection.
- C. Measure tightness of bolted connections and compare torque measurements with manufacturer's recommended values.
- D. Verify continuity of each branch circuit conductor.
- E. Megger all feeders and all branch circuits larger than 200 amp. Coordinate all testing with Section 26 05 70.

END OF SECTION

SECTION 26 05 26
GROUNDING

PART 1 – GENERAL

1.1 WORK INCLUDES

- A. Base Bid:
 - 1. Electrical Contractor provide:
 - a. Grounding for Separately Derived Systems
 - b. Grounding for equipment.

1.2 SYSTEM DESCRIPTION

- A. Ground each separately derived system neutral to structural member of building.
- B. Ground raceways and electrical equipment; use double locknuts at all panels; use bonding jumpers where conduits are installed in concentric knockouts. Ground panels, switches, motor frames, motor starters fixtures, and outlets with separate ground conductor in conduit system.
- C. Bond together system neutrals, service entrance enclosures, exposed non-current carrying metal parts of electrical equipment, metal raceway systems, grounding conductor in raceways and cables, receptacle ground terminals.

1.3 QUALITY ASSURANCE

- A. Regulatory Requirements:
 - 1. Comply with NFPA 70, National Electric Code.
 - 2. UL 467: Grounding and Bonding Equipment.

1.4 SUBMITTALS

- A. In accord with Division One.
- B. Test data in accord with 26 05 70.

PART 2 – PRODUCTS

2.1 MATERIALS

- A. Materials used for grounding conductors shall be in accordance with N.E.C. Article 250-91.
- B. Ground Rods: Steel, copper-encased, 3/4 inch O.D. x 10'-0".
- C. Connections: Exothermic weld type for inaccessible locations, mechanical clamp type for accessible locations.

PART 3 – EXECUTION

3.1 INSTALLATION

- A. Use driven ground rod where shown on drawings.
- B. Bond all grounding systems together.

- C. Separately Derived Systems: Provide connection to building steel bonded to neutral of transformer.
- D. Provide green equipment grounding conductor sized in accordance with Table 250-95 of the N.E.C., in all raceways including conduits, wireways, ducts, and boxes. Bond equipment grounding conductor to each section of ducts and wireways using a continuous conductor and lay-in type grounding lugs bolted to the housing.
- E. The equipment grounding busses of the normal and essential branch - circuit panelboards serving the same patient care areas, shall be bonded together using a No. 10 insulated (green) copper conductor in accordance with Article 517-14, N.E.C.
- F. In all patient rooms, prep/recovery areas, O.R.'s, or other patient care areas, bond outlet boxes of each switch, receptacle, TV outlet, telecom outlet, telemetry outlet, med gas outlet, nurse call outlet, code blue outlet, etc., together using a #10 AWG (min.) green equipment grounding conductor. Bond to med gas faceplates using a tapped cap-screw or similar connection. This requirement is intended to enhance equipotential grounding in these spaces.

3.2 FIELD QUALITY CONTROL

- A. Measure ground resistance in accord with 26 05 70.

END OF SECTION

SECTION 26 05 29
SUPPORTING DEVICES

PART 1: GENERAL

1.1 WORK INCLUDED

- A. Conduit and equipment supports.
- B. Fastening hardware.

1.2 COORDINATION

- A. Coordinate size, shape, and location of concrete pads with Division 3.

1.3 QUALITY ASSURANCE

- A. Support systems shall be adequate for weight of equipment and conduit, including wiring, which they carry.

PART 2: PRODUCTS

2.1 MATERIAL

- A. Support Channel: Galvanized steel.
- B. Hardware: Corrosion resistant.

PART 3: EXECUTION

3.1 INSTALLATION

- A. Fasten hanger rods, conduit clamps, and outlet and junction boxes to building concrete structure using expansion anchors.
- B. Use toggle bolts or hollow wall fasteners in hollow masonry, plaster, or gypsum board partitions and walls; expansion anchors or preset inserts in solid masonry walls; self-drilling anchors or expansion anchor on concrete surfaces; sheet metal screws in sheet metal studs; and wood screws in wood construction.
- C. Do not fasten supports to piping, ductwork, mechanical equipment, or conduit.
- D. Do not use powder-actuated anchors.
- E. Do not drill structural steel members.
- F. Fabricate supports from structural steel or steel channel, rigidly welded or bolted to present a neat appearance. Use hexagon head bolts with spring lock washers under all nuts.
- G. In wet locations install free-standing electrical equipment on concrete pads.
- H. Install surface-mounted cabinets and panelboards with minimum of four anchors. Provide steel channel supports to stand cabinet 3/4 inch off wall.

- I. Bridge studs top and bottom with channels to support flush-mounted cabinets and panelboards in stud walls.

END OF SECTION

SECTION 26 05 33
RACEWAYS

PART 1: GENERAL

1.1 SECTION INCLUDES

- A. Metal conduit.
- B. Flexible metal conduit.
- C. Liquidtight flexible metal conduit.
- D. Electrical metallic tubing.
- E. Fittings and conduit bodies.

1.2 REFERENCES

- A. ANSI C80.1 - Rigid Steel Conduit, Zinc Coated.
- B. ANSI C80.3 - Electrical Metallic Tubing, Zinc Coated.
- C. ANSI/NEMA FB 1 - Fittings, Cast Metal Boxes, and Conduit Bodies for Conduit and Cable Assemblies.
- D. ANSI/NFPA 70 - National Electrical Code.
- E. NECA "Standard of Installation."
- F. NEMA RN 1 - Polyvinyl Chloride (PVC) Externally Coated Galvanized Rigid Steel Conduit.

1.3 DESIGN REQUIREMENTS

- A. Conduit Size: ANSI/NFPA 70.

1.4 SUBMITTALS

- A. Submit under provisions of Division One.

1.5 PROJECT RECORD DOCUMENTS

- A. Submit under provisions of Division One.
- B. Accurately record actual routing of empty conduits, exterior underground.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Deliver, store, protect, and handle Products to site under provisions of Division One.
- B. Accept conduit on site. Inspect for damage.
- C. Protect conduit from corrosion and entrance of debris by storing above grade. Provide appropriate covering.

1.7 PROJECT CONDITIONS

- A. Verify that field measurements are as shown on Drawings.
- B. Verify routing and termination locations of conduit prior to rough-in.
- C. Conduit routing is shown on Drawings in approximate locations unless dimensioned. Route as required to complete wiring system.

PART 2: PRODUCTS

2.1 RIGID METAL CONDUIT

- A. Description: Rigid Galvanized Steel Conduit: ANSI C80.1.
- B. Fittings and Conduit Bodies: ANSI/NEMA FB 1; material to match conduit; all steel fittings.

2.2 NON-METALLIC CONDUIT

- A. Description: Schedule 40 PVC.
- B. Fittings and Conduit Bodies: Same manufacturer as conduit.

2.3 FLEXIBLE METAL CONDUIT

- A. Description: Interlocked steel construction.
- B. Fittings: ANSI/NEMA FB 1. Steel or malleable iron type.

2.4 LIQUIDTIGHT FLEXIBLE METAL CONDUIT

- A. Description: Interlocked steel construction with PVC jacket.
- B. Fittings: ANSI/NEMA FB 1. Steel or malleable iron type.

2.5 ELECTRICAL METALLIC TUBING (EMT)

- A. Description: ANSI C80.3; galvanized tubing.
- B. Fittings and Conduit Bodies: ANSI/NEMA FB 1; steel, set screw or compression type with insulated throat.

PART 3: EXECUTION

3.1 CONDUIT REQUIREMENTS

- A. Minimum Size: 3/4 inch unless otherwise specified.
- B. Underground Installations:
 - 1. Use rigid galvanized steel (RGS) conduit or Schedule 40 PVC outside building footprint. Paint all RGS conduit, to be installed underground, with two coats of bitumastic paint.
 - 2. Minimum Size: 3/4 inch.
 - 3. Install conduits a minimum of 30 inches below finished grade, unless inside the building line.
 - 4. Terminate conduits with bell ends or bushings at manholes.
 - 5. Duct seal all outdoor conduit terminations, and underground conduits entering a building.
 - 6. PVC conduit shall not be used in any patient care areas.
- C. Outdoor Locations, Above Grade: Use rigid steel conduit where exposed to possible physical damage. All other areas, use Schedule 40 PVC.
- D. In Slab Above Grade:
 - 1. Use rigid steel conduit or electrical metallic tubing.

2. Maximum Size Conduit in Slab: 3/4 inch.
- E. Wet Locations: Use rigid steel conduit.
- F. Damp Locations: Rigid steel conduit.
- G. Indoor Locations:
 1. Concealed: Use rigid steel conduit or use electrical metallic tubing.
 2. Exposed: Below 4'-0" AFF, use rigid steel conduit. Above 4'-0" AFF, use electrical metallic tubing.
- H. Subject to Physical Damage: Galvanized rigid steel conduit.
- I. Flexible conduit: 3/8 inch steel (min.), maximum 6 feet long.
- J. Electrical Metallic Tubing: 1/2 inch, not exceeding 10 feet long at the following conditions:
 1. Junction box above ceiling to a single box in furred wall.
 2. All other locations, use 3/4" EMT minimum.
- K. Steel flexible conduit or liquid tight conduit, 1/2 inch (maximum 3 feet long), to connect equipment where subject to vibration or frequent changing.

3.2 INSTALLATION

- A. Install conduit in accordance with NECA "Standard of Installation."
- B. All wiring shall be in conduit unless specifically noted otherwise.
- C. Arrange supports to prevent misalignment during wiring installation.
- D. Secure and/or support conduit using coated steel or malleable iron straps, lay-in adjustable hangers, clevis hangers, and split hangers.
- E. Multiple parallel runs of suspended conduits shall be supported by steel channel and straps.
- F. Group related conduits; support using conduit rack. Construct rack using steel channel; provide space on each for 25 percent additional conduits.
- G. Fasten conduit supports to building structure and surfaces under provisions of Section 26 05 29.
- H. Do not support and/or secure conduit with perforated pipe straps. Remove wire used for temporary supports.
- I. Do not attach conduit to ceiling support wires. Install additional support wires to support conduits. Conduit must be securely fastened in place.
- J. Arrange conduit to maintain headroom and present neat appearance.
- K. Route exposed conduit parallel and perpendicular to walls. Exposed conduit below 10 ft above floor in occupied areas, shall have 2 hole straps spaced a maximum of 5 ft.
- L. Do not route conduits on floors in areas used for access to any equipment.
- M. Route conduit installed above accessible ceilings parallel and perpendicular to walls.
- N. Route conduit in and under slab from point-to-point.
- O. Do not cross conduits in slab.
- P. Maintain adequate clearance between conduit and piping.
- Q. Maintain 12 inch clearance between conduit and surfaces with temperatures exceeding 104 degrees F.
- R. Cut conduit square using saw or pipe cutter; de-burr cut ends.
- S. Bring conduit to shoulder of fittings; fasten securely.
- T. Use conduit hubs or sealing locknuts to fasten conduit to sheet metal boxes in damp and wet locations and to cast boxes.
- U. Install no more than equivalent of four 90-degree bends between boxes. Use conduit bodies to make sharp changes in direction, as around beams. Use factory elbows for bends in metal conduit larger than 2 inch size.

- V. Avoid moisture traps; provide junction box with drain fitting at low points in conduit system.
- W. Provide suitable fittings to accommodate expansion and deflection where conduit crosses expansion joints.
- X. Provide a 200 lb test pull string in each empty conduit except sleeves and nipples.
- Y. Use suitable caps to protect installed conduit against entrance of dirt and moisture immediately after installation.
- Z. Ground and bond conduit under provisions of Section 26 05 26.
- AA. Identify conduit under provisions of Section 26 05 53.
- BB. New Construction: Conduits run in finished areas shall be concealed.
- CC. No conduits shall be installed on roof surface.
- DD. Do not use threadless connector or couplings on rigid conduit installed above grade.
- EE. Do not use "all-thread" conduit nipples.
- FF. Terminate all empty conduits in approved type boxes.
- GG. Disconnect switches, magnetic starters, contactors, control cabinets and panel boards shall not be used as raceways.
- HH. Flexible metal conduit and liquidtight flexible metal conduit shall not exceed 6 feet in length.
- II. Flexible metal conduit and liquid-tight flexible metal conduit shall not penetrate walls or ceilings.
- JJ. All metallic conduits and fittings below grade or in slabs shall be coated with two (2) coats of bitumastic paint prior to installation.
- KK. All conduit terminations shall have insulated throat or appropriate plastic bushing.
- LL. All raceway systems shall be complete, and each system shall be totally separate.
- MM. Non-metallic conduit shall not be used in patient care areas.

3.2 INTERFACE WITH OTHER PRODUCTS

- A. Install conduit to preserve fire resistance rating of partitions and other elements, using materials and methods under the provisions of Division Seven.
- B. Route conduit through roof openings for piping and ductwork or through suitable roof jack with pitch pocket. Coordinate location with roofing installation.

END OF SECTION

SECTION 26 05 34
BOXES

PART 1: GENERAL

1.1 SECTION INCLUDES

- A. Wall and ceiling outlet boxes.
- B. Floor boxes.
- C. Pull and junction boxes.

1.2 REFERENCES

- A. ANSI/NEMA FB 1 - Fittings and Supports for Conduit and Cable Assemblies.
- B. ANSI/NEMA OS 1 - Sheet-steel Outlet Boxes, Device Boxes, Covers, and Box Supports.
- C. ANSI/NFPA 70 - National Electrical Code.
- D. NEMA 250 - Enclosures for Electrical Equipment (1000 Volts Maximum).

1.3 PROJECT RECORD DOCUMENTS

- A. Submit under provisions of Division One.
- B. Accurately record actual locations and mounting heights of outlet, pull, and junction boxes.

1.4 REGULATORY REQUIREMENTS

- A. Conform to requirements of ANSI/NFPA 70.
- B. Furnish products listed and classified by Underwriters Laboratories, Inc., as suitable for purpose specified and shown.

1.5 PROJECT CONDITIONS

- A. Verify field measurements are as shown on Drawings.
- B. Electrical boxes are shown on Drawings in approximate locations unless dimensioned. Install at location required for box to serve intended purpose.

PART 2: PRODUCTS

2.1 OUTLET BOXES

- A. Sheet Metal Outlet Boxes: ANSI/NEMA OS 1, galvanized steel one piece construction, 4 inches x 4 inches x 1.5 inches deep, minimum.
- B. Cast Boxes: NEMA FB 1, Type FD cast ferralloy. Provide gasketed cover by box manufacturer. Provide threaded hubs, 4 inches x 4 inches x 1.5 inches deep, minimum.

2.2 PULL AND JUNCTION BOXES

- A. Sheet Metal Boxes: NEMA OS 1, galvanized steel one piece construction.
 - 1. Minimum Size Box: 4 x 4 x 1-1/2 inches deep.

- B. Surface-Mounted Cast Metal Box: NEMA 250, Type 4; flat-flanged, surface-mounted junction box.
 - 1. Material: Galvanized cast iron.
 - 2. Cover: Furnish with ground flange, neoprene gasket, and stainless steel cover screws.

PART 3: EXECUTION

3.1 INSTALLATION

- A. Install electrical boxes as shown on Drawings, and as required for splices, taps, wire pulling, equipment connections and compliance with regulatory requirements.
- B. Install electrical boxes to maintain a 6'-3" headroom and to present neat mechanical appearance.
- C. Install pull boxes and junction boxes above accessible ceilings and in unfinished areas only.
- D. Inaccessible Ceiling Areas: Install outlet and junction boxes no more than 6 inches from ceiling access panel or from removable recessed luminaire.
- E. Accessible Ceiling Areas: Install outlets and junction boxes no more than 3'-0" above removable ceiling.
- F. Install boxes to preserve fire resistance rating of partitions and other elements, using materials and methods under the provisions of Division One.
- G. Align adjacent wall-mounted outlet boxes for switches, thermostats, and similar devices with each other.
- H. Use flush mounting outlet boxes in finished areas.
- I. Do not install flush mounting boxes back-to-back in walls; provide minimum 6 inch separation. Provide minimum 24 inches separation in acoustic rated and fire rated walls.
- J. Secure flush mounting box to interior wall and partition studs. Accurately position to allow for surface finish thickness.
- K. Use stamped steel bridges to fasten flush mounting outlet box between studs.
- L. Install flush mounting box without damaging wall insulation or reducing its effectiveness.
- M. Do not fasten boxes to ceiling support wires.
- N. Support boxes from building structure or structural member.
- O. Use gang box where more than one device is mounted together. Do not use sectional box.
- P. Use 2-gang box with plaster ring for single device outlets.
- Q. Use cast outlet box in exterior locations exposed to the weather and wet locations.
- R. Use cast floor boxes for installations in slab on grade; formed steel boxes are acceptable for other installations.
- S. Set floor boxes level.
- T. Large Pull Boxes: Boxes larger than 100 cubic inches in volume or 12 inches in any dimension.
 - 1. Interior Dry Locations: Use hinged enclosure.
 - 2. Other Locations: Use surface-mounted cast metal box.
- U. Floor boxes shall not be used for feed through wiring except to another floor box.
- V. Cast boxes at the end of a run shall have one additional conduit into slab for support.
- W. Pull boxes shall be added, as necessary, to eliminate conduit runs from exceeding 200 feet in length.

- X. Box mounting height, unless indicated on drawings:
(All mounting heights shall comply with ADA)
 - 1. Refer to Section 26 27 26, Paragraph 3.4.
- Y. A maximum of one extension ring shall be used on a box.
- Z. System pull and junction boxes shall be color-coded as specified in Section 26 05 53.

3.2 INTERFACE WITH OTHER PRODUCTS

- A. Coordinate locations and sizes of required access doors with Division 8.
- B. Locate flush mounting box in masonry wall to require cutting of masonry unit corner only. Coordinate masonry cutting to achieve neat opening.
- C. Coordinate mounting heights and locations of outlets mounted above counters, benches, and backsplashes.
- D. Position outlet boxes to locate luminaries as shown on reflected ceiling plan.

3.3 ADJUSTING

- A. Adjust floor box flush with finish flooring material.
- B. Adjust flush-mounting outlets to make front flush with finished wall material.
- C. Install knockout closure in unused box opening.

END OF SECTION

SECTION 26 05 53
ELECTRICAL SYSTEMS IDENTIFICATION

PART 1: GENERAL

1.1 WORK INCLUDED

- A. Nameplates.
- B. Wire markers.
- C. Box color coding.
- D. Lighting and power junction boxes.
- E. Panel directories.

1.2 SUBMITTALS

- A. Submit shop drawings under provisions of Division One.
- B. Include schedule for nameplates.

PART 2: PRODUCTS

2.1 MATERIALS

- A. Nameplates: Engraved three-layer laminated plastic, white letters on a black background. Equipment and devices on 'critical branch' (emergency) shall have labels with white letters on red background.
- B. Underground-Type Plastic Line Marker: Manufacturer's standard permanent, bright-colored, continuous-printed plastic tape with mylar backing, intended for direct-burial service; not less than 6 inches wide x 4 mils thick. Provide tape with printing which most accurately indicates the type of the buried conduit.
- C. Wire and Cable Markers: Cloth markers, split sleeve, or tubing type.

PART 3: EXECUTION

3.1 INSTALLATION

- A. Degrease and clean surfaces to receive nameplates.
- B. Install nameplates parallel to equipment lines.
- C. Secure nameplates to equipment fronts using stainless steel screws. Secure nameplate to outside face of recessed panelboard doors in finished locations.
- D. Embossed tape will not be permitted for any application.
- E. Provide underground-type plastic line marker above exterior underground conduits. Bury 6 to 8 inches below finish grade. Provide line markers on each side of trench if wider than 16 inches.

3.2 WIRE IDENTIFICATION

- A. Phase Color Coding:
 - 1. 120/208 volt system, "A" phase - black, "B" phase - red, "C" phase - blue, neutral - white, and ground green.
 - 2. 277/480 volt system, "A" phase - brown, "B" phase - orange, "C" phase - yellow, neutral - gray, and ground - green.
- B. Maintain A, B, C, phase relation left to right or top to bottom when viewed from front. Maintain color coding throughout entire project.
- C. Phase conductors, size #10 and smaller, and neutral and ground conductors, shall have continuous outer finish color as indicated above. Size #8 and larger conductors shall have black insulation and be color coded with a six inch band of colored tape at all junctions and terminators.

3.3 NAMEPLATE ENGRAVING SCHEDULE

- A. Provide nameplates of minimum letter height as scheduled below.
 - 1. Panelboards: 1/2 inch-identify panelboard name. 1/4 inch-identify voltage rating.
 - 2. Individual Circuit Breakers and Switches: 3/8 inch-identify circuit and load served, including location.
 - 3. Safety Switches and Enclosed Switches: 1/2 inch - identify switch name; 1/4-inch - identify load served.
 - 4. Transformers: 3/8 inch-identify transformer name. 1/4 inch-identify primary and secondary voltages.
 - 5. Electrical Cabinets and Enclosures: 3/8 inch- identify equipment name.
 - 6. System Terminal Cabinets: 3/8 inch-identify equipment or system name.
- B. Headwall: 1/8 inch-identify panel and circuit number serving outlet (ex. 'LINA - 2') located above each outlet on headwall.
- C. Provide panelboard and circuit number on engraved trim plate, on each receptacle and switch. Engraving shall be deep enough to be visible and legible from a distance of 5'-0". Fasten nameplate to switch coverplate.

3.4 BOX COLOR CODING SCHEDULE

- A. Paint junction box and cover, and 6" of all conduits entering/leaving, in the following manner:
 - Life-Safety - Yellow
 - Critical - Orange
 - Equipment - Green
 - Fire alarm - Red
 - Nurse Call/Code Blue - blue.
 - Patient Monitor - purple.
 - Telephone system - brown.
 - CATV - white.

3.5 LIGHTING AND POWER JUNCTION BOX IDENTIFICATION

- A. Identify lighting and power junction box covers with circuit and panelboard number on the outside, using permanent marker.

3.6 PANEL DIRECTORY

- A. Shall be typewritten, indicating specific and clear area of control, regardless of the listing in the panel schedules on the drawings. Indicate by room name, equipment, system, etc.
- B. Provide to the Engineer corrected panel directories so the panel schedules on the record drawings can be updated to match the directories in the panels in the field.

END OF SECTION

SECTION 26 05 70
TESTING

PART 1 – GENERAL

1.1 WORK INCLUDES

- A. Testing of electrical components and equipment as herein specified.

1.2 SYSTEM DESCRIPTION

- A. Testing includes:
 1. Resistance tests.
 2. Continuity tests.
 3. Phase relationship verification.
 4. Voltage tests.
 5. Ground fault protection tests.

1.3 QUALITY ASSURANCE

- A. Regulatory Requirement
 1. Comply with National Electrical Code, (NEC).
- B. Reference Publications

1.4 SUBMITTALS

- A. Test Reports: All test reports shall be submitted in triplicate, assembled, and bound to Architect/Engineer prior to final acceptance.

PART 2 – PRODUCTS

2.1 MATERIALS

- A. Furnish all test equipment to perform specified testing.

PART 3 – EXECUTION

3.1 TESTS

- A. Conduct such tests and adjustment of equipment as necessary to verify performance requirements.
- B. Test Reports: Typewritten, listing testing equipment used, person or persons performing the tests, date tested, circuits tested, motor or equipment nameplate data, and results of tests.
- C. Insulation resistance tests general:
 1. Perform insulation resistance tests on equipment and cables listed herein.
 2. Test equipment: Furnished by Contractor.
 3. Resistance measured: line-to-ground.
 4. Disconnect, prior to testing, any device that could be damaged by application of voltage.
 5. Insulation resistance tests shall be conducted per following schedule:

Item Tested	Voltage of Test	Min. Acceptance Resistance in Megohms
Transformers	500v	5
No. 2 and larger cables (600 V)	1000V	50
Panelboards	1000V	25

D. Ground Resistance

1. Measure and record ground resistance from system neutral connection at separately derived system, to convenient ground reference point using suitable ground testing equipment. Minimum acceptable resistance: 10 ohms. When resistance exceeds 10 ohms, modify ground connection and/or increase grounding electrode conductor size and repeat test.
2. Measure equipotential difference and ground resistance between the metallic raceway, and the equipment grounding conductor at each outlet mounted in the walls, of the Operating and Procedure rooms, and prep and recovery areas. Maximum allowable potential difference is 20 millivolts, (.020 volts), and maximum ground resistance shall be 0.1 ohms.
3. Random testing shall be performed at the time of the AHCA Final Survey. Test equipment shall be provided with current calibration data indicating date of calibration, and length of test leads used during calibration. Calibration shall have been within the last twelve (12) months.

E. Continuity Test

1. Test branch circuits and control circuits to determine continuity of wiring and connection. Submit written statement that this has been performed.

F. Voltage test shall be made and recorded at the following listed points. Tests shall be conducted under normal load conditions.

1. Distribution feeders at panelboards.
2. Outlets in the headrail system.

G. Phase Relationship: Check connections to equipment for proper A-B-C phase relationships.

1. Disconnect, prior to check, any device which could be damaged by application of voltage of reversed phase sequence.

3.2 CORRECTIONS OF DEFECTS

- A. If tests disclose any unsatisfactory workmanship or equipment furnished under this contract, Contractor shall repair or replace such defects.
- B. If any wiring or equipment is damaged by tests, Contractor shall repair or replace such wiring or equipment.

END OF SECTION

SECTION 26 24 16
CIRCUIT BREAKER PANELBOARDS

PART 1 – GENERAL

1.1 WORK INCLUDES

- A. Panelboards herein specified and shown on the drawings.

1.2 SUBMITTALS

- A. In accord with Division One:
1. Shop Drawings: Panelboards and Dimensional Data.
2. Product Data: Circuit breakers.

PART 2 – PRODUCTS

2.1 MATERIALS

- A. Panelboards rated 208/120 volt shall have copper bus structure braced for 10,000 RMS amps fault current minimum, and panelboards rated 277/480 volt shall have copper bus braced for 25,000 RMS amps fault current minimum, or as indicated on the drawings, whichever is greater. All copper parts shall be plated to prevent corrosion.
1. All panelboards shall be Dead-Front Safety Type, equipped with thermal-magnetic molded case breakers, and solid neutral bus.
 2. Bus bar connections to the branch circuit breakers shall be the "Distributed Phase" or "Phase Sequence" type. Bussing shall be such that adjacent single pole breakers will be on different phases or polarities, and that two or three pole breakers can be installed at any location.
 3. Panelboard numbering shall be such that starting at the top, odd numbers shall be used in sequence down the left hand side and even numbers shall be used in sequence down the right hand side.
- B. Cabinets shall be fabricated of code gauge galvanized steel with gutters per National Electrical Code. Fronts shall have doors with matching one piece trim, be code gauge and be finished with rust inhibiting primer and baked enamel. Fronts shall have adjustable indicating trim clamps completely concealed when door is closed. Provide a circuit directory frame and card with a clear plastic covering on the inside of the doors. Fronts shall have flush locks and be furnished with two keys per lock.
- C. Provide circuit breakers, quick-make, quick-break, thermal-magnetic, trip indicating, and common trip on all multi-pole breakers. Branch circuit breakers feeding convenience outlets shall have sensitive instantaneous trip settings of not more than 10 times the trip rating of the breaker. Circuit breakers shall have bolt-on connections to the bus. Ratings are shown on the panelboard schedule.
- D. Main circuit breaker: Circuit breaker ampere rating as shown on drawings, voltage as required, 3-pole, single-throw, front connected. Molded case, thermal-magnetic, common trip, quick-make, quick-break, adjustable magnetic trip elements, with RMS interrupting rating as required to meet the panel's integrated rating. Provide where indicated on drawings.
- E. Breakers intended to switch fluorescent lighting loads on a regular basis shall be rated for switching duty.

- F. Provide ground fault circuit interrupter circuit breakers rated to trip at 30 milliamperes for circuits as shown on drawings.
- G. Panelboards shall be furnished with ground bus and separate insulated neutral bus.
- H. Circuit Breaker Panelboards:
 - 1. Acceptable Products:
 - a. Square D (Basis of Design)
 - b. G.E.
 - c. Eaton
 - d. Siemens

PART 3 – EXECUTION

3.1 INSTALLATION

- A. Locate as shown on drawings. Maximum distance from floor to highest breaker: 6 feet - 6 inches.
- B. Provide mounting materials required; make connections specified or shown. Use collars around mounting bolts, or equivalent means to provide 1/4" minimum air space between panel and wall for surface mounted panel.
- C. Provide nameplate for each panel in accord 26 05 53.
- D. Provide typed circuit directory for each panel indicating load served. Leave spare circuit breakers and circuit breaker space blank on directory.
- E. Where double-panels are indicated, provide single common trim or allow for two individual covers when mounting cabinets.

END OF SECTION

SECTION 26 27 16
CABINETS AND ENCLOSURES

PART 1 GENERAL

1.1 SECTION INCLUDES:

- A. Hinged cover enclosures.
- B. Cabinets.
- C. Terminal blocks and accessories.

1.2 REFERENCES

- A. NEMA 250 - Enclosures for Electrical Equipment (1000 Volts Maximum).
- B. ANSI/NEMA ICS 1 - Industrial Control and Systems.
- C. ANSI/NEMA ICS 4 - Terminal Blocks for Industrial Control Equipment and Systems.
- D. ANSI/NEMA ICS 6 - Enclosures for Industrial Control Equipment and Systems.

1.3 SUBMITTALS

- A. Submit product data under provisions of Division 1.
- B. Shop Drawings for Equipment Panels: Include wiring schematic diagram, wiring diagram, outline drawing and construction diagram as described in ANSI/NEMA ICS 1.

PART 2 PRODUCTS

2.1 HINGED COVER ENCLOSURES

- A. Construction: NEMA 250; steel; type as required to meet conditions of installation unless indicated on the Drawings. Where installed outdoors, enclosure shall be NEMA-4X stainless steel.
- B. Finish: Manufacturer's standard enamel finish.
- C. Covers: Continuous hinge, held closed by flush latch operable by key.
- D. Panel for Mounting Terminal Blocks or Electrical Components: 14 gage steel, enamel finish.

2.2 CABINETS

- A. Cabinet Boxes: Galvanized steel with removable end walls. Provide 3/4 inch thick plywood backboard (exterior fir, type A/C, 7 ply) painted gray on all sides, for mounting terminal blocks.
- B. Cabinet Fronts: Screw cover front, concealed hinge and flush lock keyed to match branch circuit panelboard; finish in baked enamel.

2.3 TERMINAL BLOCKS AND ACCESSORIES

- A. Terminal Blocks: ANSI/NEMA ICS 4; UL listed.
- B. Power Terminals: Unit construction type, closed-back type, with tubular pressure screw connectors, rated 600 volts.

- C. Signal and Control Terminals: Modular construction type, channel mounted; tubular pressure screw connectors, rated 300 volts.

2.4 FABRICATION

- A. Shop assemble enclosures and cabinets housing terminal blocks or electrical components in accordance with ANSI/NEMA ICS 6.
- B. Provide knockouts on enclosures.
- C. Provide protective pocket inside front cover with schematic diagram, connection diagram, and layout drawing of control wiring and components within enclosure.

PART 3 EXECUTION

3.1 INSTALLATION

- A. Install cabinets and enclosures plumb; anchor securely to wall and structural supports at each corner, minimum.
- B. Provide accessory feet for free-standing equipment enclosures.
- C. Install trim plumb.

END OF SECTION

SECTION 26 27 26
WIRING DEVICES

PART 1: GENERAL

1.1 SECTION INCLUDES

- A. Wall switches.
- B. Receptacles.
- C. Device plates and decorative box covers.

1.2 REFERENCES

- A. NEMA WD 1 - General Purpose Wiring Devices.
- B. NEMA WD 6 - Wiring Device Configurations.

1.3 SUBMITTALS

- A. Submit under provisions of Division One.
- B. Product Data: Provide manufacturer's catalog information showing dimensions, colors, and configurations.
- C. Manufacturer's Instructions:
 - 1. Indicate application conditions and limitations of use stipulated by product testing agency specified under regulatory requirements.
 - 2. Include instructions for storage, handling, protection, examination, preparation, operation and installation of product.

1.4 QUALIFICATIONS

- A. Manufacturer: Company specializing in manufacturing products specified in this Section with minimum three (3) years experience.

PART 2: PRODUCTS

2.1 WALL SWITCHES - Specification Grade - 20A, 125V/277V, grounding type. Switches on the critical branch and life safety branch shall be red.

- A. Single Pole Switch:
 - 1. Legrand
 - 2. Leviton
 - 3. Arrow-Hart
- B. Three-way Switch:
 - 1. Legrand
 - 2. Leviton
 - 3. Arrow-Hart
- C. Four-way Switch:
 - 1. Legrand
 - 2. Leviton
 - 3. Arrow-Hart

2.2 RECEPTACLES - Hospital Grade - 20A, 125V, 3W, Grounding type. Receptacles on the critical and life-safety branch shall be red.

- A. Single Convenience Receptacle:
 - 1. Legrand
 - 2. Leviton.
 - 3. Arrow-Hart
- B. Duplex Convenience Receptacle:
 - 1. Legrand
 - 2. Leviton
 - 3. Arrow-Hart
- C. GFCI Receptacle:
 - 1. Legrand
 - 2. Leviton
 - 3. Arrow-Hart
- D. Surge Protected Receptacle:
 - 1. Legrand
 - 2. Leviton

2.3 WALL PLATES

- A. Decorative Cover Plate: Stainless steel type 302/304 satin finished, non-magnetic.
- B. Weatherproof Cover Plate: Gasketed stainless steel with lockable hinged gasketed device cover, equal to Sierra Model WP-26L.

PART 3: EXECUTION

3.1 EXAMINATION

- A. Verify existing conditions.
- B. Verify outlet boxes are installed at proper height.
- C. Verify wall openings are neatly cut and will be completely covered by wall plates.
- D. Verify branch circuit wiring installation is completed, tested, and ready for connection to wiring devices.

3.2 PREPARATION

- A. Provide extension rings to bring outlet boxes flush with finished surface.
- B. Clean debris from outlet boxes.

3.3 INSTALLATION

- A. Install products in accordance with manufacturer's instructions.
- B. Install devices plumb and level.
- C. Install switches with OFF position down.
- E. Install receptacles with grounding pole on bottom, or to the left when mounted horizontally.
- F. Connect wiring device grounding terminal to branch circuit equipment grounding conductor.

- G. Install decorative plates on switch, receptacle, and blank outlets in finished areas.
- H. Connect wiring devices by wrapping conductor around screw terminal. Do not “back-wire” any devices.
- I. Install galvanized steel plates on outlet boxes and junction boxes in unfinished areas, above accessible ceilings, and on surface mounted outlets.
- J. Any receptacle within six feet of a sink shall be a GFCI type.
- K. Devices on 'emergency' circuits shall be red in color. Devices on normal power circuits shall be the color as specified by the Architect.
- L. When GFCI is specified, use only GFCI receptacles. Do not protect "down stream" receptacles with GFCI receptacles.
- M. Do not use push-in connections on any device.
- N. All devices, receptacles, and switches shall have separate grounding terminal.
- O. Identify each outlet and switch in accordance with Section 26 05 53.

3.4 MOUNTING HEIGHTS

- A. Coordinate locations of outlet boxes provided under Section 26 05 34 to obtain mounting heights specified herein or indicated on Drawings.
- B. Install wall switch 42-inches, to center, above finished floor, or as dimensioned on the drawings.
- C. Install convenience receptacle 18-inches, to center, above finished floor.
- D. Install convenience receptacle 6-inches to center, above backsplash of counter.
- E. Install telecommunications outlet 18-inches, to center, above finished floor, or as dimensioned on the drawings.

3.5 FIELD QUALITY CONTROL

- A. Inspect each wiring device for defects.
- B. Operate each wall switch with circuit energized and verify proper operation.
- C. Verify that each receptacle device is energized.
- D. Test each receptacle device for proper polarity.
- E. Test each GFCI receptacle device for proper operation.

3.6 ADJUSTING

- A. Adjust devices and wall plates to be flush, plumb, and level.

END OF SECTION

SECTION 26 28 17
OVERCURRENT PROTECTIVE DEVICES

PART 1 – GENERAL

1.1 WORK INCLUDES

- A. Fuses for all fusible equipment installed on the project regardless of which contractor has provided the equipment.
- B. Enclosed circuit breakers as indicated on the drawings and herein specified.
- C. Circuit breakers for existing panelboards for new branch circuit overcurrent protection.

1.2 SUBMITTALS

- A. In accord with Division One.
 - 1. Shop Drawings: All enclosed circuit breakers with dimensional data.
 - 2. Product Data
 - a. Fuses
 - b. Enclosed circuit breakers
 - c. Circuit breakers for installation into existing panelboards.

PART 2 – PRODUCTS

2.1 MATERIALS

- A. Fuses rated 15 to 600 ampere (except for motor branch circuit protection), 600 volt and below, U.L. listed Class RK-1 current limiting type, 200,000 amperes RMS interrupting.
 - 1. Acceptable Products
 - a. Bussman Limitron - Type KTS-R
 - b. Little Fuse - Type KLSR
 - c. Gould Shawmut - Type A2K (250 vac)/A6K (600 vac)
- B. Fuses for motor branch circuit and transformer protection U.L. listed Class RK-5 dual element type, 200,000 amperes RMS interrupting.
 - 1. Acceptable Products
 - a. Bussman Fusetron - Type FRS-R
 - b. Little Fuse - Slo-Blo, Type FLS-R
 - c. Gould Shawmut - Type TR (250 vac)/TRS (600 vac)
- C. Furnish and install individually enclosed circuit breakers as indicated on the plans. All circuit breakers shall meet Federal Specification W-C-375B, and both the circuit breaker and the enclosure shall be UL listed.
- D. Circuit breakers shall have overcenter toggle type mechanisms, providing quick-make, quick-break action. Breakers shall have current and interrupting rating as indicated on the plans. Each circuit breaker shall have trip indication by handle position and shall be trip-free. Two and three pole breakers shall be common trip. Each breaker shall have a permanent trip unit containing individual thermal and magnetic trip elements in each pole.
- E. Enclosures shall be of the NEMA type indicated on the plans.
- F. NEMA 1 enclosures shall be furnished with knockouts where practical and shall be fabricated from sheet steel which conforms to UL 50. The enclosure shall be given an electrodeposited, gray baked enamel finish. Padlocking provisions shall be provided to allow locking the circuit breaker in the "OFF" position. Enclosures shall be UL listed.

- G. NEMA 3RSS enclosures for circuit breakers rated thru the 225 ampere frame size shall be furnished with provisions for interchangeable, bolt-on hubs. Enclosures shall be fabricated from stainless steel and shall be given an electrodeposited, gray baked enamel finish. Enclosure covers shall be securable in the open position. Padlocking provisions shall be provided to allow locking the enclosure cover closed. Enclosures shall be UL listed.

PART 3 – EXECUTION

3.1 INSTALLATION

- A. Distribution system is designed to provide selectivity, coordination, and component protection. To guarantee this system, all fuses or circuit breakers shall be from the same manufacturer. Substitution provisions are specified in Division One.
- B. Place a fuse identification label showing size and type of fuses installed inside the cover of each switch.
- C. Furnish Owner at completion of project, one spare set (3) of each size of fuse rated over 100 amperes. Obtain a written receipt for same from the Owner.
- D. Provide a nameplate for each enclosed circuit breaker in accordance with Section 26 05 53.

END OF SECTION

SECTION 26 29 10
ELECTRIC CONTROLS AND RELAYS

PART 1 GENERAL

1.1 SECTION INCLUDES:

- A. Pushbutton and selector switches.
- B. Control stations.
- C. Relays.
- D. Time-delay relays.
- E. Control power transformers.
- F. Control panels.

1.2 REFERENCES

- A. NEMA ICS 1 - General Standards for Industrial Control Systems.
- B. NEMA ICS 2 - Standards for Industrial Control Devices, Controllers and Assemblies.
- C. NEMA ICS 6 - Enclosures for Industrial Controls and Systems.
- D. NEMA ST 1 - Standard for Specialty Transformers (Except General Purpose Type).

1.3 SUBMITTALS

- A. Submit shop drawings under provisions of Division 1.
- B. Submit shop drawings to NEMA ICS 1 indicating control panel layouts, wiring connections and diagrams, dimensions, support points.
- C. Submit product data under provisions of Division 1.
- D. Submit product data for each component specified.

1.4 PROJECT RECORD DOCUMENTS

- A. Submit record documents under provisions of Division 1.
- B. Accurately record actual locations of control equipment. Revise diagrams included in Drawings to reflect actual control device connections.

1.5 OPERATION AND MAINTENANCE DATA

- A. Submit operation data under provisions of Division 1.
- B. Include instructions for adjusting and resetting time-delay relays, timers, and counters.
- C. Submit maintenance data under provisions of Division 1.
- D. Include recommended preventive maintenance procedures and materials.

1.6 QUALIFICATIONS

- A. Manufacturer: Company specializing in manufacturing the products specified in this Section with minimum three years documented experience.

PART 2 PRODUCTS

2.1 CONTROL SWITCHES AND STATIONS

- A. Contacts: NEMA ICS 2; Form C.
- B. Contact Ratings: NEMA ICS 2; as scheduled.
- C. Pushbutton Operator: NEMA ICS 2; as scheduled.
- D. Control Stations: NEMA ICS 2; as scheduled.

2.2 CONTROL RELAYS

- A. Contacts: NEMA ICS 2; Form C.
- B. Contact Ratings: NEMA ICS 2; as scheduled.
- C. Coil Voltage: As scheduled.

2.3 TIME-DELAY RELAYS

- A. Contacts: NEMA ICS 2; as scheduled.
- B. Contact Ratings: NEMA ICS 2; Class A150.
- C. Coil Voltage: As scheduled.
- D. Time-Delay Relays: NEMA ICS 2; as scheduled.

2.4 CONTROL POWER TRANSFORMERS

- A. Transformer: NEMA ST 1; machine tool transformer with isolated secondary winding.
- B. Power Rating: 500 va.
- C. Voltage Rating: As required.

2.5 ENCLOSURES

- A. Control Station Enclosure: NEMA ICS 6; Type as required to meet conditions of installation unless indicated on the Drawings.
- B. Relay Enclosure: NEMA ICS 6; Type as required to meet conditions of installation unless indicated on the Drawings.

2.6 FABRICATION

- A. Control Panels: Shop fabricate control panels to NEMA ICS 1, using cabinets and terminal blocks furnished under the provisions of Section 26 27 16.

PART 3 EXECUTION

3.1 INSTALLATION

- A. Install devices and equipment in accordance with manufacturer's instructions.
- B. Install individual relays and time delay relays in enclosures.
- C. Install cabinets under the provisions of Section 26 27 16.
- D. Make electrical wiring interconnections as shown on Drawings.

END OF SECTION

28

DIVISION

ELECTRONIC SAFETY AND SECURITY

SECTION 28 05 28
SECURITY RACEWAY SYSTEM

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract, including, but not limited to, General, Special and Supplementary Conditions and other Division-1 Specification Sections, apply to the work of this section.

1.2 SCOPE

- A. Provide materials, equipment, labor, and supervision necessary to install conduit system only, for installation of complete security system to be provided by Owner. Raceway system is intended to accommodate intrusion detection and video surveillance system (CCTV), as would be provided by the Owner's vendors. Conduit system shall accommodate all wiring, devices, control panel, and interconnections to other systems.

1.3 QUALITY ASSURANCE

- A. Regulatory Requirements:
 - 1. National Electrical Code, (NEC).

1.4 SUBMITTALS

- A. Product Data: N/A
- B. Shop Drawings: N/A

PART 2 – PRODUCTS

2.1 MATERIALS

- A. Raceways:
 - 1. J-Hooks: Static load limit of 75 lbs. galvanized steel construction. Caddy "Cablecat" or equal.
 - 2. Provide #6 AWG insulated copper grounding conductor from each system control panel enclosure/rack, to ground bus in room.
 - 3. Interior conduits concealed in partitions and exposed above 4'-0" aff shall be EMT, ¾-inch minimum. Conduits in or under slab or exposed below 4'-0" aff shall be RGS, ¾-inch minimum, painted with two (2) coats of bitumastic paint.
- B. Outlet Boxes:
 - 1. Outlet boxes concealed in partitions shall be 4-11/16" x 2-1/8" DP, galvanized sheet metal. Provide with single-gang drywall ring mounted vertically. Stub ¾-inch conduit from box, up into ceiling space.
 - 2. Provide single-gang blank plate on each unused outlet opening. Color shall match all other device plates.

PART 3 – EXECUTION

3.1 INSTALLATION

- A. Provide 200 pound test line in all empty conduits.
- B. Ensure a complete pathway for cabling is possible from each outlet device, back to the respective security system control panel. Provide sleeves through firewalls/partitions as necessary to provide for future cabling.

END OF SECTION

SECTION 28 13 10
ACCESS CONTROL SYSTEM

PART 1 GENERAL

1.1 RELATED DOCUMENTS

- A. The provisions of the General Conditions, Supplementary Conditions, and the Sections included under Division 01, General Requirements, are included as a part of this Section as though bound herein.

1.2 PERFORMANCE REQUIREMENTS

- A. Purpose:
1. Provide electronic card access control system for all new construction and renovation projects.
 2. Electronic card access shall be located at designated perimeter doors leading to each of the program areas with electric re-strike rim exit device, controlled by card access system.
 3. Electronic card access control system shall include all necessary components, wiring for power and control to sensors, card access controls, door hardware devices, uninterruptible power supply system (UPS) and capable of interfacing with existing AMAG software for a complete operable and fully integrated system that is capable of control through the internet.
 4. Raceway system shall consist of conduit, J-hooks, sleeves, boxes and wiring for an automatic card access system.
 5. Electronic card access system shall be independent from Section Intrusion Detection System and shall be an internet-based control system, connected to MCSD main security control center.
 6. The system shall shunt the alarm system to allow passage through the doors when access card is swiped then rearm the alarm system when the door closes. On egress a passive infrared sensor shall shunt the alarm and unlock the door allowing for passage out of the building then resetting the alarm when the door closes.
- B. The System shall include but not be limited to:
1. Main Cabinet shall be surface mounted steel construction, AMAG Panel Model # 2100 installed on a plywood backboard. Main cabinet shall be installed in the MDF Room, including all required power supplies, batteries, integral charger, and the software for a complete fully operational system.
 - a. Backboard: Plywood, 1/2 inch thick, AC Grade, covered with two coats of UL Classified, fire retardant intumescent paint, light gray color, painted front, rear, and all four sides.
 - b. Backboard shall be clearly labeled with the name of the backboard manufacturer, UL classification of the Fire Retardant Coating with the NFPA 255 Coating Flame Index and the APA Grade of the plywood. Backboard shall be securely fastened to the wall in order to support any and all attached equipment.
 2. Each cabinet shall feed a minimum of eight controlled devices (readers).
 3. Surge suppression for the 120 VAC power supply.
 4. Card readers.
 5. The distribution cabinet must be within 300 feet of the controlled devices.

6. Raceway shall not exceed 400 feet without a pull box.
 7. Grounding.
 8. Raceway, fittings, wire, and wire fittings.
 9. A 2 inch raceway from the main cabinet to the next building and floor distribution cabinet.
 10. Wire and cable labeling.
 11. Programming Software that is capable of interfacing with AMAG system.
 12. Electrical power required to comply with all functions and operations required for the system.
- C. Access Card Locations: Provide a card reader/controlled device at the following locations:
1. All designated perimeter doors at the discretion of MCSD Site Security and/or Electrical Engineer.
 2. Other doors may be installed to include;
 - a. Principal's Office
 - b. Bookkeeper's Office
 - c. AV Storage
 - d. CCTV Studio Area
 - e. Custodial Receiving
 - f. MDF Room
 - g. Other areas as defined in the plans specific review process

1.3 QUALITY ASSURANCE

- A. Installer Qualifications:
1. The Contractor shall use personnel who are manufacturer-certified, thoroughly trained and experienced with the specified requirements and methods needed for the proper performance of the work.
- B. Manufacturer Qualifications:
1. Manufacturer shall have completed a minimum of five projects of equal scope to systems described herein and shall have been in the business of supplying and installing specified type of systems for a minimum of five years.
- C. Fabricator Qualifications Mockups:
1. Fabricator shall have completed a minimum of five projects of equal scope to systems described herein and shall have been in the business of supplying and installing specified type of systems for a minimum of five years.

1.4 SUBMITTALS

- A. Shop Drawings:
1. Shop Drawings shall be prepared in latest version of AutoCAD 2006 or later format with electronic copies submitted along with full sized Shop Drawings.
 2. Shop Drawings shall indicate typical wire connections and cable types, keypad locations, and all main and remote panels. Provide wiring schematics including point-to-point, terminal strips, connections to batteries, and power supplies, including the estimated anticipated wiring lengths required for all connection points (i.e., zone and system communications bus runs) within the system. Indicate interfaces to equipment furnished by others.

3. Submit dimensioned Shop Drawings indicating mechanical layout of all card access equipment, including cabinets and interconnecting conduit for the main panel, typical remote panel, keypad, and indicator locations, identifying all parts by manufacturer and part number.
 4. Shop Drawings shall be accompanied by engineering documentation including:
 - a. Floor Plans indicating all components, raceways, and terminal boxes and cabling.
 - b. Riser diagram indicating all connections in a manner following the floor plan layout.
 - c. Cabling diagram indicating the Contractor's designed routing and number of cables in specific raceways or conduits, from the main panel connecting to other sub-panels, modules, or devices. Diagram shall include length, in wire feet, and capacitance calculation charts for all cables.
- B. Warranty Requirements:
1. Contractor shall warranty that all materials furnished shall be free from defects of material for a period of one year excluding specific items of work that require a warranty of a greater period that may be set forth in this Specification. Contractor shall warranty that workmanship for a period of one year from date of Final Completion, excluding specific items of work that require a warranty of a greater period that may be set forth in this Specification. Immediately upon receipt of written notice from the Owner, the Contractor shall repair or replace at no expense to the Owner, any defective material or work that may be discovered before final acceptance of work or within the warranty period; any material or work damaged thereby; and adjacent material or work that may be displaced in repair or replacement. Examination of or failure to examine work by the Owner shall not relieve Contractor from these obligations.

PART 2 PRODUCTS

2.1 MATERIALS, PRODUCTS, EQUIPMENT, MANUFACTURED UNITS

- A. Raceways
1. General:
 - a. Provide raceways (conduits, wireways, pull boxes, J-hooks, outlet boxes, etc.) in compliance with the requirements of the card access manufacturer, Section Conduit for Electrical Systems, and Section Outlet Boxes.
 2. Conduit:
 - a. Provide conduit sized and based on fill in accordance with the NEC. Minimum size of conduit is to be 1 inch.
 - b. Provide pull cords in all raceway installed without cable.
 3. J-Hooks:
 - a. Provide J-hooks in accordance with the NEC, EIA/TIA requirements for structured cabling systems. All cable supports shall be UL listed.
 - i. Design Selection: Enrico Caddy or J-Hook
 4. Boxes:
 - a. Provide boxes sized as required by the system manufacturer and the NEC for cables and/or devices installed.
- B. Conduit and Boxes
1. Provide and install the building and floor distribution cabinets for each building according to the following criteria:
 - a. There must be one of these main cabinets within 300 feet of a door access reader.

- b. Each cabinet shall feed a minimum of eight controlled devices (access readers) and the cabinet can be located on any floor in an MDF or IDF room. It does not have to be located on the same floor as the controlled devices.
 - c. The main cabinet can serve as the distribution cabinet for its area of eight door access readers.
 - d. Minimum conduit size shall be 1 inch. No conduit shall be installed more than 150 feet without a pull box.
 2. Provide 1 inch conduits if needed from the distribution cabinets and distribute to feed the junction and mounting boxes for each device.
 - a. If a separate 120V feed is needed at any device, a separate conduit will be needed.
 - b. Each separate 1 inch feed will supply no more than one Controlled Device/Card Reader Feed locations however if multiple devices are being installed in the same area, conduit sizes will need to be increased.
 3. Provide and extend conduit to feed 2 inch x 4 inch x 2 1/8 inch flush mounted boxes with single gang mud ring and weatherproof covers; mounted with the opening vertical, at all designated card reader locations.
 - a. Locate to the strike side of single doors, and as designated for double doors, and gates.
 - b. Center 42 inches above finished floor/grade.
 - c. Exact location to be determined during plan review.
 4. Provide a 2 inch x 4 inch x 2 1/8 inch card access feed junction box with cover at the interior side of all designated card access door locations.
 - a. If the area location has removable ceiling tiles, the box shall be located above the tile.
 - b. If the location has a structure of fixed ceiling material, then flush-mount the box with a square to round mud ring and cover
 - c. Both boxes from a) and b) above shall be connected. Also if door is a double door an additional single gang box will be installed, connected and centered on the top of the door frame.
 5. Provide a 1 inch conduit from the AMAG control box to the closet network switch if conduit is determined to be needed.
 6. Cable:
 - a. Provide at each card reader location, a single home run cable to the locations to be identified in the drawings. The cable for the Card Access System shall be Belden # 658AFS or manufacturer recommended equivalent.
 - b. Provide between Access Control Panel and Access Control Terminal Cabinet one (1) Belden # 9502 cable or manufacturer recommended equivalent.
 - c. Card Access system cables installed in interior, exterior and/or underground raceways shall comply with the applicable section of the NEC.
 7. Power Feeds:
 - a. Provide a double duplex, dedicated 120-volt clean power receptacle adjacent to the lower portion of the main terminal cabinet and each distribution cabinet.
 8. Surge Suppression:
 - a. Provide surge suppression equipment listed by Underwriters' Laboratories, bearing the UL seal and marked accordingly. Surge suppression equipment is to be UL listed and labeled for the intended use.

PART 3 EXECUTION

3.1 FIELD QUALITY CONTROL

- A. Training of the School's administrative and maintenance personnel is required in cooperation with the District's Representative.
 - 1. Engage a factory-authorized service representative to inspect, test, and adjust components, assemblies, and equipment installations, including connections, and to assist in field testing.
 - 2. Report results in writing.
- B. Startup Service:
 - 1. Engage a factory-authorized service representative to perform startup service in accordance with the manufacturer's requirements.
 - a. Complete installation and startup checks according to manufacturer's written instructions.
 - b. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.
 - c. Report results in writing.
- C. Adjusting
 - 1. When requested within 12 months of date of Substantial Completion, provide on-site assistance in adjusting system to suit actual occupied conditions. Provide up to three visits to site during other-than-normal occupancy hours for this purpose. These visits are not be considered as "warranty calls."

3.2 ERECTION TOLERANCES

- A. Install system in accordance with NECA "Standard of Installation" and Divisions 26 and 28.
- B. Permanently label all conduits as to plan room number destination, at all terminal cabinets.
- C. Install 200 lb strength pull string throughout the conduit system.
- D. The Card Access System shall be independent and shall not interconnect with or be used by any other system.
- E. Mount all junction boxes located above the ceiling with the opening facing down unless mounted to the wall above the ceiling, and with a reasonable immediate access pathway provided.
 - 1. Note: The requiring of removing of a light fixture or other similar ceiling equipment is not a reasonable access pathway.
- F. All conduit runs shall be as direct as possible in order to save on wiring costs and to reduce poor performance due to cable loss.
- G. Refer to Section Door Hardware for Card Access Door preparation.
- H. The Contractor shall be advised that the circuit routing for the card access system may not be shown on the project drawings and that he is responsible to install all raceways, wiring and cabling for a complete and fully functional system.
- I. General:
 - 1. The Contractor shall provide and install the card access system (including raceways, pull and back boxes, and wire) in accordance with the Card Access System manufacturer's requirements.

2. The Contractor shall size and route raceways to accommodate the proper installation of the system cabling. T-tapped cabling is not acceptable.
3. Where raceway and/or conduit is not accessible after completion of the project, conduit shall be routed from device to device or fire rated access panels shall be installed to provide access to junction and pull boxes.
4. Device to device wiring is only to be acceptable where the wiring scheme of the system, as recommended by the manufacturer, requires cable to pass from device to device.
5. Termination of devices is to be in accordance with manufacturer's requirements.
6. Install Card Access System wiring with at least 12 inches of separation from line voltage power wiring on parallel runs. Wiring crossing power circuits shall be at right angles. For metal enclosed electric light or power or Class 1 circuits, separation may be reduced as described in the National Electrical Code. Increase separation if so required to comply with EIA/TIA referenced standards.
7. Each Card Access System outlet shall have splice-free cables homerun to the respective control panel in the associated Main/Intermediate Distribution Frame (MDF/IDF) at the communication equipment room (CER), communication closet (CC), or communication panel (CP) as indicated on the drawings. Each cable shall be tagged at each end.
8. Provide a minimum of three-hundred (300) access cards in addition to the original compliment required by the Owner.

3.3 DEMONSTRATION

- A. Training of the School's Administrative and Maintenance Personnel is required in cooperation with the District's Representative:
- B. Engage a factory-authorized service representative to train school administrative and maintenance personnel to adjust, operate, and maintain Card Access System. Refer to Division 01 Section Closeout Procedures for information regarding Demonstration and Training.

END OF SECTION

SECTION 28 31 00
FIRE ALARM AND SMOKE DETECTION SYSTEMS

PART 1: GENERAL

1.1 SCOPE

- A. The work covered under this section of the specification includes the provision of all labor, materials, and supervision necessary to install and test a Fire Alarm System, associated devices, and components in the project. This shall include, but not be limited to provision of the following:
- Control Panel
 - Voice Alarm Panel
 - Terminal Cabinet
 - Pull Stations
 - Heat Detectors
 - Area Smoke Sensors
 - Strobe Lights
 - Audible/Strobe Combinations
 - Programming
 - System Start-up, Test
 - Supervisory Switches
 - Remote Annunciators
 - Duct Smoke Detectors and Test Switches
 - Water Flow Switches
 - Magnetic Door Holders

1.2 DESCRIPTION

- A. The system installed under this contract shall be able to communicate with and report to the existing 'Siemens' fire alarm system serving the entire building. Provide all zone modules, power supplies, programming, etc. as required for an approved, fully functional system. All components of the system must be listed by Underwriters Laboratories (U.L.).
- B. All duct detectors shall be equipped with test switches and annunciator light.
- C. Conduit fill shall not exceed 40%.
- D. All fire alarm devices shall be white. All conduit junction boxes and couplings will be painted RED and marked "FA" in white.
- E. All wiring entering and leaving the panel and junction boxes will be permanently labeled in such a manner as to indicate the type of device and its location.
- F. All wires that leave or enter the panel from outside the building must have surge and transient protection at the panel with devices that will limit the voltage to no more than 10% above the peak operating voltage of the devices connected to the wires.
- G. The system shall provide a three-pulse temporal signal to the horns or voice evacuation system. A switch shall be provided on the control panel for silencing the alarm devices. Any additional incoming alarm shall operate normally. Each alarm shall be represented on the control panel by an audio and visual indication.
- H. See attached list of acceptable and pre-approved equipment.

1.3 QUALITY ASSURANCE AND WARRANTY

- A. Perform all work in accord with the following codes and standards:
 - 1. Federal, State, and local codes, regulations and ordinances.
 - 2. National Electrical Code (NEC), latest edition.
 - 3. Occupational Safety and Health Act (OSHA).
 - 4. All authorities having jurisdiction.
 - 5. Factory Mutual system (FM) requirements.
 - 6. EIA, Electronics Institute of America.
 - 7. UL, Underwriters Laboratories.
 - 8. American Disability Act (ADA).
 - 9. National Fire Alarm Code NFPA 72
 - 10. Life Safety Code (NFPA 101).
- B. System Warranty: All components, parts, assemblies, and software shall be guaranteed against defects in material and workmanship for a period of at least 12 months, beginning on the date of acceptance by the local Fire Marshall and the Owner's designated representative. Warranty service shall be provided by a manufacturer's authorized representative 24 hours per day, 7 days per week. The representative shall be based in a fully staffed branch office located within one (1) hour travel time of the installation site and respond within this time. All repairs performed during the warranty period must be non-chargeable for labor, material, and travel time. All repairs performed during the warranty period shall be completed within the time limitations imposed by NFPA rules. The initial fire alarm call will be handled by the Owner who will assess the problem and notify the vendor of corrective actions required.

1.4 SUBMITTALS

- A. At completion of project, prior to final payment provide to Owner copies of the following:
 - 1. Manufacturer's installation diagrams, written product specifications, and instructions for installation, operation, and maintenance.
 - 2. Manufacturer's published product warranties and warranty instructions.
 - 3. Point to point wiring diagrams for devices/circuits added under this contract. (2 sets)
 - 4. Data sheets on each item of equipment.
 - 5. List of device location indicating specific zone designation. (2 sets)
 - 6. List of all programming and access codes associated with the panel. (2 sets)
 - 7. Supply all software required to program/re-program fire alarm panel/components, dialers and any other device required for operation of the system.
- B. At the Fire Alarm Panel(s), install the following:
 - 1. Plan drawings (1/16" = 1'-0" or larger as required for clarity), modified to include new equipment, showing location of automatic detectors and manual pull stations. Drawings shall be professionally drawn on suitable drafting medium 8.5" x 11" and shall reflect the system as installed. Devices shall be numbered in a manner that reflects the ZONE/DEVICE location.
 - 2. A Certificate of Completion as required by NFPA.
 - 3. A Certificate of Inspection, showing a completed 100% test, as required by NFPA.

1.5 SYSTEM OPERATION

- A. System Supervision:
1. Initiation Circuits: The occurrence of an open circuit in the initiation circuit shall cause a trouble indication. The occurrence of a ground condition in the initiation circuit shall cause a trouble and a panel ground fault indication. A single open circuit or a single ground condition, or both at the same time on the same initiation circuit, shall not inhibit the panel from recognizing an alarm condition from any other initiation device on that same circuit or any other circuit.
 2. Signal Circuits: The occurrence of an open circuit in a signal circuit cause a signal zone trouble indication. The occurrence of a ground condition in a signal circuit shall cause a signal zone trouble indication and a panel ground fault indication. A single ground in a signal circuit shall not inhibit the signals from working properly.
 3. Remote Annunciator: Shall be supervised as required for signal circuits, and be of LCD design, with alpha-numeric display.
 4. The system shall detect the following conditions:
 - a. Loss of primary and/or secondary operating power.
 - b. A single ground, open, or short on any installation wiring to supervisory or alarm initiating devices.
 - c. A single ground, open or short on any installation wiring to the system speakers, remote supervised annunciator, and remote telephone station.
 - d. Failure of a tone generator, pre-amplifier, or power amplifier in the audio subsystem.
 5. If any of the above faults develop, the system shall produce both an audible and visual trouble signal at the Fire Alarm Control Panel (FACP) and/or the remote annunciator.
 6. If the switch of a supervisory device is operated, the system shall product audible and visible supervisory signals at the Fire Alarm Control Panel and Remote Annunciator.
- B. Alarm Initiating Devices: If an alarm initiating device is activated, the following responses shall automatically occur:
1. Visual indications shall identify the specific device in alarm, and common audible and visual alarm signals shall be generated by the Fire Alarm Control Panel.
 2. An audio indication shall produce a message to the speakers sufficient to product an audio signal 15db over ambient noise.
 3. Auxiliary relays shall be installed to accommodate accessories such as: air-handler shutdown, vent fans (etcetera), to match the design of the system, as required by NFPA standards and rules.
 4. Each device shall be a measured device having the capability to send measured and intelligent signals back to the panel stating the condition of the device (e.g. measured level of obscuration, measure particles of dirt/dust and measured temperature levels).
- C. Alarm/Trouble Silencing:
1. The general alarm devices may be silenced only by entering a locked control cabinet and operating the proper silencing switch. However, a subsequent alarm shall reactive the signals. Operation of the silencing switch shall be indicated by a trouble light and an audible signal.

2. Power failure, opens, grounds, or an interruption of the system wiring or components, shall be indicated by a visual and audible trouble signal. The audible trouble signal may be silenced, however, the visual trouble indications shall remain illuminated until the system has been returned to a normal operating condition.

1.6 OPERATION AND MAINTENANCE DATA

- A. Submit data under provision of Division One.
- B. Include operating instructions, and maintenance and repair procedures.
- C. Include manufacturer representative's letter stating that system is operational.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Deliver products to site under provisions of Division One.
- B. Store and protect products under provisions of Division One.

PART 2 PRODUCTS

2.1 FIRE ALARM AND SMOKE DETECTION CONTROL PANEL

- A. Control Panel: The control panel shall provide power, annunciation, supervision, and control for the detection and alarm system and shall be modular in construction and contain all modules necessary to operate according with this section.
 1. The detection system shall remain 100% operational and capable of responding to an alarm condition while in the routine maintenance mode.
 - a. The system shall be capable of having the entire total number of detection devices in alarm at the same time, without any loss of function.
 - b. The control panel shall be capable of supporting non-addressable as well as addressable detection devices.
 - c. The panel annunciator shall be a minimum, 32-character alphanumeric display, providing an optional user definable message associated with each detection device or zone.
 2. The control system shall provide the supervision of system electronics, wiring, devices, and software.
 - a. Monitor for the failure of system hardware or wiring with an independent hardware watchdog, which will indicate their failure.
 - b. The system shall provide failsafe operation, i.e. incoming alarms shall automatically override all other modes of operation, and the panel shall automatically return to normal operating mode from any operator initiated mode.
 - c. Provide ground fault detection for all initiating and audible circuits.
 3. Provide lamp test capability to test all visual panel indicators and associated software.
 - a. Make provisions for remote trouble and remote alarm silencing switches.
 - b. The control panel shall be equipped with a silence before reset feature, designed to prevent accidental system reset during an alarm condition.
 4. The system alarm lamp shall flash upon receipt of any alarm condition.
 - a. Acknowledgement of the alarm by operation of the silence switch shall silence the audible alarm and cause the alarm lamp to light steadily.
 - b. Receipt of subsequent alarms shall cause the audible devices to resound and the alarm lamp to flash.

5. The system trouble lamp shall flash and an integral trouble buzzer shall sound upon the occurrence of any trouble condition.
 - a. Acknowledgement of the trouble condition by operation of the silence switch shall silence the audible alarm and cause the trouble lamp to light steadily.
 - b. Receipt of subsequent troubles shall cause the trouble buzzer to resound and the trouble lamp to flash.
6. Use the same pair of wires to perform the individual input and output device addressability.
 - a. The system shall be capable of having all addressable devices in alarm simultaneously.
7. The service mode shall permit the arming and disarming of individual input or output devices as well as manually operating output devices.
 - a. Provide one-step function switches to allow the disarming & arming of groups of inputs or outputs.
 - b. The control panel shall display the status of these devices upon command.
 - c. The panel shall automatically return to normal mode in the event the panel remains unattended in the service mode for more than 4-hours.
 - d. The panel shall be capable of receiving and processing alarms even when in the service mode.
8. The control shall operate from a three-wire 120 VA supply and internal 24V back-up battery.
 - a. Separately fuse all power connections whether AC or DC within the control unit.
 - b. Include light emitting diodes (LED's) to indicate (green) system power, (yellow) trouble, and (red) alarm; with trouble and alarm annunciated on an alphanumeric display, giving device number and location plus diagnosis of trouble.
 - c. Momentary contact switches shall provide for Locate, Next Alarm, Next Trouble, Acknowledge/Silence, and Reset.
 - d. An audible device shall sound within the control for alarm or trouble.
 - e. This device shall have two distinct sounds and shall be silenceable by the acknowledge/silence switch.
 - f. Alarms shall override any trouble condition.
9. The control CPU and power supply shall be capable of powering up to 960 addressable early warning detectors and up to 960 addressable auxiliary relays.
 - a. All system expansion modules shall interconnect through a card edge connector and shall require no inter-module wiring.
 - b. The control shall be capable of measuring and adjusting the sensitivity of detectors.
 - c. Provide an alphanumeric display, to display custom messages and give readings of detector sensitivity, detector by detector.
 - d. The system shall check each device on an addressable initiating circuit continuously for the following: sensitivity, response, open shorts, ground faults, functionality, and status.
 - e. The control CPU shall report the failure of a device's transmitting component(s) for open or shorts on an addressable initiating circuit.
 - f. Recognize and identify the device by location with the circuit to the specific device, and all other devices shall continue to function properly.
10. The control shall report, by specific device number, any device removed from an addressable initiating circuit and all other devices shall continue to function.
11. The control shall allow changing the status of configured circuits (arming or disarming and changing status of relays).

- a. If any change in status degrades system operation as configured, a trouble condition shall be reported and remain until system operation again meets configured status.
12. FACP shall include the necessary hardware to provide remote access via an Internet/Intranet Interface.
 - a. The Internet Interface shall provide an alternative access to system information using the familiar interface of a standard Internet browser.
 - b. Remotely located authorized personnel can use this access to analyze control panel status during non-alarm conditions and to assist responder during alarm conditions.
 - c. The Internet Interface shall provide single user access for multi-user accounts each with separate password.
 - i) Provide programmable lockout to prevent excessive login attempts by unauthorized users.
 - ii) Provide a built-in email feature that will automatically notify user accounts of individually selected status changes
 - iii) (i.e.: Alarm, Trouble, Supervisory, Sensor Sensitivity Status, and Historical Logs, for the same, on demand or via a selectable schedule-weekly, bi-weekly, or monthly).
13. The control panel shall allow for expansion and shall be configurable without system inter-wiring.
 - a. Leave 20% of points or addresses on each mapnet loop available for future additions on fire alarm system.
14. The manufacturer shall provide all system software, configuration software, licensing and required certification that is necessary.
15. The system shall have capability to provide a level III access to view all past trouble and alarm events on site.
16. The system shall be capable of providing a hardcopy written record of all alarms, troubles, and system activity by means of full carriage width terminal to print detection device designations and location messages on a single line of up to 128 characters wherein 32 are reserved for device or zone custom identification. Printer is not required.
17. New unacknowledged alarms and troubles shall be distinctively displayed on the visual display and differentiated from previous alarm and troubles.
18. The system shall automatically indicate the total quantity of alarms and of troubles, which have occurred prior to reset at the control unit.
19. No alarm or trouble indication shall be re-settable until acknowledged.
20. It shall not be possible to reset the system without acknowledging all alarms It shall be possible to display up to 250 alarms and up to 250 trouble indications, one at a time, on the digital annunciator, which shall be capable of listing, upon request:
 - a. Alarms with time, date, and location
 - b. Troubles with time, date, and location
 - c. Status of output functions, "on" or "off"
 - d. Sensitivity of addressable smoke detectors
 - e. Device number, type, and location
 - f. Status of remote relays, "on" or "off"
21. The fire alarm system's programmed database of initiation devices shall be "hard burned" (stored in permanent memory) not reliant on a power source of any form.
- B. Voice Alarm Panel: Provide and install a new voice alarm panel. System shall be capable of distributing voice messages throughout the building via an audio amplifier and fire alarm speakers. Provide the following features:
 1. Multiplexed audio wiring.
 2. Distributed audio.

3. Pre-recorded evacuation message using solid-state electronics. May provide different message or tones based on events.
 4. Remote All-Call page option.
 5. Medium system capacity.
 6. Multiple channel capability for up to 4 audio channels.
 7. Style Y or Style Z speaker circuit operation.
 8. Speaker and telephone on/off manual switches with custom labels.
 9. 30 watt and 120 watt audio amplifiers with switch-mode power supplies.
 10. All-call switch and indicator.
 11. Field configurable and programmable.
 12. Field recorded message option.
 13. Zone-coded voice options.
- C. Audio Amplifier: Provides up to 120 watts of 25 VRMS audio power, low-power standby mode for low battery drain, high-efficiency switched regulation, plug-in terminal strips and cable connectors, and 10-position level adjust and indicator LED's, and includes a built-in automatic tone generator (slow whoop on high/low).
- D. Include a digital communicator in the control panel capable of automatically transmitting alarm and trouble information, annunciated by device, via a Cat 6 cable, to the dispatcher located in PBX room.
- E. Power Supply: Adequate to serve control panel modules, remote detectors, remote annunciator(s), door holders, smoke dampers, relays, and alarm signaling devices and 20% spare capacity.
- F. Connect the system to the life safety branch of emergency generator.
1. The system shall have battery back up.
 2. Size the batteries to provide 24-hours of standby operation followed by five-minutes of alarm.
 3. Provide a dual rate battery charger, which is capable of recharging the batteries to 80% capacity in 12-hours.
 4. Loss of commercial power shall annunciate as a system trouble.
 5. System trouble shall indicate for over or under voltage conditions, blown fuse or disconnected batteries.
 6. The system shall indicate visually and audibly when operating from standby power.
 7. The system shall automatically restart upon the return of power.
- G. Detection Circuits:
1. Addressable device input supervisory modules capable of Class A or Class B supervision, Class B is allowed with the following conditions:
 - a. No more than 25 devices on one circuit
 - b. The end line resistors shall be located in the fire alarm terminal cabinets.
 - c. Any construction on an active campus requires hand excavation in locations within 10' of any known or suspected location of utility or wiring.
 2. Addressable devices shall be monitored, each device uniquely identifiable.
 3. Capable of supporting non-addressable initiating devices through installation of additional modules.
 4. Sized and programmed, suitable for all initiating devices connected to the system and an additional 100 possible future expansion devices.
- H. Signal Circuits:
1. Supervised march time signal modules, sufficient for signal devices connected to system and two additional unused circuits, tested, installed, and programmed for future expansion.

- I. Remote Station Outputs: Provide a self-restoring relay to output common trouble conditions and a re-settable relay to output common alarm conditions to the Owner's security interface equipment.
- J. Auxiliary Relays: Provide sufficient SPDT auxiliary relay contacts to provide accessory functions specified.
- K. Supervised booster panels, or remote power supplies may be used to power and supervise the notification appliance circuits.
 - 1. Install Manufacturer recommended transient absorption devices at booster panels.
 - 2. Install remote booster panels or remote power supplies in electrical or mechanical rooms.
 - 3. Do not install fire alarm system equipment in locations that are not readily accessible.
 - 4. Connect booster panels and remote power supplies to the life safety branch of generator.

2.2 INITIATING DEVICES

- A. Manual Station: Semi-flush mounted, double action manual station equipped with an addressable interface module that interfaces the manual station and the addressable initiating circuit. It shall be field programmable. The double action product shall be self restoring and not a disposable component.
- B. Heat Detectors: NFPA 72; Combination rate-of-rise and fixed temperature, rated 135 degrees F and temperature rate of rise of 15 degrees F or (fixed only) 190 degree F as specified. Addressable and controlled by the system control panel. Each detector to be uniquely identifiable and be field programmed. Calibration and device identification monitored by the system control panel.
- C. Ceiling Mounted Smoke Detector: NFPA 72; Addressable detector that is controlled by the system control panel. Photoelectric type with adjustable sensitivity, plug-in base, auxiliary relay contact, integral thermal element rated 135 degrees F, and visual indication of detector actuation, suitable for mounting on 4 inch (100 mm) outlet box. Each detector shall be uniquely identifiable and can be field programmed. Calibration, device identification and sensitivity shall be monitored by the system control panel. The sensitivity controlled by the system control panel.
- D. Duct Mounted Smoke Detector: NFPA 72; photoelectric type with auxiliary SPDT relay contact, duct sampling tubes extending width of duct, and visual indication of detector actuation, in duct-mounted housing.

2.3 SIGNALING DEVICES

- A. Alarm Lights: NFPA 72; strobe lamp and flasher with red lettered FIRE on white lens. 2-3 (flash rate) per second. Strobes shall comply with ADA requirements and NFPA 72 placement requirements. If any one room or area contains more than 3 visual devices, flashing shall be synchronized.
- B. Alarm Speaker: NFPA 72; flush type with wall or ceiling trim plate (interior), surface type (exterior), fire alarm speaker. Sound Rating: 87 dB at 10 feet (3 m). As designated, provide additional integral strobe lamp and flasher with red lettered FIRE on white lens. (Strobes cannot be mounted on ceiling.)
- C. Remote Annunciator: Remote annunciator shall be 32 character LCD display type, similar to the annunciator in the FACP.
- D. Duct detector remote test switch: flush mounted with red L.E.D. to indicate remote (above ceiling or obscured from normal view) duct detectors alarm status. Normal - off, Alarm - on. Provide with magnetic test switch.

2.4 AUXILIARY DEVICES

- A. Waterflow Detector: Shall be suitable for installation into Schedule 10 and Schedule 40 Steel or Black Iron Pipe. Unit shall be sealed in metal enclosure, be provided with two SPDT switches, each with N.O. and N.C. contacts, have aluminum saddles, and steel U-bolts.
- B. Supervisory (tamper) Switch: Shall be suitable for installation on OSY, butterfly, and post-indicating valves with rising or falling flags. Unit shall be sealed in metal, weatherproof enclosure, be provided with two SPDT switches each with N.O. and N.C. contacts, and be suitable for use on 1" through 12" valves.
- C. Magnetic Door Hold Devices: Devices shall be suitable for flush mounting on walls, have 25 pounds holding force, and have an adjustable swivel contact plate.

2.5 SYSTEM RACEWAY

- A. Install all raceway necessary to provide specified equipment function and per print sheets as under the provisions of Sections 26 05 33, 26 05 34, and 26 05 53.
- B. All raceway for fire alarm system shall be rigid galvanized steel underground, painted with two (2) coats of bitumsatic paint RGS exposed below 4'-0" AFF, and EMT exposed above 4'-0" AFF. Flexible liquidtight conduit to duct detectors.
- C. Install ground rod and provide grounding bar and bond to the ground rod with solid #8 minimum wire. Grounding bar buss is to be used as earth potential for the installed transient protection devices.
- D. All fire alarm terminal boxes, panels and relay enclosures shall be permanently labeled in accordance with Section 26 05 53. (Fire Alarm)

2.6 FIRE ALARM WIRE AND CABLE

Note: Approved cabling not installed in conduit, may be used for fire alarm wiring as long as it complies with NEC Article 760, AHCA, and the local building authority.

- A. Fire Alarm Power Branch Circuits: Building wire as specified in Section 26 05 13.
- B. Initiating Circuits and Auxiliary Control: Building wire as specified in Section 26 05 13. Non-power limited fire-protective signaling cable, copper conductor, Class 1, 600 volt insulation and Article 760 of NEC Power limited circuits, Constructed in accordance with articles 318, 340, 500 & 501 of NEC. Passing VW-1 Vertical Flame Test. If stranded, (maximum of seven strands).
- C. Signal Circuits, and Annunciator point wiring: Building wire as specified in Section 26 05 13. 600 volt insulation, Type THWN stranded (maximum of 19 strands), and in accordance with NEC 310.
- D. Each separate circuit, initiation, signal, and auxiliary shall have a specific number. Label each conductor by this circuit number at the control connections and at each terminal connection in the terminal boxes.
- E. A grounding conductor shall be installed through the entire conduit system and bonded to each device, junction box, terminal box, and control panel.

2.7 APPROVED EQUIPMENT

- A. Manufacturers listed below are acceptable under this contract, contingent upon their compatibility with the main fire alarm control panel. It shall be the Contractor's responsibility to coordinate and verify this compatibility.

1. Simplex
2. Notifier
3. EST

PART 3 EXECUTION

3.1 INSTALLATION

- A. Install system in accordance with manufacturer's instructions.
- B. Install manual station with operating handle 48 inches above finished floor. Install audible and visual signal devices 90 inches above finished floor.
- C. Waterflow switches and tamper switches shall be provided by the Division 26 Contractor, installed by the Division 23 Contractor, and wired by the Division 26 Contractor. Contractors shall coordinate as required.
- D. Make conduit and wiring connections to door release devices, sprinkler flow switches, sprinkler valve tamper switches, fire suppression system control panels, duct smoke detectors, and all other specified peripherals.
- E. Automatic Detector Installation shall be in compliance with NFPA-72.
- F. Fire Alarm equipment mounting boxes shall house only the wiring pertinent to the equipment mounted on the box and are not to be used as junction points or run through pathways.
- G. All exterior equipment, mounting boxes and junction boxes shall be installed with all precautions necessary to insure the wiring and equipment being "weatherproof".
- H. Install Manufacturer recommended transient absorption MOV's from field wiring to ground plane for all circuit conductors, (NOT just those circuits that exit the building).
- I. All wiring shall be in conduit (see note in paragraph 2.6).
- J. There shall be no splices made in any wiring.
- K. All terminations, other than at devices, shall be made in terminal cabinets, wall mounted in electrical rooms or equipment spaces. (No terminations shall be made in boxes above the ceiling.)
- L. All visual indicating circuits shall be wired on a separate circuit independent of horn/speaker circuits. All strobe circuits, during an alarm condition, shall have the option of remaining active after a signal silence and only turn off on a panel reset or turning off after the signal silence is activated.
- M. All fire alarm junction/pull/device boxes shall be red.

3.2 FIELD QUALITY CONTROL

- A. Field inspection and testing will be performed under provisions of Division One.
- B. Test in accordance with NFPA 72 and additional owner requirements.

3.3 MANUFACTURER'S FIELD SERVICES

- A. Provide manufacturer's field services under provisions of Division One.
- B. Include services of certified technician to supervise installation, adjustments, final connections, and system testing and field service certification per NFPA 72A. Services shall also include on-site presence of a trained factory technician during the final inspection.

3.4 SYSTEM TESTING & ACCEPTANCE

- A. It is the responsibility of the vendor to meet with the appropriate Owner's representative to compare the placement and installation of proper devices with the drawings and specifications (as-built prints must be furnished to the Owner). A 100% device by device test shall be conducted by the vendor under the supervision of the Owner. Punch lists will be developed at this time by Owner's representative and furnished to the vendor. All punch list items must be corrected and verified as such by the Owner, prior to acceptance of the system.
- B. Vendor shall have manufacturer's trained technician present for final AHCA survey. Coordinate time and date with Contractor. At the survey, provide sensitivity test reports with the required range for all smoke and duct detectors installed in the project area. Also provide an approved 'Record of Completion' for the fire alarm system at the final AHCA survey.

3.5 TRAINING

- A. The Contractor and/or manufacturer's representative shall instruct the Owner's representative in the operation, maintenance, and repair of the system to the sub-assembly level, including familiarization with the operation, maintenance, and parts manual.

3.6 SPARE PARTS

- A. A spare parts inventory equal to ten (10) percent of the total number of each of the smoke detectors, heat detectors, speakers, pull stations, and strobes shall be supplied to the Owner, prior to acceptance.

END OF SECTION

INDIANTOWN MIDDLE SCHOOL ENHANCED SECURITY PROJECT A2

MARTIN COUNTY SCHOOL DISTRICT
PERMIT DOCUMENTS SUBMITTAL

ARCHITECTURAL DESIGN CONSULTANT:

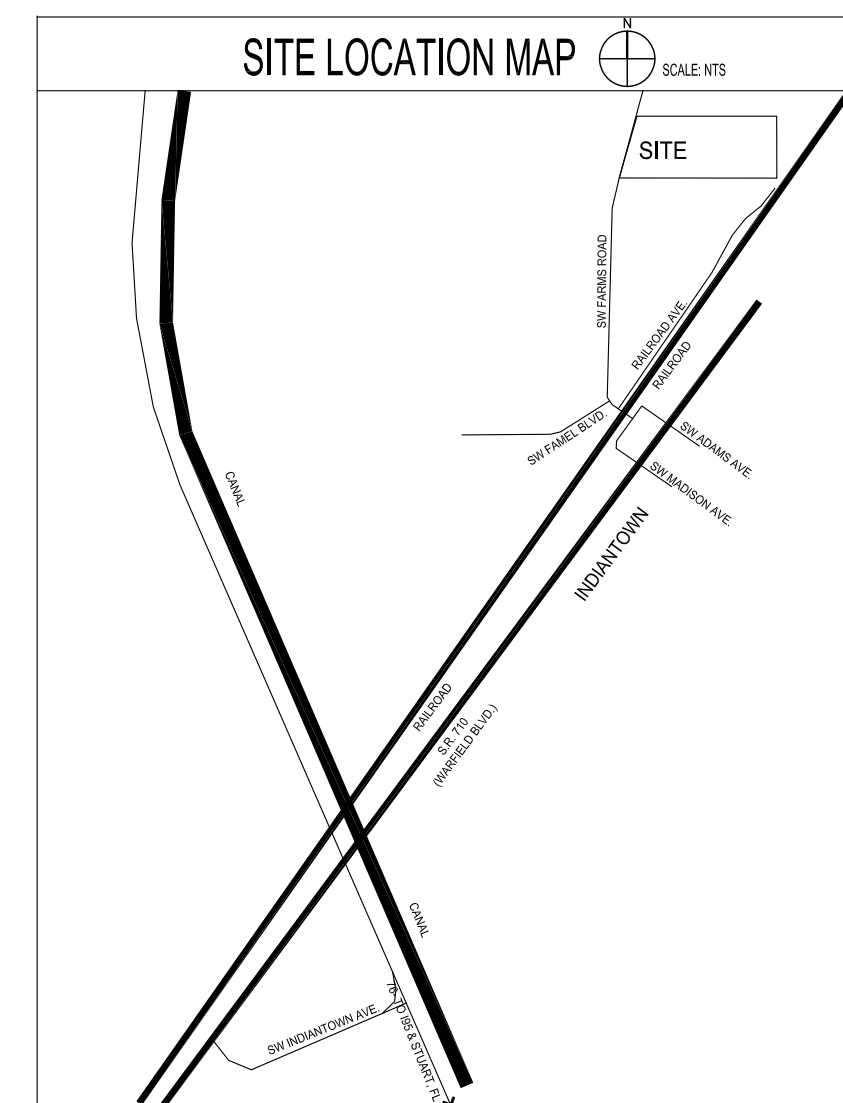
HARVARD JOLLY ARCHITECTURE

2047 VISTA PARKWAY, SUITE 100
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PHONE: 561-478-4457

MECHANICAL, PLUMBING & ELECTRICAL ENGINEER:

JLRD INC. ENGINEERS

1450 CENTREPARK BLVD - SUITE 350
WEST PALM BEACH, FLORIDA 33401
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MEMBER**

SUPERINTENDENT

PROJECT NARRATIVE

THIS PROJECT INCLUDES THE SECURITY ENHANCEMENT OF INSTALLING A NEW ENTRY VESTIBULE WITHIN THE EXISTING LOBBY OF THE ADMINISTRATION AREA AT INDIANTOWN MIDDLE SCHOOL LOCATED WITHIN THE MARTIN COUNTY SCHOOL DISTRICT. THE INSTALLATION OF THE NEW IMPACT RESISTANT STOREFRONT VESTIBULE, NEW CASEWORK, INTERIOR PARTITION WALLS AND DOORS WILL BE INSTALLED AS WELL. NEW CONSTRUCTION SHALL BE IN ACCORDANCE WITH DRAWINGS AND SPECIFICATIONS SET FORTH IN THESE DOCUMENTS, FROM DIRECTION GIVEN FROM THE MARTIN COUNTY SCHOOL DISTRICT AND PER MANUFACTURERS RECOMMENDED INSTALLATION REQUIREMENTS. ALL AREAS, REGARDLESS OF LOCATION, WILL BE REQUIRED TO BE REPAIRED IF DISTURBED BY THE INSTALLATION OF THE SCOPE OF WORK. CONTRACTOR TO REVIEW ALL AS-BUILT DOCUMENTS BEFORE COMMENCING CONSTRUCTION AND VISIT THE SITE TO RECOGNIZE THE AREAS WITHIN THE SCOPE OF WORK. ALL NEW CONSTRUCTION SHALL BE IN CONFORMANCE WITH THE MARTIN COUNTY SCHOOL DISTRICT STANDARDS, APPLICABLE CODES AND AUTHORITY HAVING JURISDICTION. THIS INCLUDES THE REQUIREMENTS OF SREF THE 2017 FLORIDA BUILDING CODE SIXTH EDITION AND THE FLORIDA FIRE PREVENTION CODE.

ARCHITECT'S STATEMENT OF COMPLIANCE:
TO THE BEST OF OUR KNOWLEDGE, THESE DRAWINGS AND THE PROJECT MANUAL ARE COMPLETE AND COMPLY WITH THE MINIMUM REQUIREMENTS OF THE 2017 FLORIDA BUILDING CODE SIXTH EDITION.

SHEET NO.	TITLE	ORIGINAL DATE	REVISION NO.	LATEST REVISION DATE
ARCHITECTURAL				
G-001	COVER SHEET & INDEX	07/23/2020		
A-101	OVERALL SITE PLAN	07/23/2020		
A-102	ENLARGED PLAN-DEMOLITION	07/23/2020		
A-103	ENLARGED PLAN-PROPOSAL	07/23/2020		
A-104	CASEWORK DETAILS	07/23/2020		
MECHANICAL				
M0.1	MECHANICAL LEGEND AND GENERAL NOTES	07/23/2020		
M1.1	FIRST FLOOR HVAC PLAN - NEW WORK	07/23/2020		
ELECTRICAL				
E0.1	ELECTRICAL NOTES AND LEGEND	07/23/2020		
E1.1	ELECTRICAL PLAN - OVERALL	07/23/2020		
E2.1	LIGHTING PLAN - DEMOLITION	07/23/2020		
E2.2	LIGHTING PLAN - NEW WORK	07/23/2020		
E3.1	POWER AND SYSTEMS PLAN - DEMOLITION	07/23/2020		
E3.2	POWER AND SYSTEMS PLAN - NEW WORK	07/23/2020		
E4.1	ELECTRICAL RISERS AND SCHEDULES	07/23/2020		
E5.1	ELECTRICAL DETAILS	07/23/2020		

Martin County School District
Indiantown Middle School Enhanced Security A2
16303 SW Farm Road
Indiantown, Florida 34956
Permit Documents Submittal

Comm. No: 16025.19

Date: 07/23/2020

Drawn: ER

Revisions		
No.	Date	Note

TO THE BEST OF MY KNOWLEDGE, THE PLANS AND SPECIFICATIONS COMPLY WITH THE MINIMUM BUILDING CODES.

Daniel T Canavan, AIA
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INDEX

G-001

HARVARD JOLLY ARCHITECTURE
2047 Vista Parkway, Suite 100 West Palm Beach, FL 33411 | 561-478-4457 | www.harvardjolly.com | AAC000119

BUILDING CODE/ LIFE SAFETY CODE ANALYSIS

REVIEW QUALIFICATION:
 THIS REVIEW IS BASED ON CODES INTERPRETATIONS BY THE AUTHOR AND INCLUDES ARCHITECTURAL ISSUES ASSOCIATED WITH THE BUILDING AND LIFE SAFETY CODES. NOTE THAT NO CONFIRMATION OF THE INFORMATION HEREIN HAS BEEN OBTAINED BY THE REVIEW AGENCIES, WHICH, AS STATED IN THE CODES, HAVE THE AUTHORITY TO DIRECT MORE STRINGENT REQUIREMENTS. THE ARCHITECT OF RECORD RESERVES THE RIGHT TO IMPLEMENT MORE STRINGENT REQUIREMENTS.

PROJECT LOCATION/ GOVERNMENT AGENCY JURISDCITION

INDIANTOWN, FLORIDA/ MARTIN COUNTY SCHOOL DISTRICT

APPLICABLE CODES

- A. FLORIDA BUILDING CODE - BUILDING (FBC - B) 6TH EDITION, 2017
- B. FLORIDA BUILDING CODE - ACCESSIBILITY (FBC - A) 6TH EDITION, 2017
- C. STATE REQUIREMENTS FOR EDUCATIONAL FACILITIES (SREF), 2017
- D. PUBLIC LAW 101-336; AMERICAN WITH DISABILITIES ACT OF 1993 (ADA)
- E. NATIONAL ELECTRIC CODE
- F. FLORIDA FIRE PREVENTION CODE, 2017 (FFPC) INCLUDING NFPA 10, 13 AND 101
- G. FLORIDA BUILDING CODE - MECHANICAL (FBC-M) 6TH EDITION, 2017

OCCUPANCY CLASSIFICATION

EXISTING BUILDING IS CLASSIFIED AS FOLLOWS:

SECTION 905 - EDUCATIONAL (GROUP E OCCUPANCY)
 -NO CHANGE IN OCCUPANCY, OCCUPANT LOAD OR SQUARE FOOTAGE.
 -BUILDING IS FULLY SPRINKLERED.

BUILDING DATA:

THE EXISTING BUILDING IS A TWO STORY ON THE INDIANTOWN MIDDLE SCHOOL CAMPUS WITHIN THE MARTIN COUNTY SCHOOL DISTRICT. THE ENHANCED SECURITY PROJECT INVOLVES CREATING A NEW VESTIBULE AT THE MAIN ENTRY WITH AN IMPACT RESISTANT STOREFRONT SYSTEM. A NEW RECEPTION DESK WILL BE PROVIDED.

GENERAL NOTES

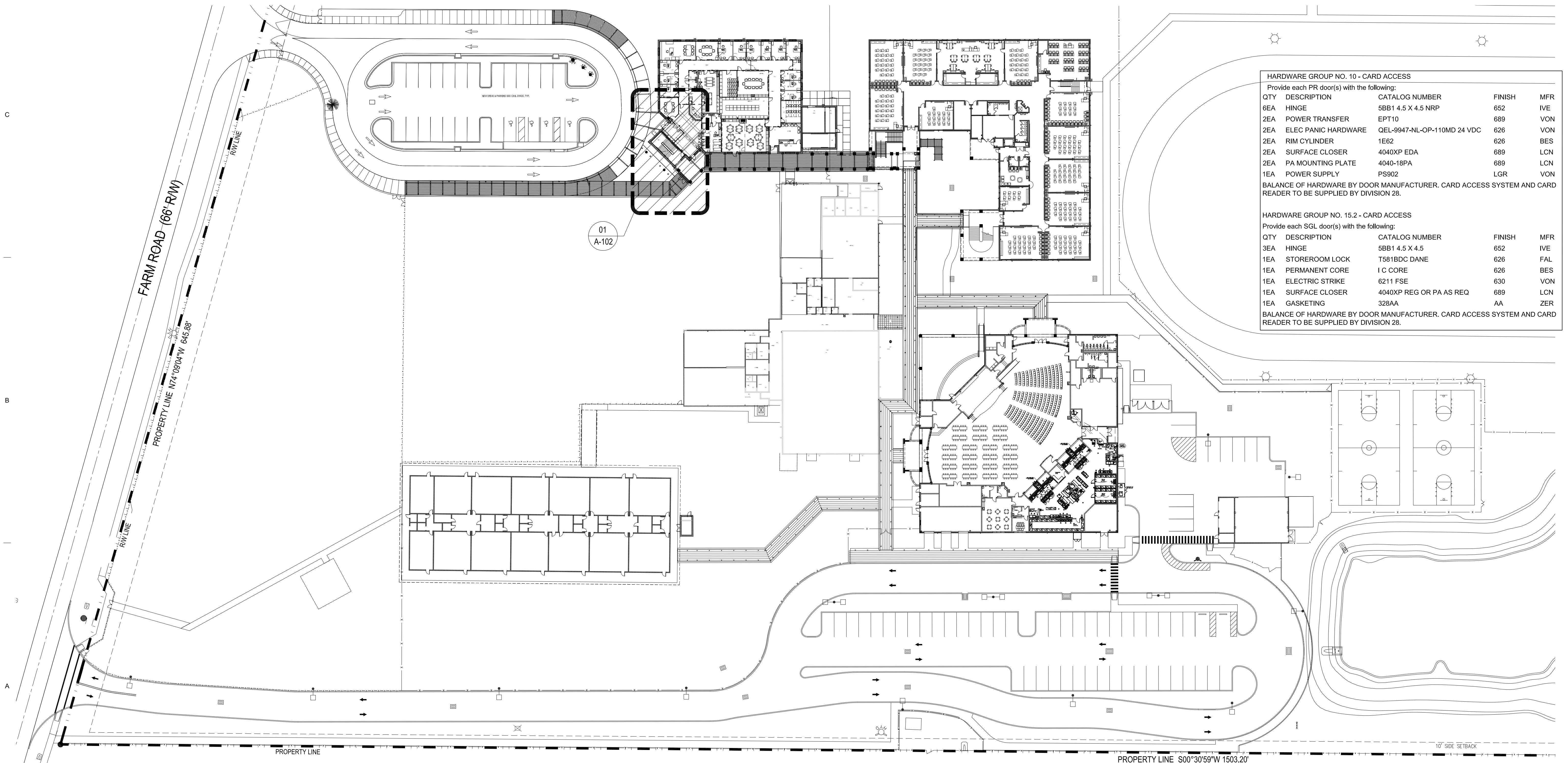
1. DEMOLITION NOTES - REFER TO DEMOLITION NOTES FOR SPECIFIC DEMOLITION REQUIREMENTS. SPECIFIC DEMOLITION ITEMS ARE NOT TO BE CONSIDERED ALL INCLUSIVE OR COMPLETE IN THEMSELVES. PERFORM ADDITIONAL DEMOLITION THAT MIGHT REASONABLY BE REQUIRED FOR THE PREPARATION OF INSTALLATION OF NEW CONSTRUCTION OR SPECIFIED FINISHES. DEMOLITION SHALL BE PERFORMED IN A MANNER THAT WILL NOT DAMAGE ADJOINING SURFACES INDICATED TO REMAIN. SURFACES SHALL BE PATCHED IF NECESSARY TO PROVIDE A SUITABLE SUBSTRATE FOR NEW FINISHES.
2. SITE VISIT - PRIOR TO BIDDING, THE CONTRACTOR SHALL VISIT THE FACILITY AND THOROUGHLY FAMILIARIZE THEMSELVES WITH EXISTING CONDITIONS. NO CLAIMS FOR ADDITIONAL WORK DUE TO REASONABLY INFERRED OBSERVABLE CONDITIONS WILL BE CONSIDERED.
3. SCHEDULING - SCHEDULE DEMOLITION WORK WITH OWNERS PROJECT MANAGER PRIOR TO START OF WORK TO MAXIMIZE PRODUCTIVITY.
4. PROTECTION - EXERCISE CARE DURING WORK TO PROTECT INTERIOR AND EXTERIOR EXISTING CONSTRUCTION TO REMAIN. REPAIR TO EXISTING CONSTRUCTION DUE TO DAMAGE SHALL BE DONE AT NO COST TO THE OWNER.
5. HAZARDOUS MATERIALS - THE CONTRACTOR SHALL IMMEDIATELY REPORT ANY HAZARDOUS OR TOXIC MATERIALS DISCOVERED TO ARCHITECT, OWNER AND AUTHORITIES HAVING JURISDICTION.
6. CUTTING AND PATCHING REQUIRED FOR THE INSTALLATION OF WORK OF OTHER TRADES SHALL BE PROVIDED AT NO ADDITIONAL COST TO THE OWNER.
7. THE WORK IS TO TAKE PLACE ON AN OCCUPIED AND ACTIVE SITE. ALL PERSONNEL WORKING ON-SITE WITH THIS PROJECT MUST HAVE AND WEAR COMPANY IDENTIFYING CLOTHING.

LEGEND

 AREA OF SCOPE OF WORK

STOREFRONT SCHEDULE												
TYPE	STOREFRONT SIZE			MATL	FRAME MATL	HEAD	JAMB	SILL	HDW GROUP	NOTES	FRAME	
	WD	HGT	THK								TYPE	MATL
A	(2) 3'-0"	7'-0"	1 3/4"	ALUM	ALUM	06 & 09/A-104	07/A-104	08 & 11/A-104	10	PROVIDE ELECTRIC STRIKE RELEASE; PANIC HARDWARE; CARD READER		
B	3'-0"	7'-0"	1 3/4"	ALUM	ALUM	06 & 09/A-104	07/A-104	08 & 11/A-104	15.2	PROVIDE ELECTRIC STRIKE RELEASE; PANIC HARDWARE; CARD READER		
C	19'-11"	3'-8"	1 3/4"	ALUM	ALUM	06/A-104	07/A-104	08/A-104	-			

DOOR SCHEDULE													
NUMBER	TYPE	DOOR SIZE			MATL	FRAME	HEAD	JAMB	SILL	HDW GROUP	NOTES	FRAME	
		WD	HGT	THK								TYPE	MATL
1-101	B	3'-0"	7'-0"	1 3/4"	SC	F1	HM	H1	J1	S1	15.2		FINISH TO MATCH EXISTING DOORS
1-102A	A	3'-0"	7'-0"	1 3/4"	SC	F1	HM	H1	J1	S1	10		FINISH TO MATCH EXISTING DOORS
1-116	B	3'-4"	7'-0"	1 3/4"	SC	F1	HM	H1	J1	S1	15.2		FINISH TO MATCH EXISTING DOORS



HARDWARE GROUP NO. 10 - CARD ACCESS
 Provide each PR door(s) with the following:

QTY	DESCRIPTION	CATALOG NUMBER	FINISH	MFR
6EA	HINGE	5BB1 4.5 X 4.5 NRP	652	IVE
2EA	POWER TRANSFER	EPT10	689	VON
2EA	ELEC PANIC HARDWARE	QEL-9947-NL-OP-110MD 24 VDC	626	VON
2EA	RIM CYLINDER	1E62	626	BES
2EA	SURFACE CLOSER	4040XP EDA	689	LCN
2EA	PA MOUNTING PLATE	4040-18PA	689	LCN
1EA	POWER SUPPLY	PS902	LGR	VON

BALANCE OF HARDWARE BY DOOR MANUFACTURER. CARD ACCESS SYSTEM AND CARD READER TO BE SUPPLIED BY DIVISION 28.

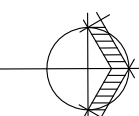
HARDWARE GROUP NO. 15.2 - CARD ACCESS
 Provide each SGL door(s) with the following:

QTY	DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3EA	HINGE	5BB1 4.5 X 4.5	652	IVE
1EA	STOREROOM LOCK	T581BDC DANE	626	FAL
1EA	PERMANENT CORE	I C CORE	626	BES
1EA	ELECTRIC STRIKE	6211 FSE	630	VON
1EA	SURFACE CLOSER	4040XP REG OR PA AS REQ	689	LCN
1EA	GASKETING	328AA	AA	ZER

BALANCE OF HARDWARE BY DOOR MANUFACTURER. CARD ACCESS SYSTEM AND CARD READER TO BE SUPPLIED BY DIVISION 28.

01 OVERALL SITE PLAN

SCALE: 1/40" = 1'-0"



Martin County School District
 Indiantown Middle School Enhanced Security A2
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Revisions		
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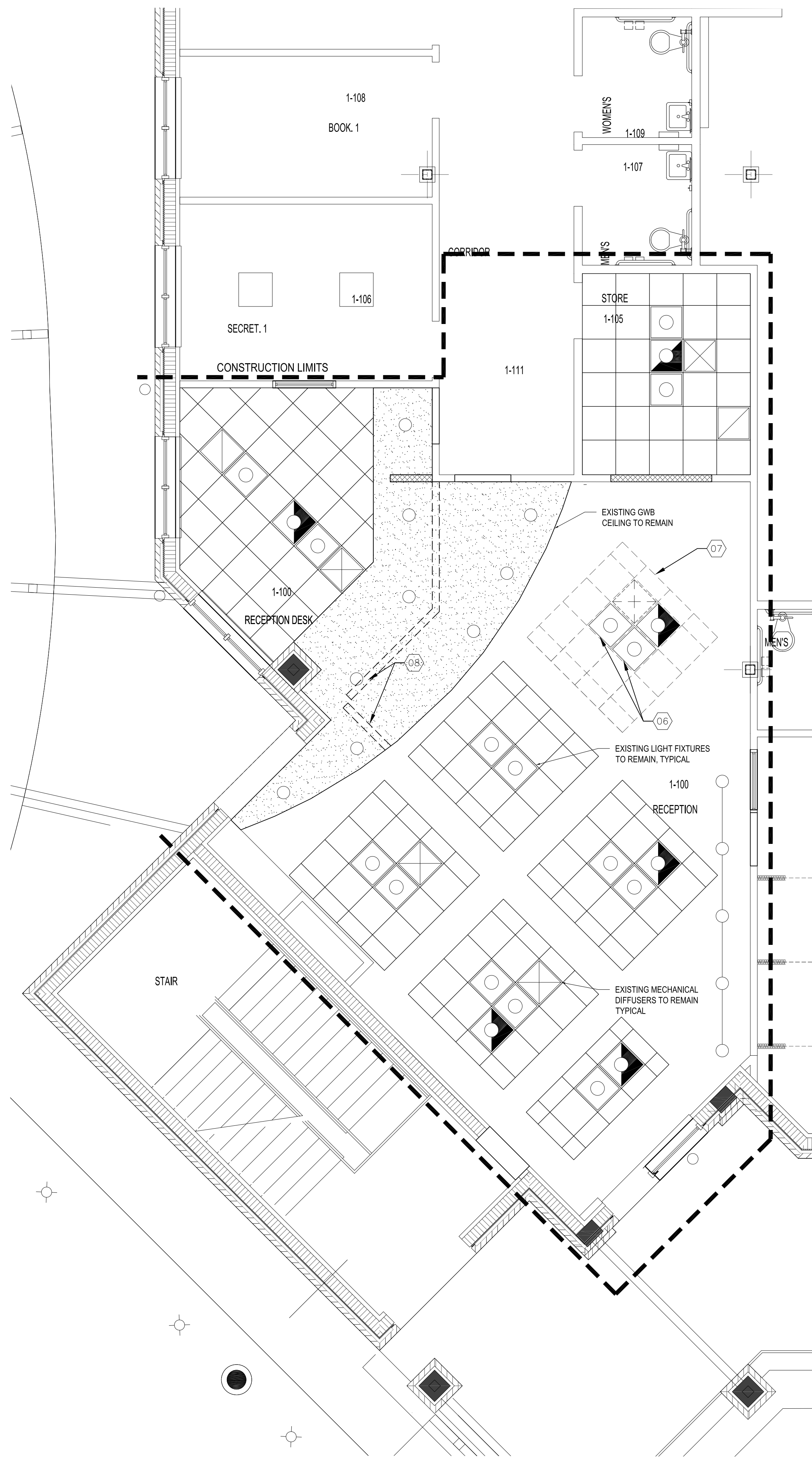
TO THE BEST OF MY KNOWLEDGE, THE PLANS AND SPECIFICATIONS COMPLY WITH THE MINIMUM BUILDING CODES.

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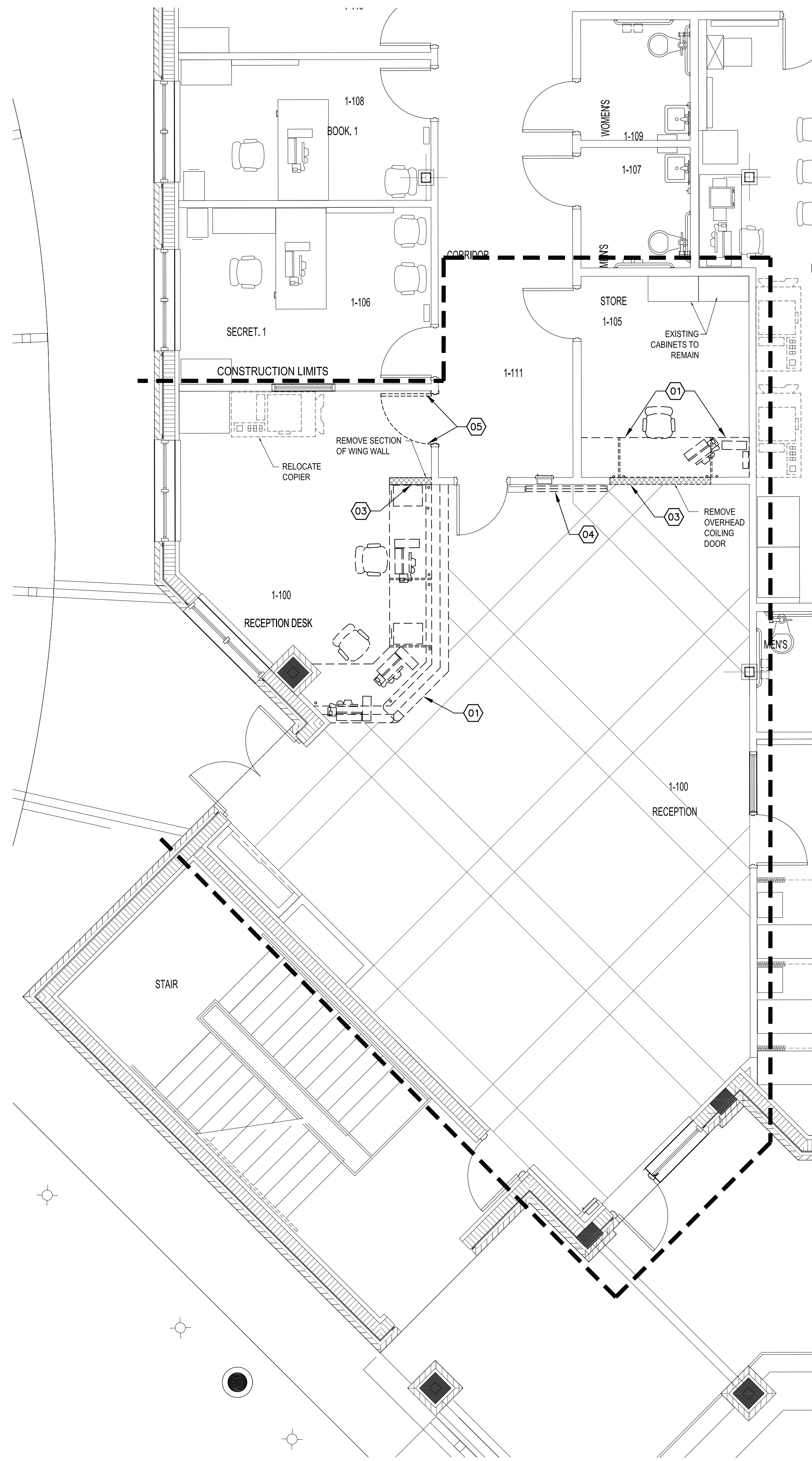
OVERALL SITE PLAN

A-101

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02 REFLECTED CEILING PLAN -DEMO
SCALE: 1/4" = 1'-0"



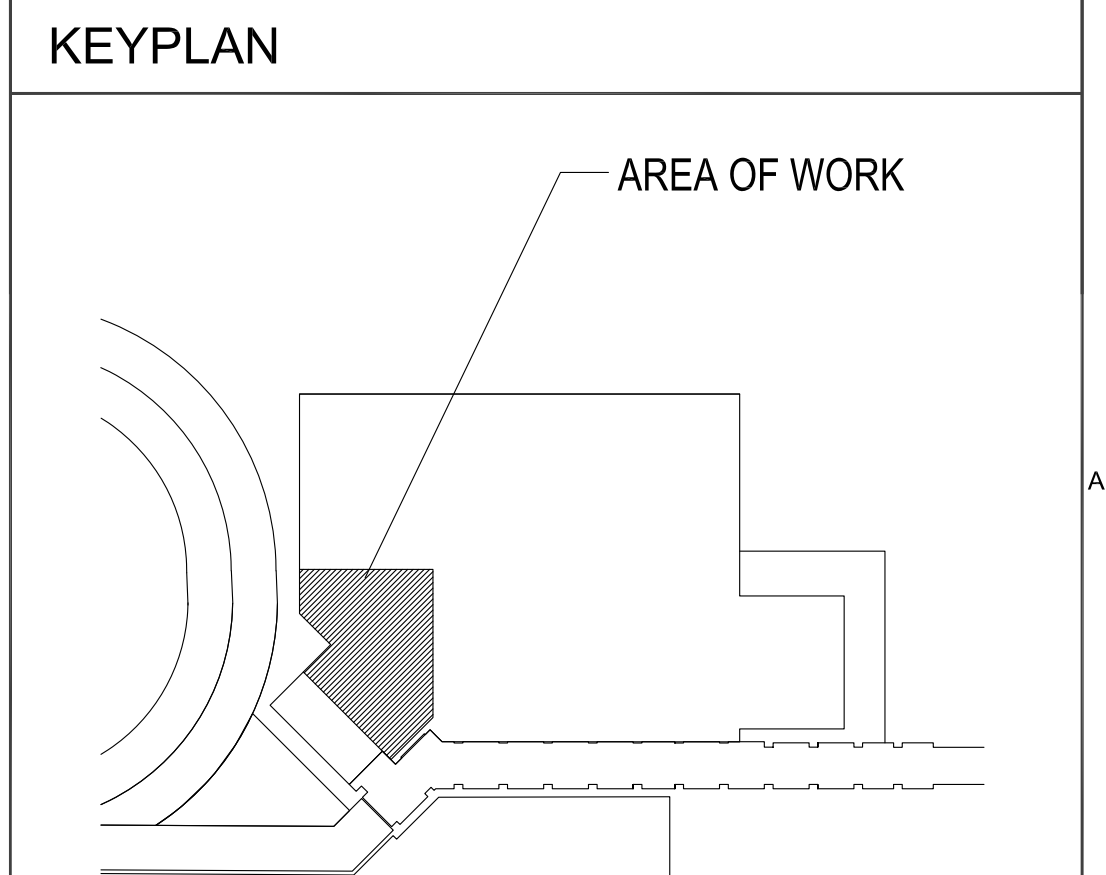
01 FLOOR PLAN - DEMO
SCALE: 1/4" = 1'-0"

LEGEND

	EXISTING WALL TO REMAIN
	EXISTING TO BE DEMOLISHED
	NEW STUD AND GWB PARTITION
	LIMIT OF NEW WORK / CONSTRUCTION
	EMERGENCY EXIT SIGN; (E) DENOTES EXISTING - SEE ELECTRICAL DRAWINGS
	DEMOLITION - DOOR & FRAME
	2'X2' LAY-IN ACOUSTICAL CEILING ON GRID
	DRYWALL SOFFIT, PAINTED
	2'X2' RECESSED LED LIGHT FIXTURE - REFER TO ELECTRICAL DRAWINGS
	DIFFUSER GRILLE REFER TO MECHANICAL DRAWINGS
	RETURN AIR GRILLE REFER TO MECHANICAL DRAWINGS

- DEMOLITION GENERAL NOTES**
- CONTRACTOR(S) ARE RESPONSIBLE FOR FIELD VERIFYING THE EXTENT OF DEMOLITION WORK PRIOR TO BIDDING, AND FOR COORDINATING THE EXTENT OF DEMOLITION WITH THE INSTALLATION OF NEW SYSTEMS AND FINISHES INDICATED IN THE CONTRACT DOCUMENTS. REFER TO THE NEW CONSTRUCTION DRAWINGS FOR DEMOLITION REQUIRED, BUT NOT SHOWN ON DEMOLITION PLANS.
 - REFER TO THE MECHANICAL, PLUMBING AND ELECTRICAL DOCUMENTS FOR ADDITIONAL DEMOLITION ITEMS. PATCH, REPAIR AND RESTORE FINISHES TO MATCH EXISTING TO ALL BUILDING CONSTRUCTION REQUIRING DEMOLITION IN ORDER TO INSTALL ALL NEW ITEMS OF MECHANICAL, ELECTRICAL & PLUMBING WORK.
 - MECHANICAL, PLUMBING AND ELECTRICAL ITEMS REMOVED SHOULD BE CAPPED AND ABANDONED; THEY SHALL BE LOCATED BEHIND FINAL FINISH SYSTEMS.
 - "CEILING" DENOTES CEILING MATERIALS INCLUDING SUSPENSION SYSTEMS, ADHESIVE RESIDUES, MOULDINGS, UP TO BUT EXCLUSIVE OF STRUCTURAL SYSTEMS.
 - REMOVE EACH ITEM SHOWN WITH DASHED LINES ON THIS DRAWING WHETHER OR NOT EACH ITEM IS SPECIFICALLY NOTED TO BE REMOVED.
 - AFTER THE DEMOLITION OF MATERIALS, THE RESULTING EXPOSED SURFACE SHALL BE SMOOTH AND FLUSH WITH EXISTING CONDITIONS.
 - MATERIALS OF DEMOLITION SHALL BE DISPOSED OF OFF SITE UNLESS DIRECTED OTHERWISE BY OWNER.
 - OWNER SHALL HAVE "FIRST RIGHTS OF REFUSAL" PRIOR TO DEMOLITION OPERATIONS AND SHALL SALVAGE ALL EXISTING EQUIPMENT PRIOR TO START OF CONSTRUCTION. ANY REMAINING EQUIPMENT SHALL BE DISPOSED OF OR SALVAGED BY THE CONTRACTOR.
 - WHERE WALLS ARE SHOWN TO BE REMOVED, REMOVE ALL ITEMS IN THE WALLS: ELECTRICAL, PLUMBING, ETC. PER ALL APPLICABLE CODES AND STANDARDS.
 - IN ALL AREAS OF DEMOLITION, ALL DUCTWORK, DOORS AND WALLS NOT TO BE DEMOLISHED SHOULD BE PROTECTED SO THAT NO DEBRIS/ DUST CAN FILTER THRU TO OTHER PARTS OF THE BUILDING.
 - MAINTAIN THE EGRESS REQUIRED IN ALL AREAS PER ALL APPLICABLE CODES AND STANDARDS DURING CONSTRUCTION.
 - TO THE BEST OF OWNER'S KNOWLEDGE THERE ARE NO HAZARDOUS CONTAINING MATERIALS IN THE LIMITS OF CONSTRUCTION. THE CONTRACTOR SHALL NOTIFY THE OWNER IMMEDIATELY IF ANY HAZARDOUS CONTAINING MATERIALS ARE ENCOUNTERED.
 - CONTRACTOR SHALL FILL VOIDS AROUND PENETRATIONS WITH FIRE RATED CAULK IN FIRE RATED DRYWALL DECKING AND FIRE RATED PARTITIONS.

- DEMOLITION KEY NOTES**
- REMOVE EXISTING MILLWORK.
 - REMOVE EXISTING INTERIOR WINDOW AND FRAME. PREPARE FOR THE INSTALLATION OF NEW FRAME AND IMPACT RESISTANT GLAZING.
 - REMOVE SECTION OF WALL AND PREPARE FOR THE INSTALLATION OF A NEW WINDOW FRAME AND IMPACT GLAZING.
 - REMOVE EXISTING MONITOR, PROTECT & STORE FOR FUTURE RE-INSTALLATION IN SIMILAR LOCATION. SEE ELECTRICAL DRAWINGS.
 - REMOVE EXISTING WINDOW & SECTION OF WALL ABOVE/ BELOW FOR INSTALLATION OF NEW DOOR.
 - REMOVE EXISTING LIGHT FIXTURE. PATCH & REPAIR CEILING GRID OR DRYWALL CEILING BASED ON TYPE OF FIXTURE INSTALLATION.
 - REMOVE EXISTING ACOUSTICAL CEILING TILE GRID AS REQUIRED TO ALLOW FOR NEW WALL ASSEMBLY INSTALLATION.
 - REMOVE EXISTING DRYWALL CEILING AS REQUIRED TO ALLOW FOR NEW WALL ASSEMBLY INSTALLATION.



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Martin County School District
Indiantown Middle School Enhanced Security A2
16303 SW Farm Road
Indiantown, Florida 34956
Permit Documents Submittal

Comm. No: 16025.19
Date: 07/23/2020
Drawn: ER

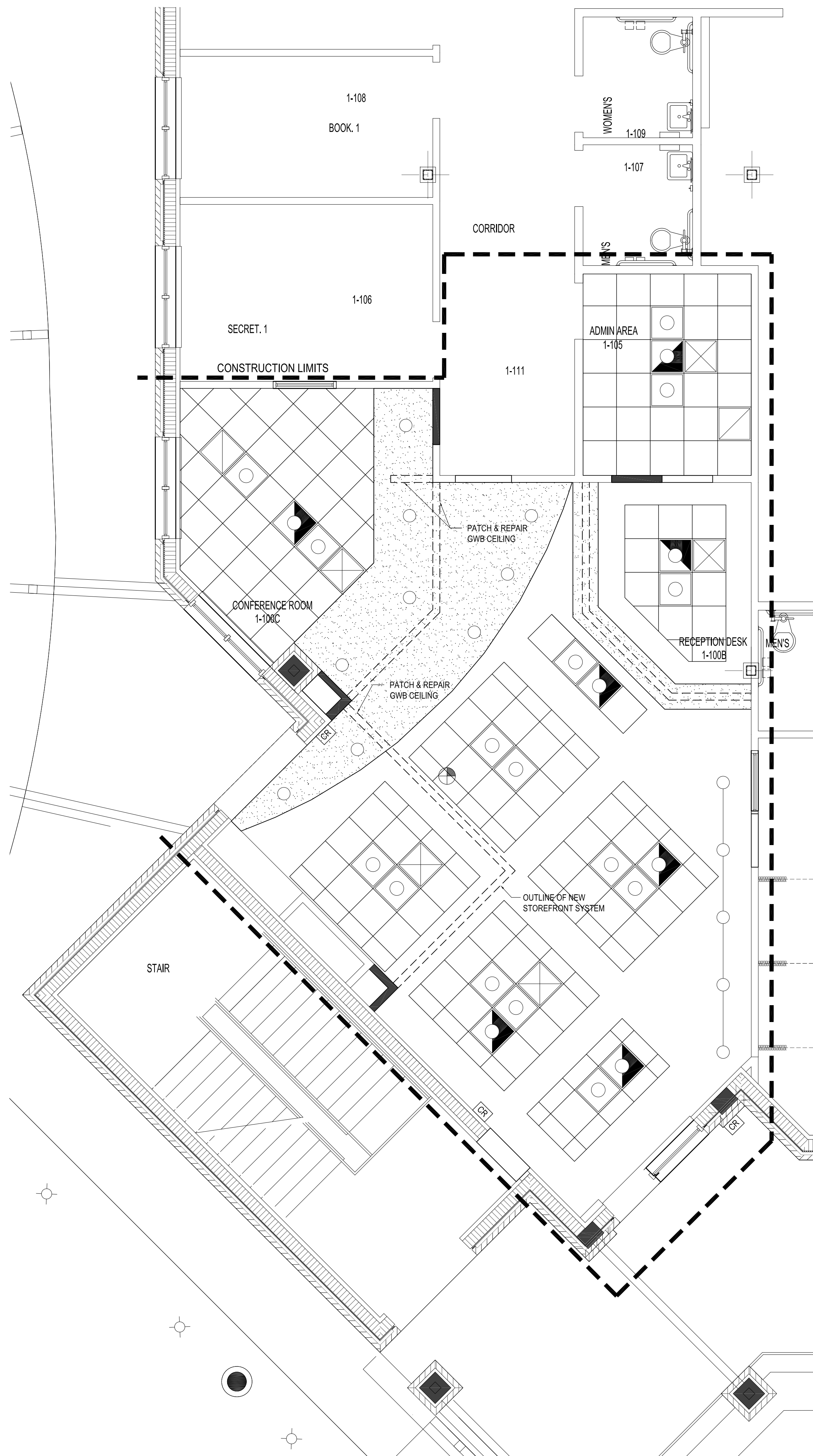
Revisions		
No.	Date	Note

TO THE BEST OF MY KNOWLEDGE, THE PLANS AND SPECIFICATIONS COMPLY WITH THE MINIMUM BUILDING CODES.

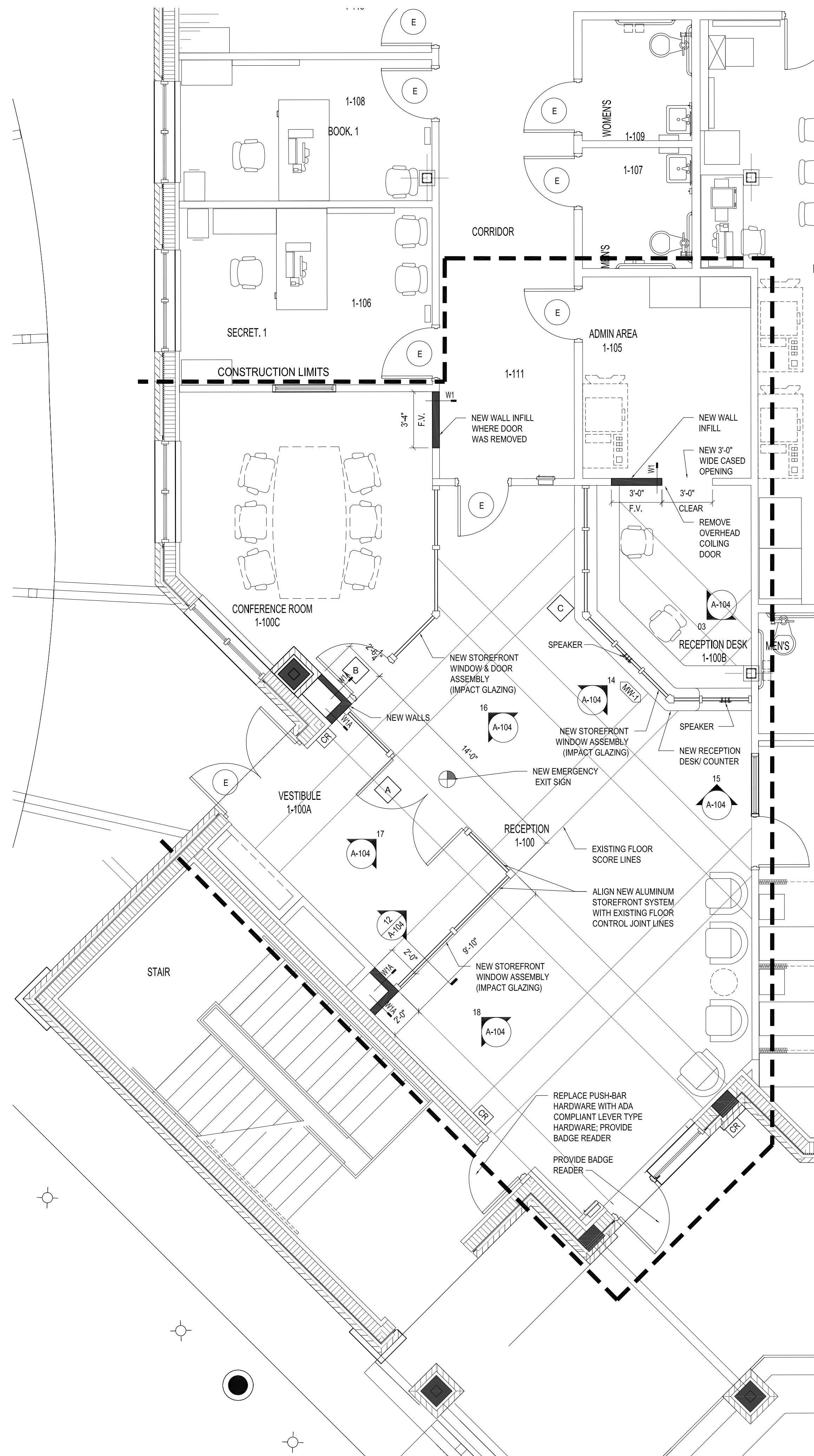
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ENLARGED FLOOR PLAN

A-102



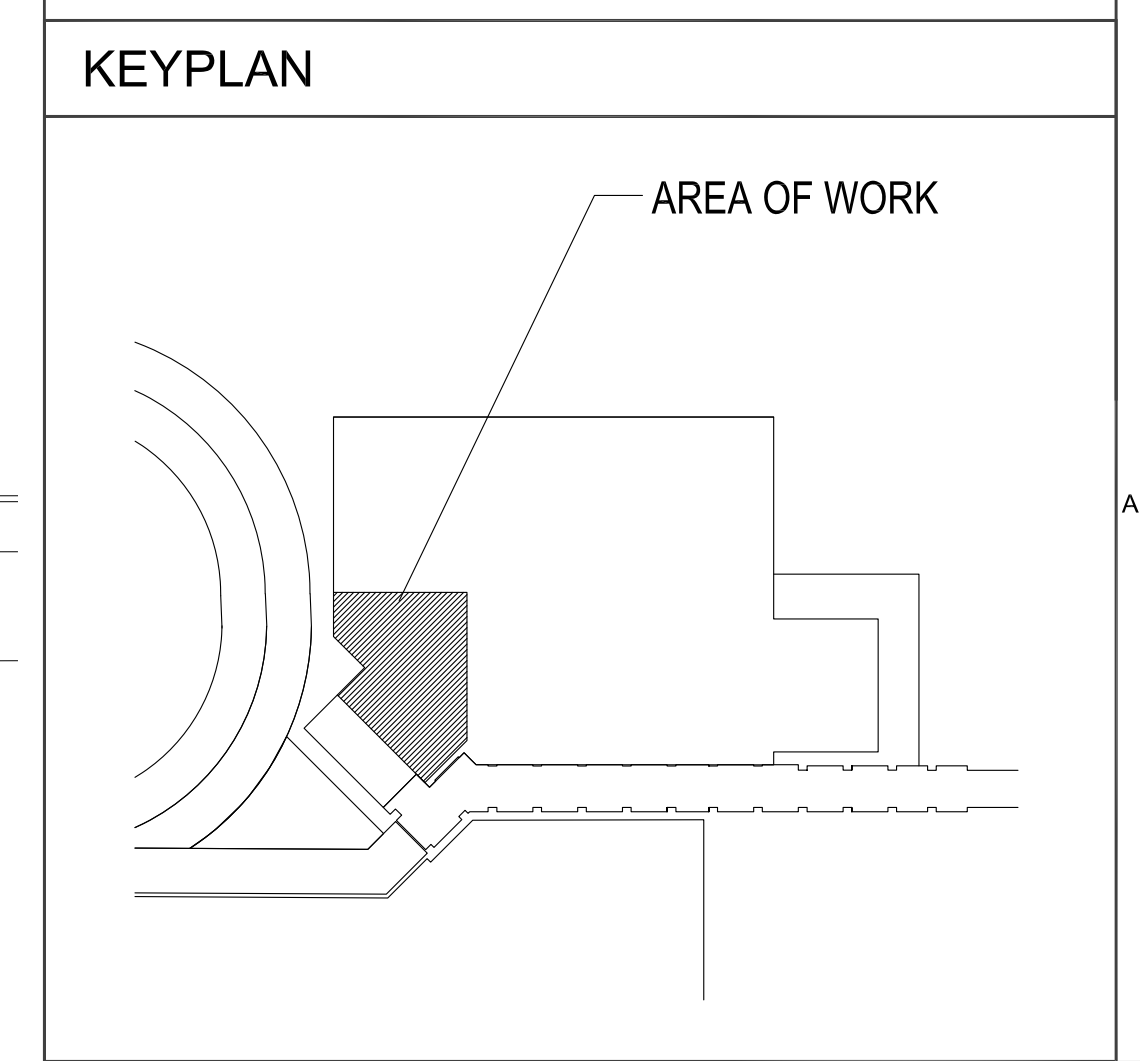
02 REFLECTED CEILING PLAN - PROPOSED
SCALE: 1/4" = 1'-0"



01 FLOOR PLAN - PROPOSED
SCALE: 1/4" = 1'-0"

- ### LEGEND
- EXISTING WALL TO REMAIN
 - NEW STUD AND GWB PARTITION - BRACE AS REQUIRED
 - CARD READER - SEE ELECTRICAL DRAWINGS
 - 2X2 LAY-IN ACOUSTICAL CEILING ON GRID
 - DRYWALL SOFFIT, PAINTED
 - RECESSED LED LIGHT FIXTURE - REFER TO ELECTRICAL DRAWINGS
 - 2X2 RECESSED LED LIGHT FIXTURE - REFER TO ELECTRICAL DRAWINGS
 - DIFFUSER GRILLE REFER TO MECHANICAL DRAWINGS
 - RETURN AIR GRILLE REFER TO MECHANICAL DRAWINGS

- ### GENERAL NOTES
1. CONTRACTOR SHALL COMPLY WITH FLORIDA BUILDING CODE SIXTH EDITION (2017) WITH ALL APPLICABLE REVISIONS, FLORIDA FIRE PREVENTION CODE SIXTH EDITION, ALL STATE AND LOCAL ZONING CODES AND THE THE DISTRICT SCHOOL CODES OF MARTIN COUNTY CRITERIA. PERMITS SHALL BE POSTED IN A VISIBLE PLACE AT ALL TIMES. ALL PERMITS, UTILITY AND METER CONNECTIONS FEES SHALL BE OBTAINED AND PAID FOR BY THE CONTRACTOR.
 2. ALL WORK, MATERIALS AND EQUIPMENT UTILIZED IN THIS PROJECT SHALL BE NEW AND INSTALLED IN STRICT ACCORDANCE WITH THE MANUFACTURERS RECOMMENDATIONS AND SPECIFICATIONS.
 3. ALL WORK FOR THIS PROJECT SHALL CONFORM TO STANDARDS PUBLISHED BY RECOGNIZED PROFESSIONAL AND INDUSTRY ORGANIZATIONS.
 4. CONTRACTOR SHALL BE RESPONSIBLE FOR VISITING THE SITE PRIOR TO BIDDING AND FAMILIARIZING HIMSELF WITH ALL EXISTING CONDITIONS AFFECTING THE WORK INCLUDING BUT NOT LIMITED TO PUBLIC UTILITIES, ON AND OFF SITE ACCESS ROADS AND OTHER SUPPORT FACILITIES.
 5. CONTRACTOR SHALL REMOVE, RELOCATE OR RE-ROUTE, AS NECESSARY, ELECTRICAL, TELEPHONE, WATER, SEWER, GAS OR ANY OTHER UTILITY LINES ENCOUNTERED AND SHALL COORDINATE THIS WORK WITH ALL LOCAL UTILITY COMPANIES.
 6. CONTRACTOR SHALL IMMEDIATELY NOTIFY THE ARCHITECT OF ANY UNEXPECTED OR UNKNOWN FIELD CONDITIONS, ERRORS, OMISSIONS, OR DISCREPANCIES IN THE DRAWINGS, PROJECT MANUAL OR CONTRACT DOCUMENTS PRIOR TO PROCEEDING WITH THE WORK OR SHOP FABRICATIONS.
 7. CONTRACTOR SHALL PREPARE AND MAINTAIN ALL CONSTRUCTION AREAS, AS WELL AS, SURROUNDING AREAS FREE OF DEBRIS OR HAZARDOUS EQUIPMENT AT ALL TIMES.
 8. CONTRACTOR SHALL BE RESPONSIBLE FOR THE REPAIR AND/OR THE REPLACEMENT OF ANY ITEMS DAMAGED DURING CONSTRUCTION OR CLEAN-UP. CONSTRUCTION PERSONNEL SHALL BE CONFINED TO THE LIMITS OF THE CONSTRUCTION AREA. ALL OSHA REGULATIONS FOR CONSTRUCTION AREAS SHALL BE STRICTLY FOLLOWED.
 9. DRAWINGS ARE NOT TO BE SCALED. WRITTEN DIMENSIONS SHALL BE FOLLOWED.
 10. ALL DIMENSIONS ARE BASED ON NOMINAL SIZES OF MEMBERS AND ARE GIVEN TO THE OUTER FACE OF SUCH MEMBERS, NOT TO FACE OF FINISH MATERIALS UNLESS OTHERWISE NOTED ON DRAWINGS. WHERE A DIMENSION IS LABELED "CLEAR" IT IS TAKEN FROM THE FACE OF FINISH MATERIALS TO FACE OF FINISH MATERIALS.
 11. CONTRACTOR SHALL SUBMIT SHOP DRAWINGS FOR APPROVAL BEFORE COMMENCING FABRICATION AND/OR INSTALLATION OF ALL APPLICABLE ITEMS FOR CONSTRUCTION. ALL SHOP DRAWINGS DIMENSIONS SHALL BE FIELD VERIFIED, REVIEWED AND APPROVED BY CONTRACTOR BEFORE SUBMITTAL.
 12. CONTRACTOR SHALL BE RESPONSIBLE FOR REMOVING ALL DEBRIS AND CONSTRUCTION MATERIAL FROM THE SITE. CONTRACTOR SHALL ALSO BE RESPONSIBLE FOR PROPERLY CLEANING ALL AREAS PRIOR TO FINAL ACCEPTANCE BY THE OWNER INCLUDING BUT NOT LIMITED TO WINDOWS, FLOORS, CARPETS, WALLS, DOORS, EQUIPMENT, ETC.
 13. UPON COMPLETION OF THIS PROJECT, THE CONTRACTOR SHALL GIVE TO THE OWNER A COMPLETE SET OF AS-BUILT ARCHITECTURAL, MECHANICAL AND ELECTRICAL DRAWINGS IN CAD FORMAT ALONG WITH THE WRITTEN GUARANTEES, OPERATION AND MAINTENANCE MANUALS OF ALL EQUIPMENT AND FINISHES INSTALLED. THE CONTRACTOR SHALL MAINTAIN A CURRENT SET OF AS-BUILT DRAWINGS AND SPECIFICATIONS. INFORMATION SHALL BE RECORDED BY CONTRACTOR AS CONSTRUCTION PROGRESSES AND REVIEWED FOR COMPLETENESS AT EACH REQUISITION REQUEST. REFER TO PROJECT MANUAL.
 14. CONTRACTOR SHALL INSTALL BARRIERS AS NECESSARY AND REQUIRED AROUND PERIMETER OF CONSTRUCTION LIMITS TO PROTECT THE PUBLIC. EGRESS FROM THE EXISTING BUILDINGS SHALL NOT BE REDUCED OR LIMITED.
 15. CONTRACTOR SHALL FURNISH AND INSTALL ALL METAL AND/OR WOOD BLOCKING REQUIRED FOR WALL MOUNTED OR BRACED FIXTURES, COUNTERTOPS, SHELVES, AND ACCESSORIES OR BY OTHERS' ITEMS DESCRIBED IN INTERIOR DESIGN AND ARCHITECTURAL DRAWINGS. BLOCKING SHALL BE CONSTRUCTED TO SUPPORT THE IMPOSED LOAD AND SHALL COMPLY WITH SCHOOL DISTRICT REQUIREMENTS.
 16. CONTRACTOR SHALL PROVIDE A SAFETY AND STAGING PLAN PRIOR TO START OF CONSTRUCTION TO CLEARLY DELINEATE AREAS FOR CONSTRUCTION, SAFETY BARRIERS, EXITS, CONSTRUCTION TRAFFIC DURING THE VARIOUS PHASES AND WHEN CONDITIONS CHANGE.
 17. CONTRACTOR SHALL SUBMIT SHOP DRAWINGS FOR REVIEW AND APPROVAL BY THE AUTHORITY HAVING JURISDICTION (AHJ) FOR THE FOLLOWING BUT NOT LIMITED TO ALL FINISHES, STOREFRONT ASSEMBLIES, LIGHT FIXTURES, MECHANICAL EOMT, ETC.
 18. ALL INTERIOR NON-LOAD BEARING WALLS SHALL EXTEND TO UNDERSIDE OF DECK ABOVE U.N.O.
 19. ALL FIRE-RATED AND SMOKE-RATED NON-LOAD BEARING WALLS SHALL EXTEND TO UNDERSIDE OF DECK ABOVE U.N.O.
 20. ALL STUD WALLS TO HAVE HIGH IMPACT 5/8" G.W.B. TO 4'-0" A.F.F. PROVIDE STANDARD G.W.B. ABOVE 4'-0".
 21. ALL WALL FRAMING STUDS TO BE MIN. 20 GAUGE U.N.O. ON DRAWINGS OR IN SPECIFICATIONS.
 22. CONTRACTOR SHALL PROTECT THE EXISTING FLOOR FROM DAMAGE DURING DEMOLITION AND NEW CONSTRUCTION ACTIVITIES.



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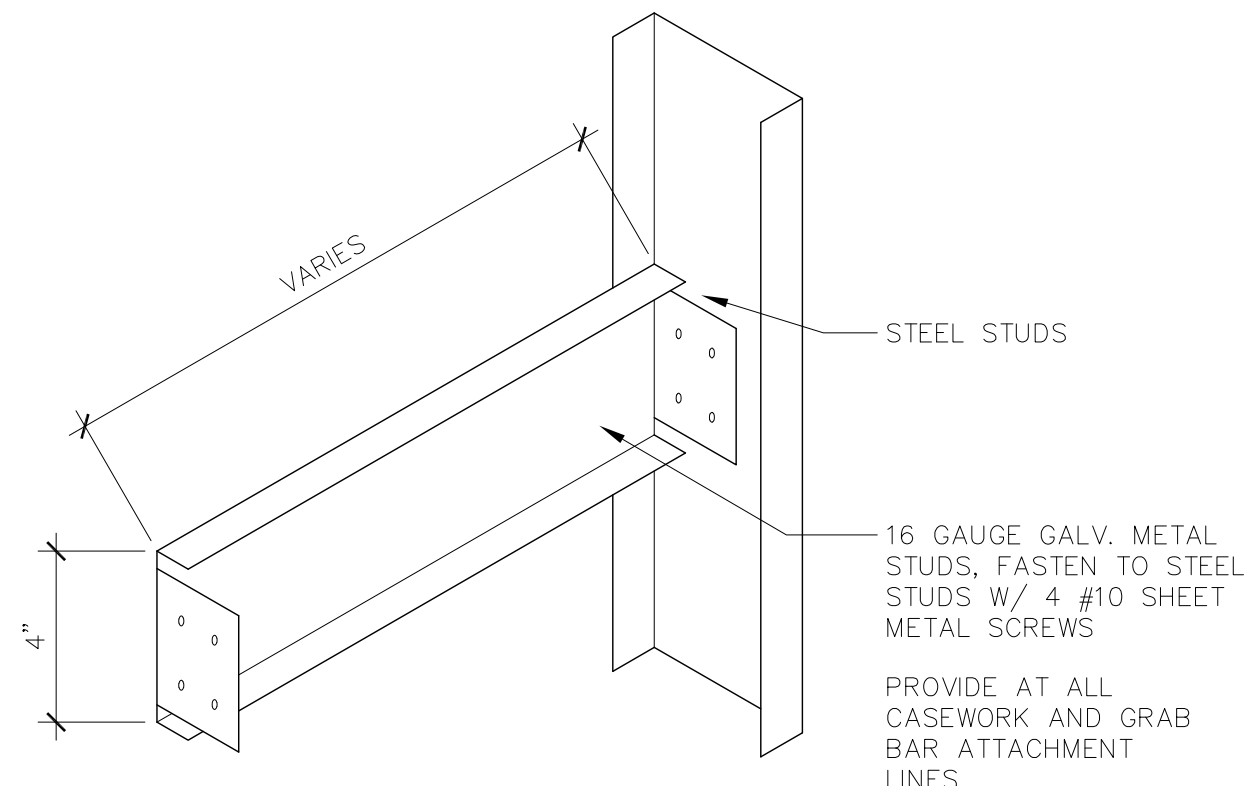
Comm. No: 16025.19
 Date: 07/23/2020
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Revisions		
No.	Date	Note

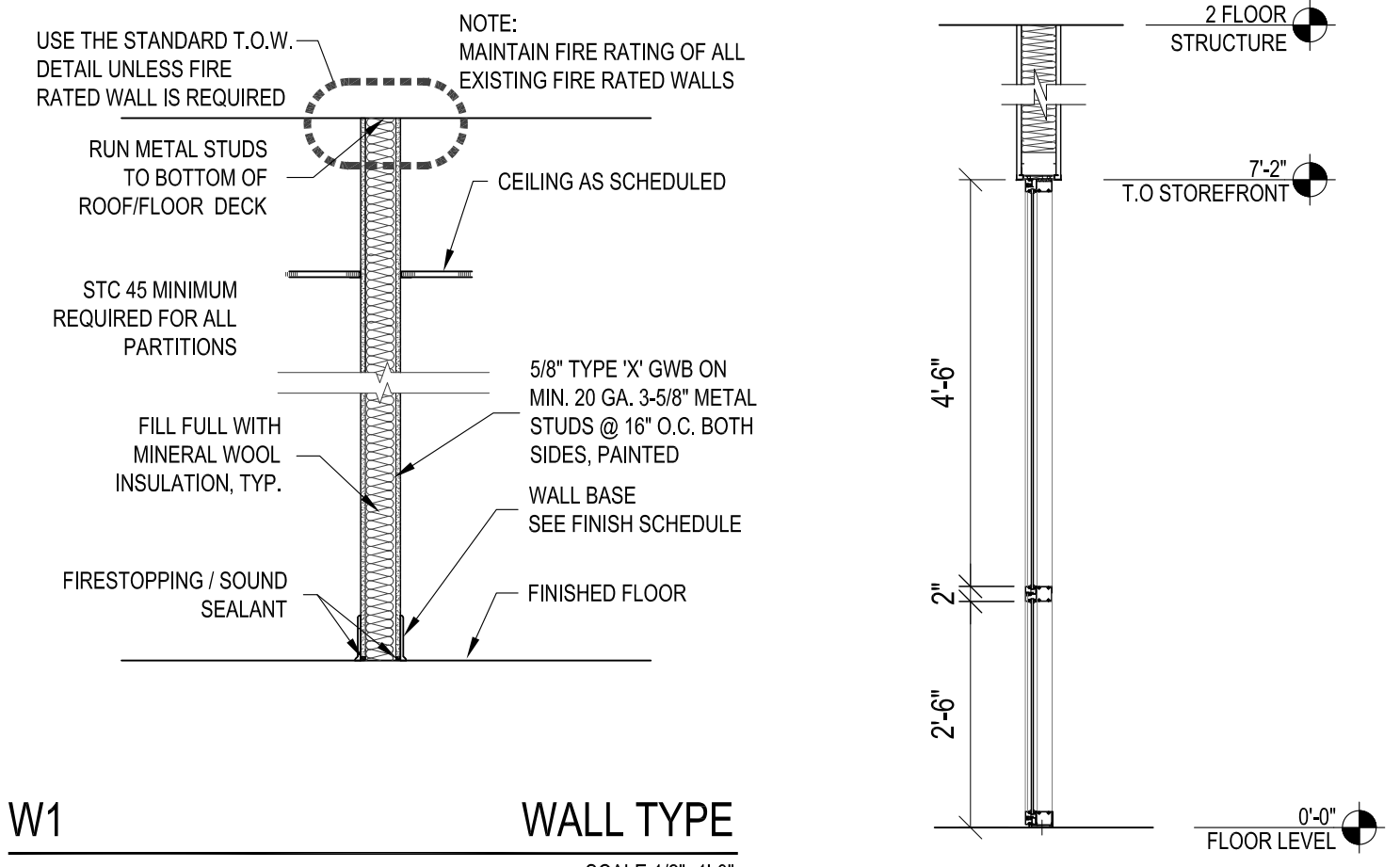
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PROPOSED FLOOR
 & REFLECTED
 CEILING PLAN

A-103

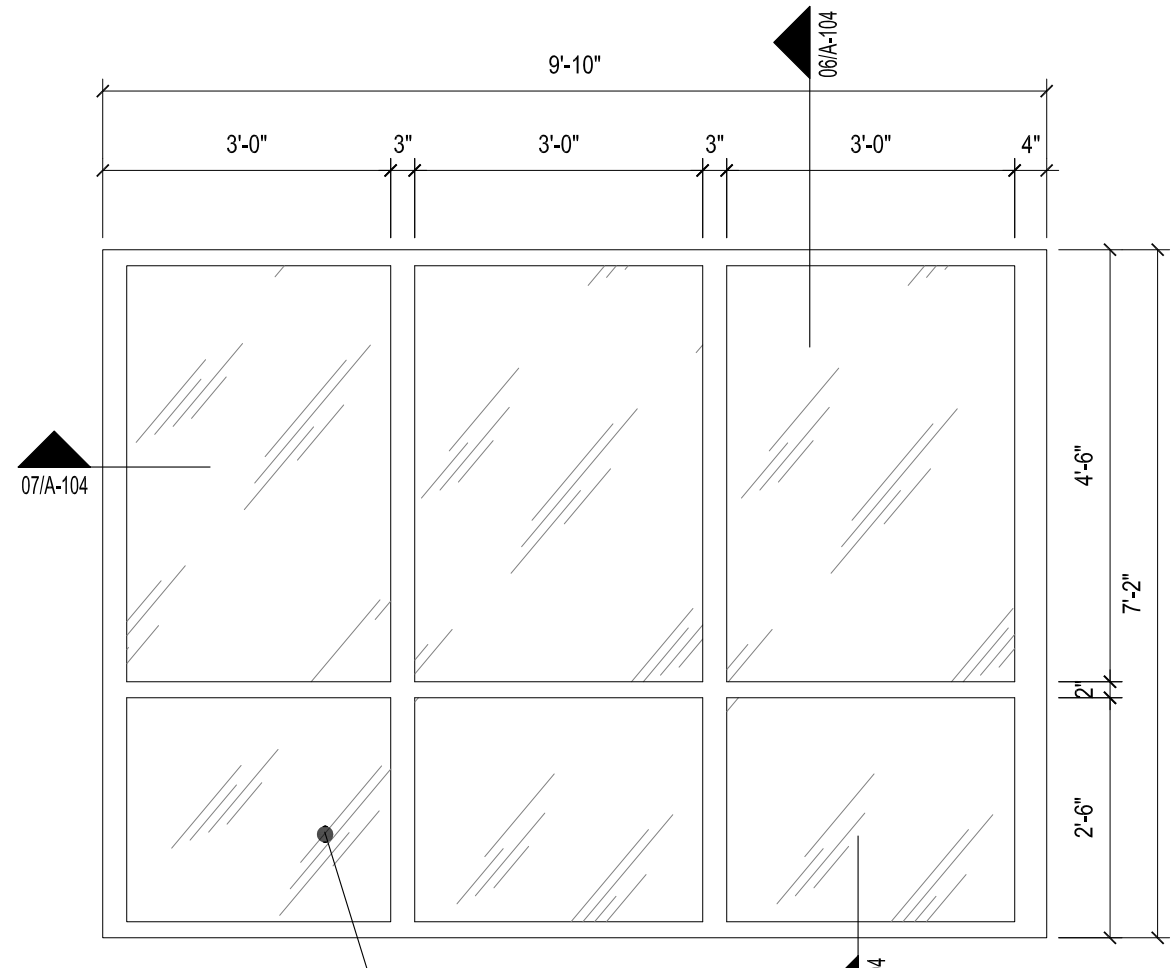


13 WALL BACKING DETAIL
SCALE: 3/4" = 1'-0"



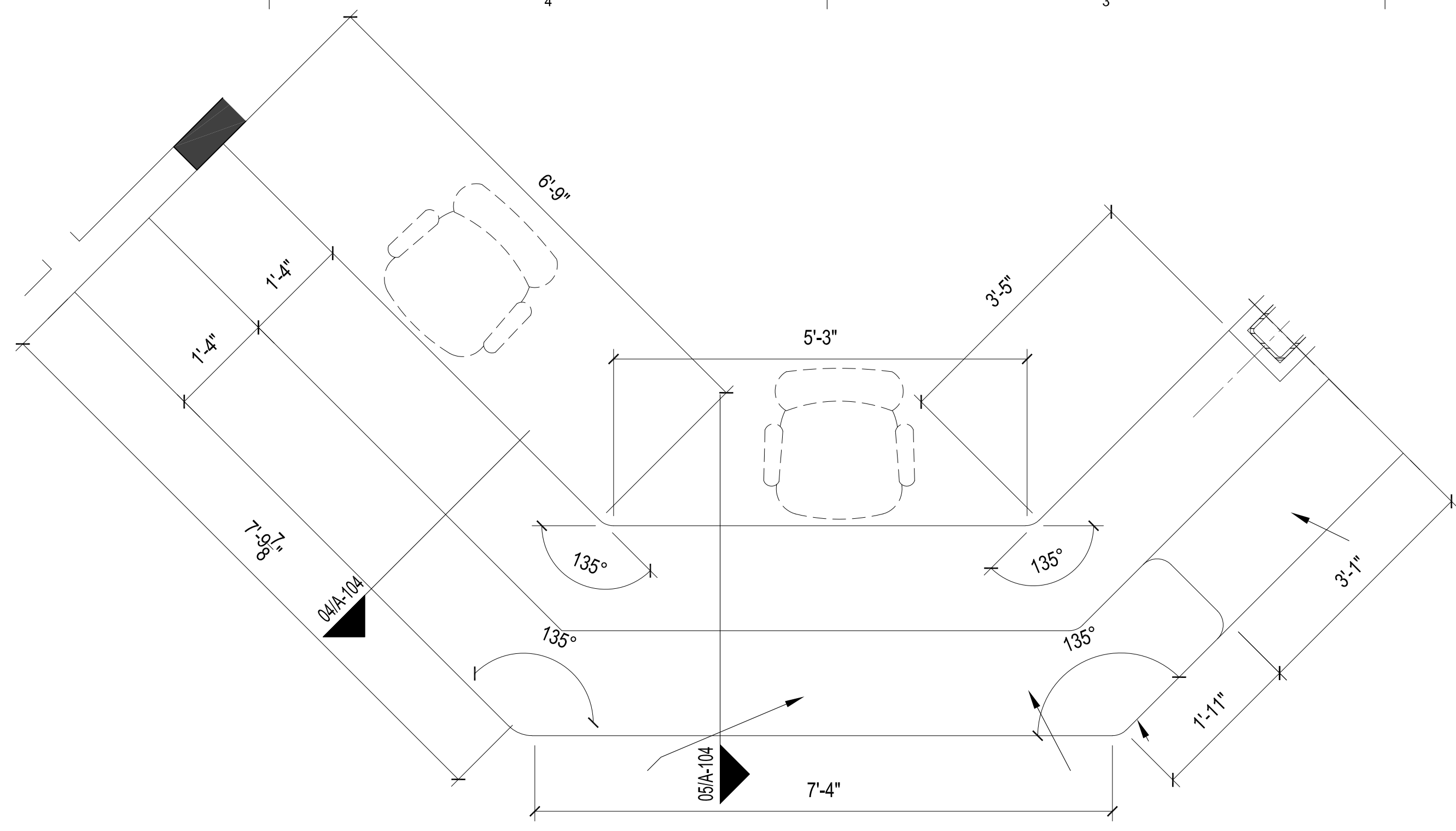
W1 WALL TYPE
TYPE W1A: 5/8" GWB ONE SIDE ONLY
SCALE: 1/2" = 1'-0"

12 SECTION
SCALE: 1/2" = 1'-0"

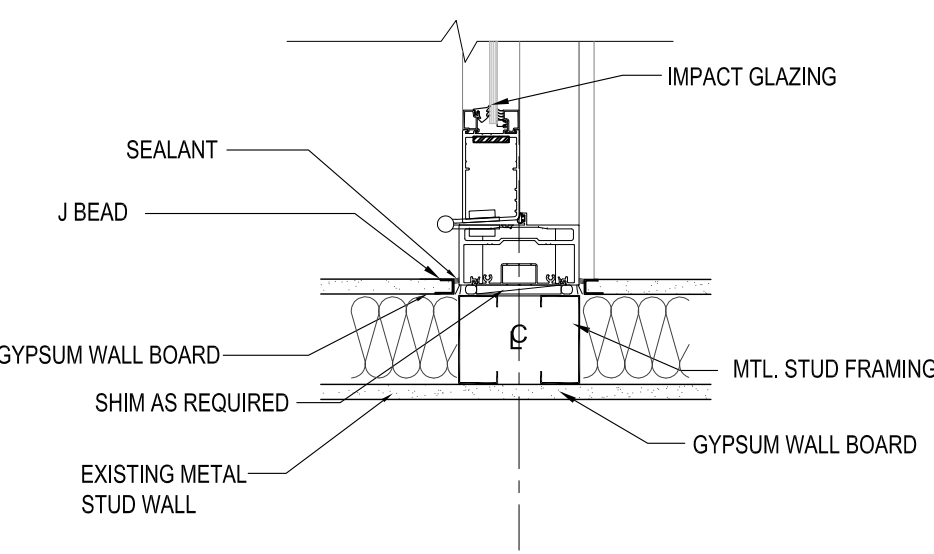


18 STOREFRONT "A"

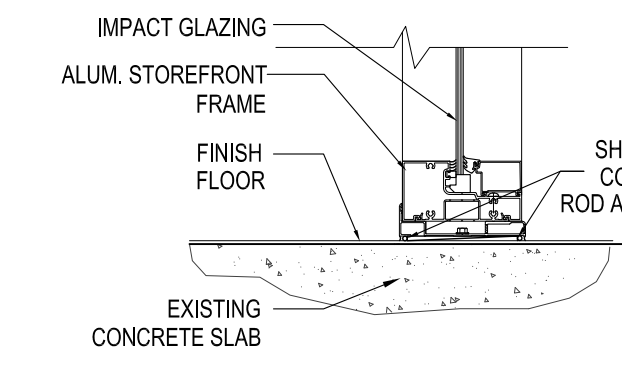
ALL STOREFRONTS TO BE CLEAR ANODIZED ALUMINUM. BASIS OF DESIGN KAWNEER TRIFAB 601 FRAMING SYSTEM WITH SMALL/LARGE MISSILE IMPACT GLAZING



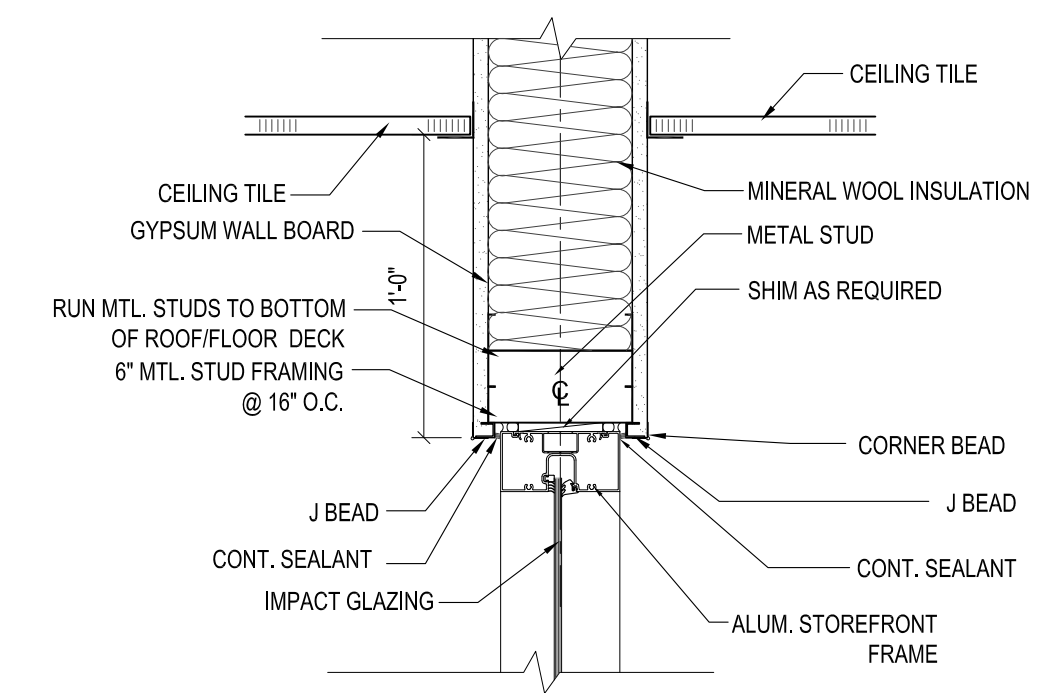
01 CASEWORK DETAIL
SCALE: 1/4" = 1'-0"



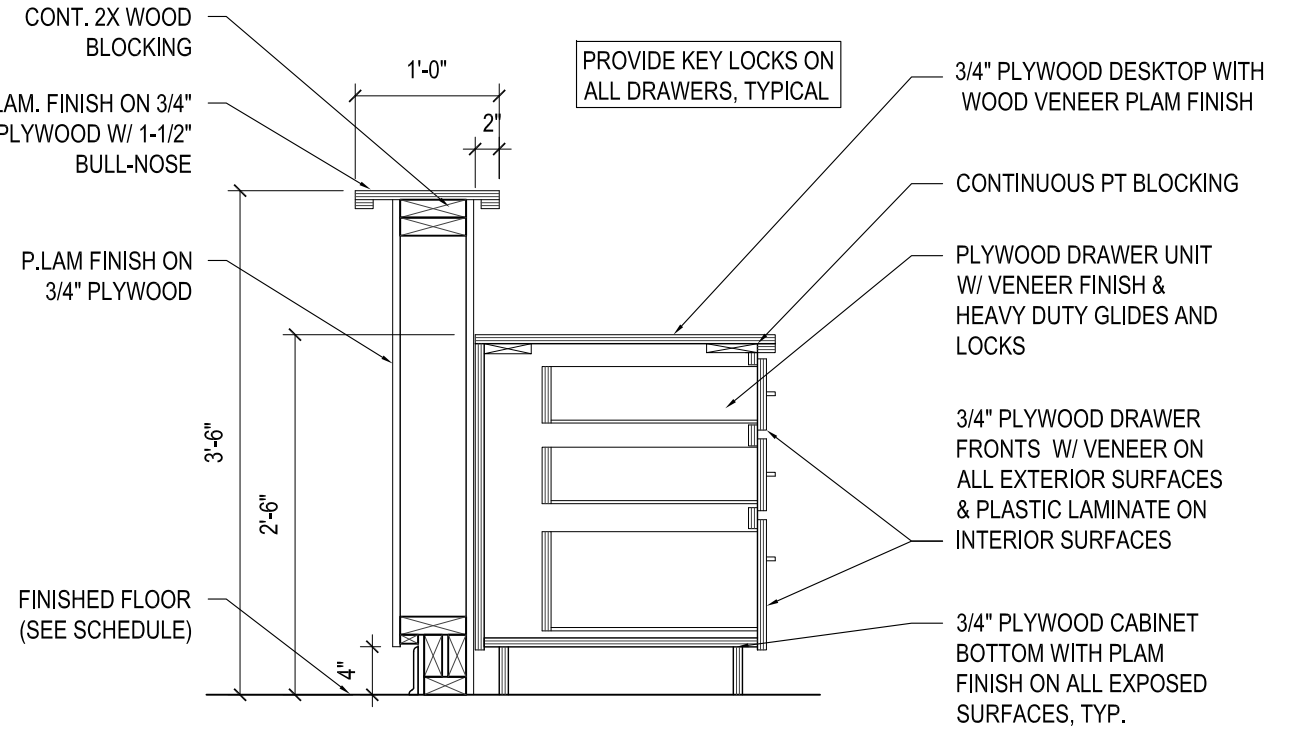
10 STOREFRONT DETAIL-J2
SCALE: 1-1/2" = 1'-0"



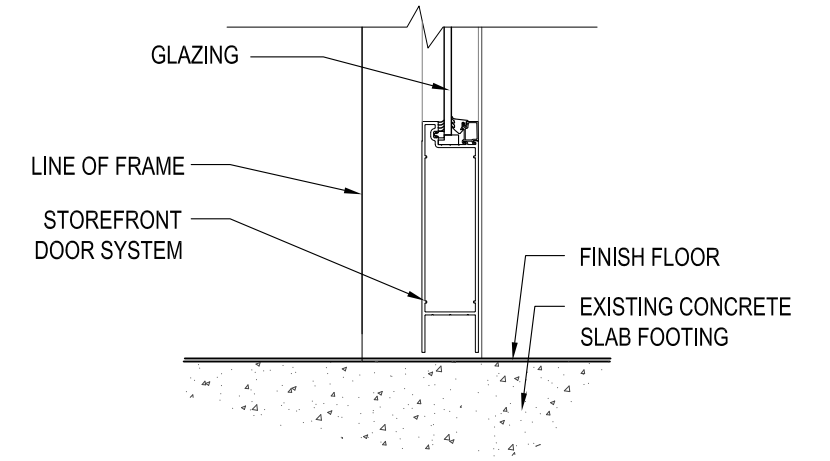
08 STOREFRONT SILL DETAIL
SCALE: 1-1/2" = 1'-0"



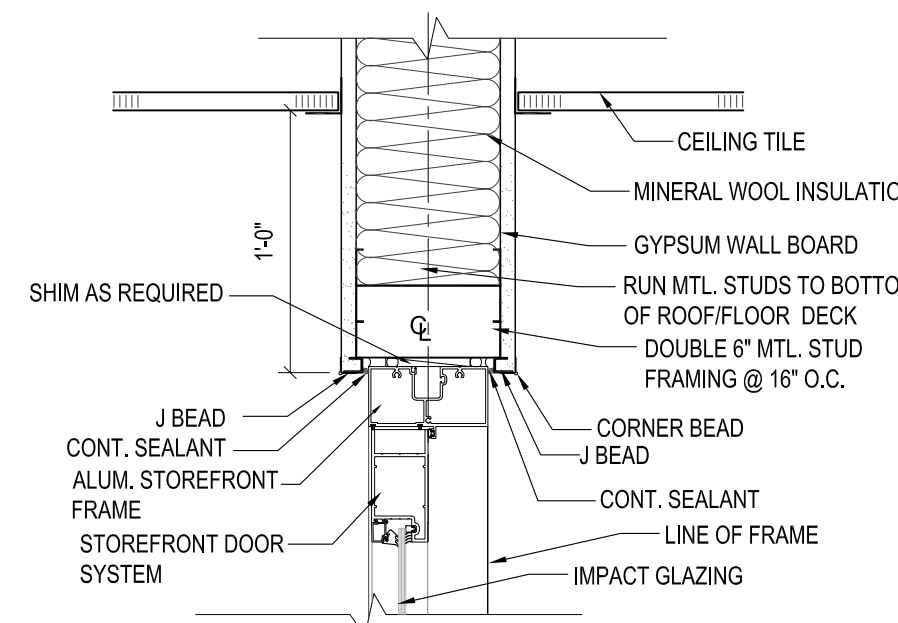
06 STOREFRONT HEAD DETAIL
SCALE: 1-1/2" = 1'-0"



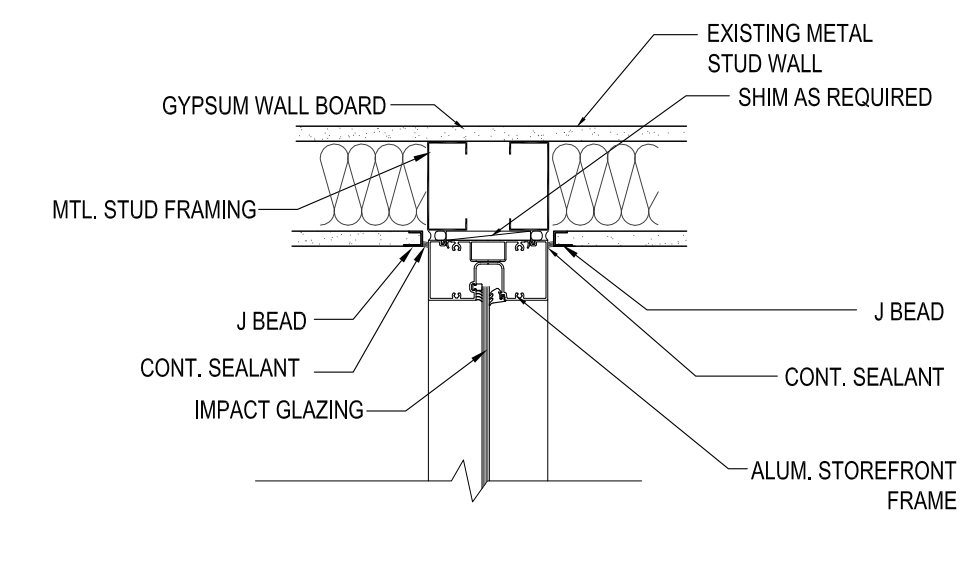
04 CASEWORK DETAIL
SCALE: 1/4" = 1'-0"



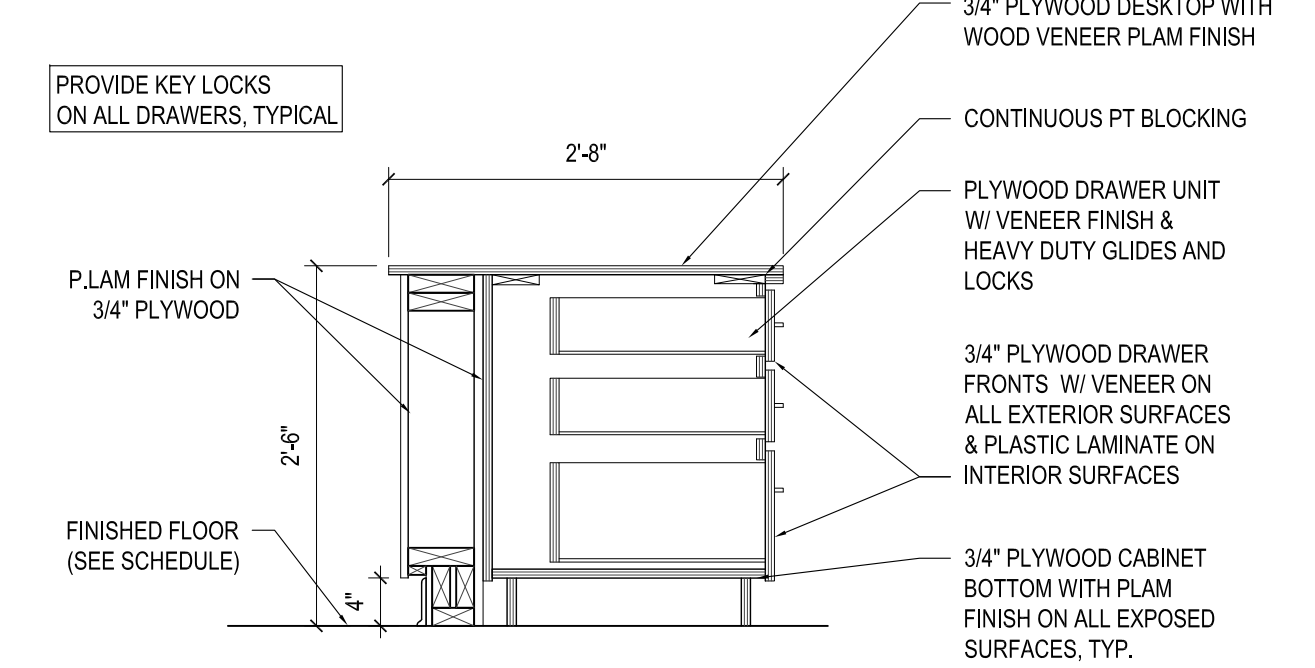
11 STOREFRONT DETAIL-S2
SCALE: 1-1/2" = 1'-0"



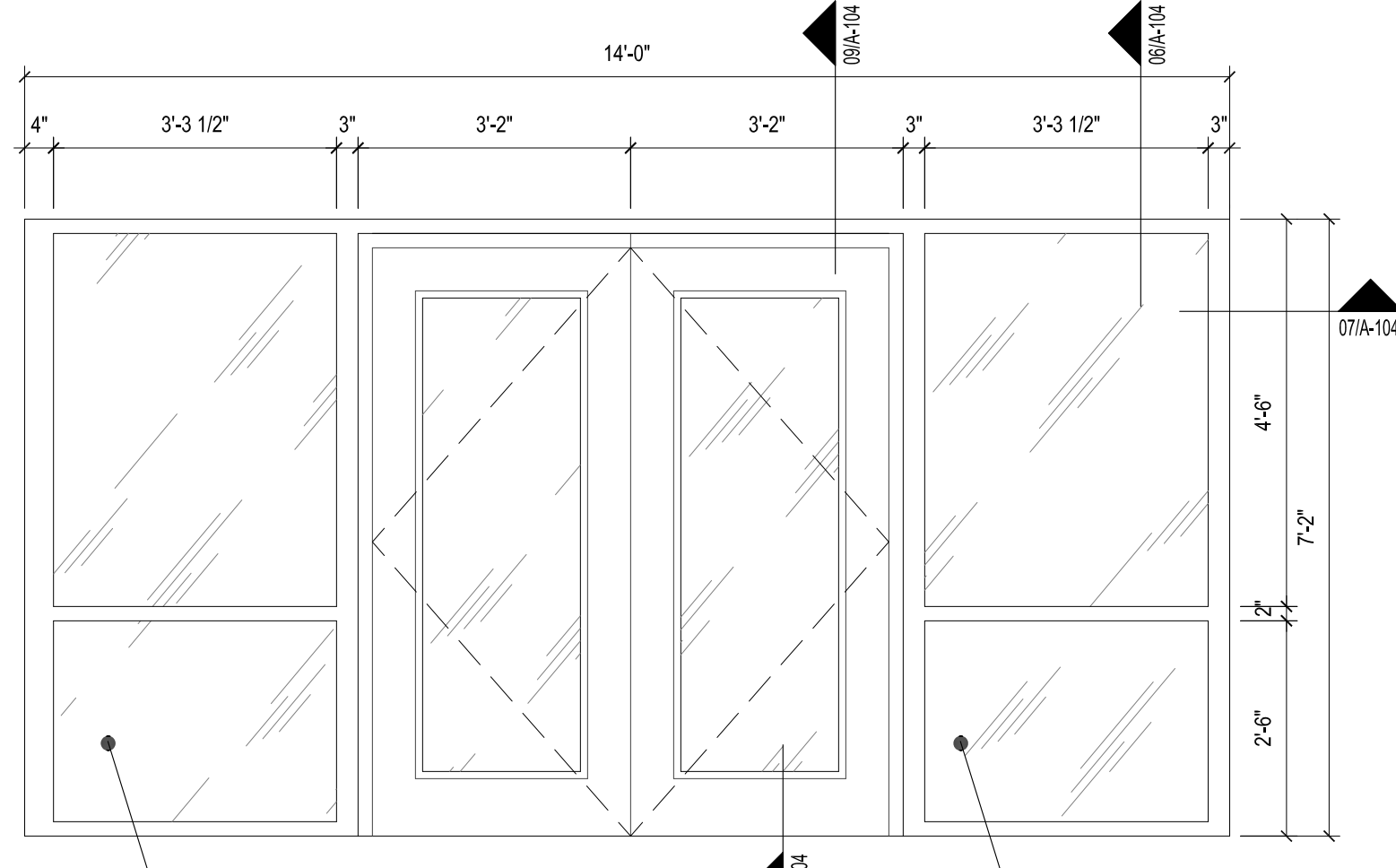
09 STOREFRONT DETAIL-H2
SCALE: 1-1/2" = 1'-0"



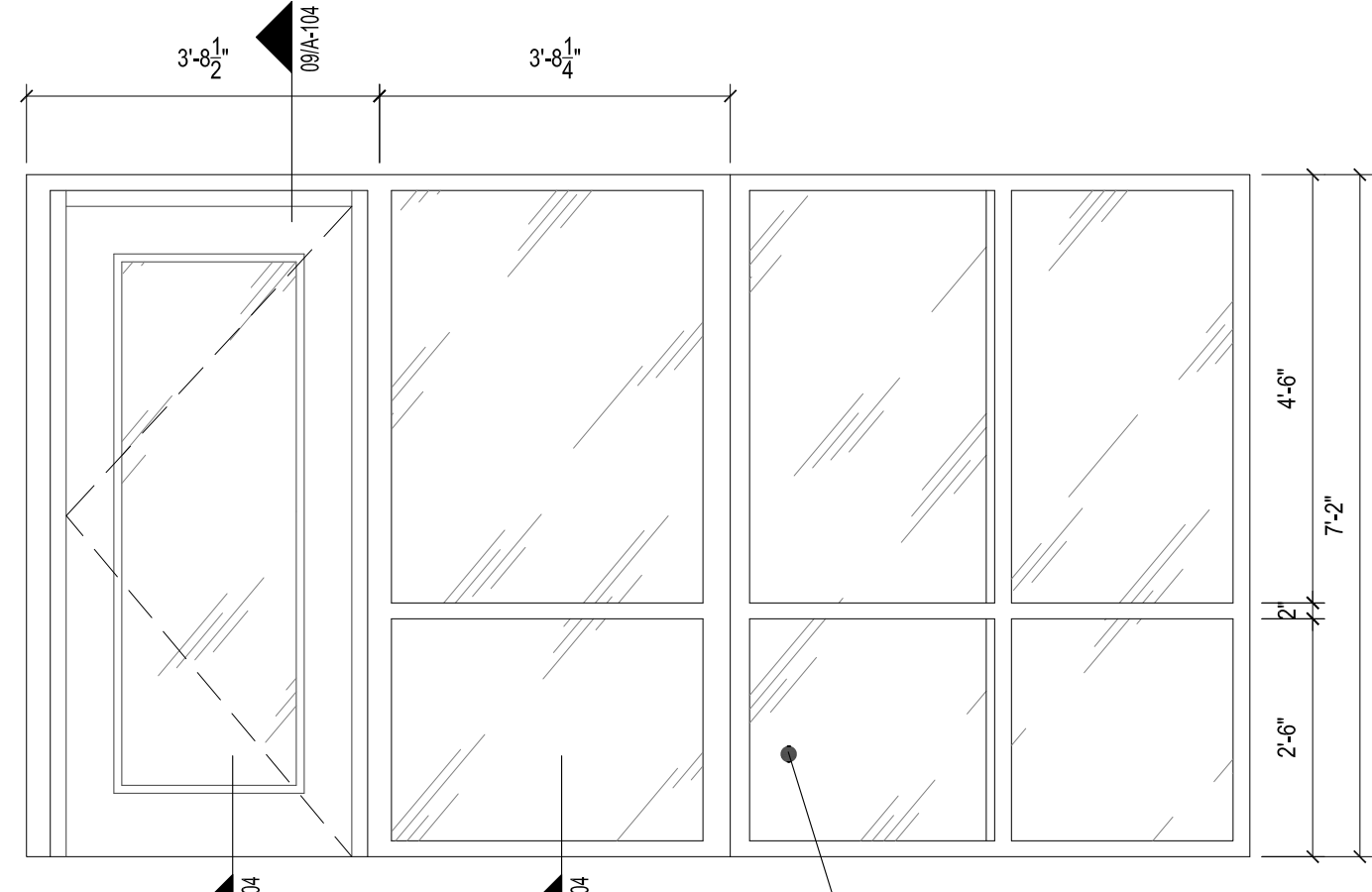
07 STOREFRONT JAMB DETAIL
SCALE: 1-1/2" = 1'-0"



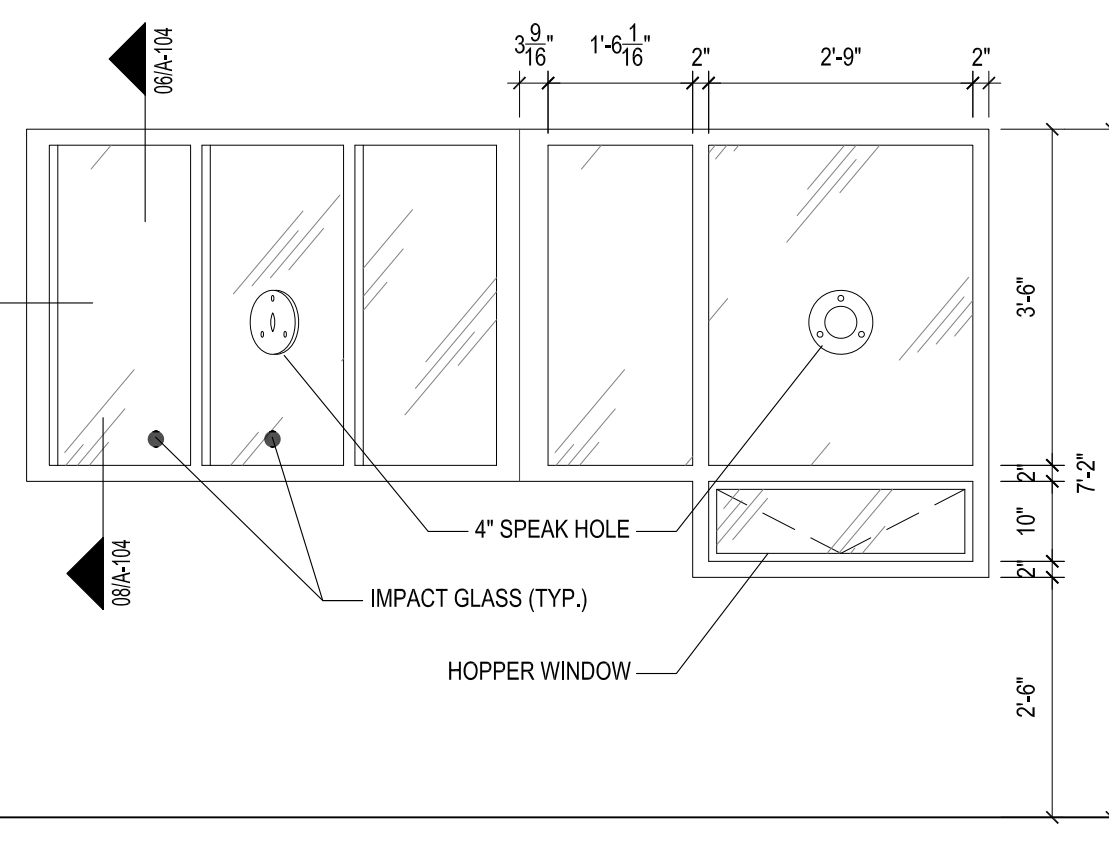
05 CASEWORK DETAIL
SCALE: 1/4" = 1'-0"



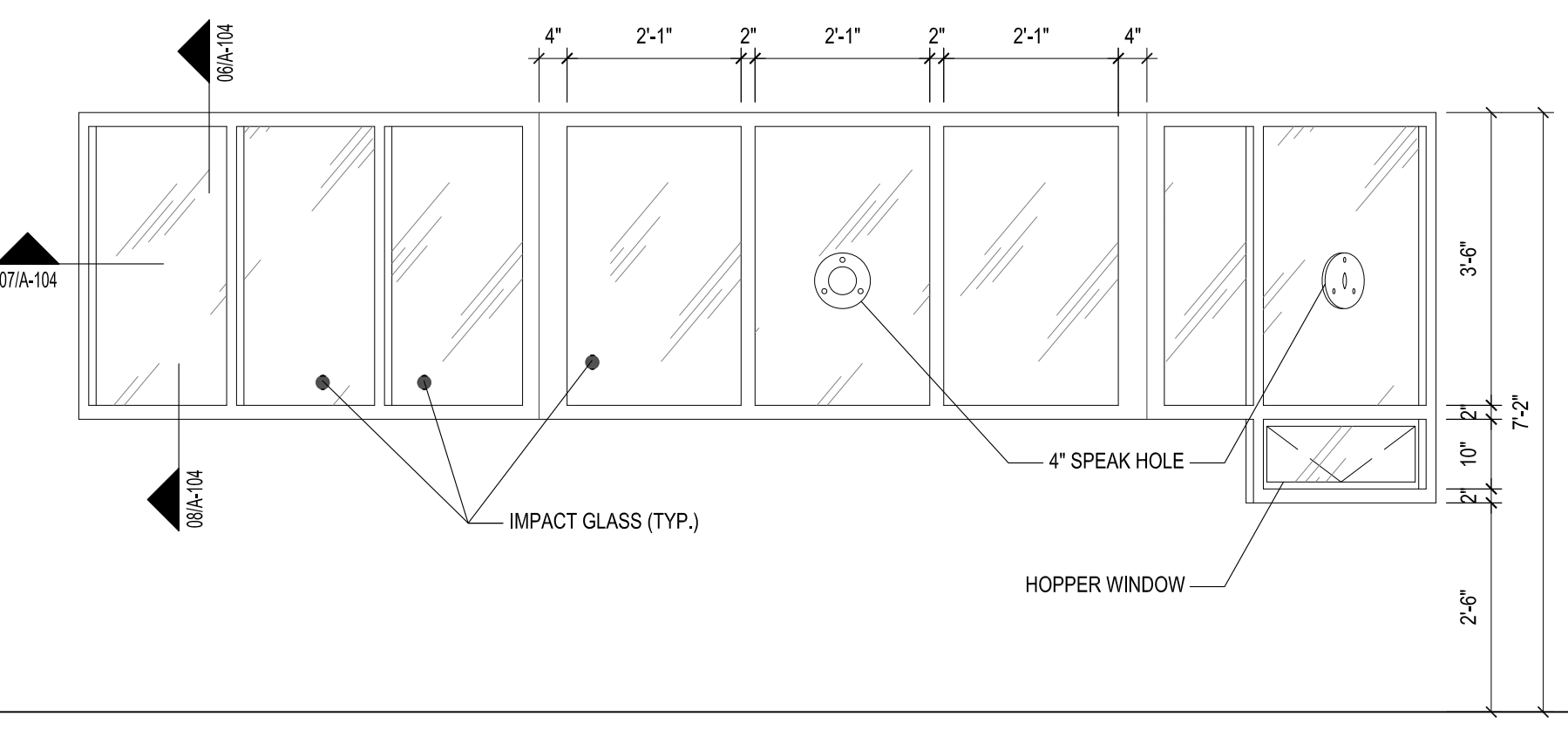
17 STOREFRONT "A"



16 STOREFRONT "B"



15 STOREFRONT "C"



14 STOREFRONT "C"

Revisions		
No.	Date	Note

TO THE BEST OF MY KNOWLEDGE, THE PLANS AND SPECIFICATIONS COMPLY WITH THE MINIMUM BUILDING CODES.

LEGEND

- REVISIONS
- ACCESS DOOR (DUCT)
- ACCESS PANEL (CEILING MOUNTED)
- A.F.F. ELEVATION/ABOVE FINISHED FLOOR
- C — CONDENSATE DRAIN LINE
- BOC BOTTOM OF COLUMN
- BOJ BOTTOM OF JOIST
- TOS TOP OF STRUCTURE
- RBJ RUN BETWEEN JOISTS
- RTJW RUN THRU JOIST WEBBING
- SA SUPPLY AIR
- RA RETURN AIR
- OA OUTDOOR AIR
- EA EXHAUST AIR
- TU TERMINAL UNIT
- DCV DEMAND CONTROL VENTILATION
- CEILING SUPPLY AIR DEVICE
→ ARROW DENOTES DIRECTION OF THROW
- NEW SUPPLY, RETURN, EXHAUST OR OUTSIDE AIR DUCTWORK FIRST DESIGNATION IS SIDE SHOWN.
- DOUBLE WALL INSULATED DUCT, SUPPLY OR RETURN FIRST DESIGNATION IS SIDE SHOWN, FREE AREA DIMENSION.
- ALUMINUM EXHAUST DUCT
- TYPE 304 STAINLESS STEEL DUCT
- TURNING VANES (NUMBER OF VANES SHALL BE BASED ON ACTUAL DUCT SIZE & NOT ON SCHEMATIC SYMBOL ON DRAWING - SEE SMACNA)
- RETURN OR OUTSIDE AIR DUCT
- DISCHARGE OR SUPPLY DUCT
- EXHAUST FAN
- EXHAUST GRILLE
- FLEXIBLE DUCT CONNECTION
- VOLUME DAMPER (WITH OR WITHOUT MD)
- FIRE DAMPER WITH ACCESS DOOR
- SMOKE DAMPER WITH ACCESS DOOR
- FIRE SMOKE DAMPER WITH ACCESS DOOR
- DROP IN DIRECTION OF AIR FLOW
- RISE IN DIRECTION OF AIR FLOW
- FLEXIBLE AIR DUCT
- SPIN COLLAR WITH MANUAL DAMPER
- AUTOMATIC MOTORIZED DAMPER
- THERMOSTAT OR TEMPERATURE SENSOR
- SMOKE DETECTOR
- HUMIDISTAT OR HUMIDITY SENSOR
- STATIC PRESSURE SENSOR
- HIGH OCCUPANCY SWITCH
- OUTDOOR AIR SENSOR
- 0-12 HOUR TIMER SWITCH
- ELECTRIC DUCT HEATER WITH CONTROL AND TERMINAL CABINET
- CARBON DIOXIDE SENSOR

GENERAL MECHANICAL NOTES

1. ALL SUPPLY, RETURN, EXHAUST, AND OUTSIDE AIR DUCTWORK SHALL BE CONSTRUCTED OF GALVANIZED SHEET METAL. DUCTS SHALL BE FABRICATED IN COMPLIANCE WITH SMACNA "HVAC DUCT CONSTRUCTION STANDARDS METAL AND FLEXIBLE." REFER TO THE PROJECT SPECIFICATIONS FOR PRESSURE CLASSIFICATION AND SEALING REQUIREMENTS. THE FIRST 20 FEET OF SUPPLY AND RETURN AIR DUCTWORK FROM THE AIR HANDLING UNITS SHALL BE CONSTRUCTED OF THE DUAL WALL TYPE WITH A PERFORATED GALVANIZED INNER WALL, 1" THICK MYLAR ENCAPSULATED DUCT LINER, AND GALVANIZED OUTER WALL EQUAL TO UNITED MCGILL K-27.
2. EXHAUST AND OUTSIDE AIR DUCTWORK SHALL BE UNINSULATED. ALL DUCTWORK SHALL BE SLOPED BACK TOWARDS LOUVER AT 1/8 INCH PER FOOT.
3. ALL CONCEALED SUPPLY AIR DUCTS SHALL BE EXTERNALLY INSULATED WITH DUCT WRAP AS INDICATED IN SPECIFICATIONS. RIGID INSULATION SHALL BE PROVIDED IN EXPOSED LOCATIONS SUCH AS MECHANICAL ROOMS.
4. RETURN DUCTS LOCATED ABOVE CEILINGS OF CONDITIONED SPACES SHALL BE UNINSULATED. RETURN DUCTS LOCATED ABOVE UNCONDITIONED SPACES SHALL BE INSULATED THE SAME AS SUPPLY AIR DUCTS.
5. EXACT LOCATION OF AIR DISTRIBUTION DEVICES SHALL BE COORDINATED WITH THE ARCHITECTURAL CEILING PLANS.
6. PROVIDE ACCESS DOORS AT ALL FIRE DAMPERS/FIRE/SMOKE DAMPERS, SMOKE DETECTORS, DUCT HEATERS, AND AUTOMATIC TEMPERATURE CONTROL DEVICES WITH MAXIMUM ALLOWABLE STANDARD SIZE PERMITTED BY DUCT DIMENSIONS. DOORS SHALL BE REMOVABLE TYPE WITH CAM LATCHES AND SAFETY CHAIN, AND FULLY GASKETED TO THE PERIMETER. PROVIDE ACCESS PANELS IN CEILING WHERE REQUIRED TO PROVIDE ACCESS TO DAMPERS, DUCT HEATERS AND SIMILAR DEVICES.
7. COORDINATE INSTALLATION WITH ALL OTHER INVOLVED TRADES. IN THE CASE OF CONFLICT BETWEEN DRAWINGS AND SPECIFICATION, THE MORE STRINGENT REQUIREMENT AS DETERMINED BY THE ARCHITECT / ENGINEER SHALL TAKE PRECEDENT.
8. REFER TO PLANS FOR ADDITIONAL NOTES.
9. FLEXIBLE AIR DUCT SHALL BE USED FOR RUNOUTS BETWEEN THE SUPPLY AND RETURN AIR DUCTS AND AIR DISTRIBUTION DEVICES WHERE INDICATED. FLEXIBLE DUCT SHALL BE A MINIMUM OF SIX AND MAXIMUM OF TEN FOOT IN LENGTH AND OF THE MYLAR-COATED WIRE HELIX TYPE WITH FIBERGLASS INSULATION WITH A VALVE OF R-6 OR GREATER AND METALIZED NYLAR LAMINATE VAPOR BARRIER COVER. ATTACH FLEXIBLE AIR DUCT TO DIFFUSERS AND SPIN COLLARS WITH PLASTIC OR METAL DRAW BANDS AND SEAL THE ENDS WITH TAPE AND MASTIC TO MAINTAIN THE VAPOR BARRIER. FLEXIBLE DUCT AND SPIN COLLAR SIZE SHALL BE THE SAME NOMINAL DIAMETER AS THE NECK OF THE AIR DISTRIBUTION DEVICE IT IS CONNECTED TO. FLEXIBLE DUCT SHALL BE ONE-PIECE AND NOT BE SPLICED TOGETHER.
10. SPIN COLLARS SHALL BE OF THE INTEGRAL DAMPER TYPE WITH LOCKING WING NUT AND 2 INCH TALL STAND OFF BRACKET. ALL SPIN COLLARS SHALL BE ATTACHED TO THE SIDE OF DUCT WITH THE CONNECTION SEALED WITH MASTIC, CONNECTION TO TOP OR BOTTOM OF DUCT SHALL NOT BE USED UNLESS SPECIFICALLY APPROVED BY THE ENGINEER. SPRAY PAINT DAMPER HANDLES DAY-GLOW ORANGE AND INSTALL A 24 INCH LONG RED RIBBON ON THE HANDLE FOR T.A.B. PURPOSES AFTER INSTALLATION.
11. ELEVATIONS GIVEN: B.E. = BOTTOM ELEVATION, C.E. = CENTERLINE ELEVATION, T.E. = TOP ELEVATION; ARE TAKEN FROM THE CONCRETE FLOOR SLAB. THESE ELEVATIONS ARE APPROXIMATE AND MUST BE VERIFIED IN THE FIELD BY THE CONTRACTOR PRIOR TO FABRICATION OF ANY DUCTWORK OR PIPING.
12. PROVIDE SINGLE THICKNESS METAL TURNING VANES IN ALL SQUARE ELBOWS INCLUDING SUPPLY, RETURN, EXHAUST, RELIEF AND OUTSIDE AIR DUCTS. WHERE UNEQUAL SQUARE ELBOWS ARE SHOWN, TURNING VANES WITH TRAILING EDGE EXTENSIONS SHALL BE USED.
13. DOCUMENTS ARE SCHEMATIC IN NATURE AND DO NOT INDICATE EVERY BEND, ELBOW, OR OFFSETS REQUIRED IN DUCTWORK AND PIPING. FIELD VERIFY ALL SIZES AND ELEVATIONS PRIOR TO FABRICATION/INSTALLATION. PROVIDE MODIFICATIONS WHERE REQUIRED FOR COORDINATION IN BASE CONTRACT PRICE AT NO ADDITIONAL COST.
14. ENDS OF DUCTWORK SHALL BE KEPT SEALED USING PLASTIC SHEETING AND DUCT TAPE DURING CONSTRUCTION.
15. LOCATIONS FOR TEMPERATURE, HUMIDITY AND CO2 SENSORS ARE APPROXIMATE IN NATURE AND SHALL NOT BE SCALED FROM THE DRAWINGS. COORDINATE EXACT LOCATIONS WITH ROOM FURNITURE LAYOUT AND CONFIRM PROPOSED LOCATION WITH THE OWNERS REPRESENTATIVE PRIOR TO ROUGH-IN. CO2 SENSOR HEIGHTS SHALL BE 48" A.F.F.
16. EQUIPMENT SHALL BE SUPPLIED AND INSTALLED WITH PROVISION FOR IN-PLACE CLEANING AND SIMILAR MAINTENANCE TASKS IN ACCORDANCE WITH THE REQUIREMENTS OF ASHRAE 62.
17. PROVIDE MISCELLANEOUS STRUCTURAL STEEL TO SPAN ACROSS JOISTS WHERE REQUIRED FOR INTERMEDIATE SUPPORT. PROVIDE WEIGHT AND SUPPORT POINTS TO STRUCTURAL ENGINEER FOR INCLUSION IN CALCULATIONS.
18. THE LOCATION OF FIRE DAMPERS IN DUCT PENETRATIONS OF ONE-HOUR RATED WALLS AND PARTITIONS IS BASED ON THE 2014 FLORIDA BUILDING CODE (MECHANICAL), 607.5.3. WHERE EXCEPTIONS ARE ALLOWED BY CODE FOR OMISSION OF DAMPERS, THESE EXCEPTIONS HAVE BEEN EMPLOYED FOR THIS PROJECT. FIRE DAMPERS HAVE BEEN OMITTED FROM DUCTS WHICH COMPLY WITH ALL SIX (SIX) CODE REQUIREMENTS:
 - 3.1 THE DUCT SHALL NOT EXCEED 100 SQUARE INCHES.
 - 3.2 THE DUCT SHALL BE CONSTRUCTED OF STEEL A MINIMUM OF 0.0217-INCH IN THICKNESS.
 - 3.3 THE DUCT SHALL NOT HAVE OPENINGS THAT COMMUNICATE THE CORRIDOR WITH ADJACENT SPACES OR ROOMS.
 - 3.4 THE DUCT SHALL BE INSTALLED ABOVE A CEILING.
 - 3.5 THE DUCT SHALL NOT TERMINATE AT A WALL REGISTER IN THE FIRE-RESISTANCE-RATED WALL.
 - 3.6 A MINIMUM 12-INCH-LONG BY 0.060-INCH-THICK STEEL SLEEVE SHALL BE CENTERED IN EACH DUCT OPENING. THE SLEEVE SHALL BE SECURED TO BOTH SIDES OF THE WALL AND ALL FOUR SIDE OF THE SLEEVE WITH MINIMUM 1 1/2-INCH BY 1 1/2-INCH BY 0.060-INCH STEEL RETAINING ANGLES. THE RETAINING ANGLES SHALL BE SECURED TO THE SLEEVE AND THE WALL WITH #10 SCREWS. THE ANNULAR SPACE BETWEEN THE STEEL SLEEVE AND THE WALL OPENING SHALL BE FILLED WITH ROCK (MINERAL) WOOL BATTING ON ALL SIDES.
19. IN ALL FINISHED ROOMS WITH NO SUSPENDED CEILINGS, ALL EXPOSED DUCTWORK SHALL BE CLEANED, PRIMED AND PAINTED WITH TWO COATS OF GLIDDEN ICI SPRAY MASTER, UNIGRIP, PITTSBURGH G9514, OR APPROVED EQUAL.
20. CONTRACTOR SHALL OBTAIN A COMPLETE SET OF CONSTRUCTION DRAWINGS AND SPECIFICATIONS, AND REVIEW TO ENSURE ALL ITEMS INDICATED ON THE DRAWINGS ARE INCLUDED IN HIS BASE BID; ALL ITEMS REQUIRING A MECHANICAL CONNECTION (DUCTWORK, PIPING, ETC.) SHALL BE HOOKED-UP TO PROVIDE A FULLY OPERATIONAL AND FUNCTIONAL SYSTEM, AND INCLUDED IN THE BASE BID.
21. ACCESS PANELS IN HARD CEILINGS IN SUCH AREAS AS LOCKERS, GROUP TOILETS, ETC., SHALL BE A MINIMUM OF 18 X 18 TO ALLOW FOR TEST AND BALANCE ACCESS, WHERE 18 X 18 ACCESS DOOR CANNOT BE USED DUE TO CONFLICT, PROVIDE MAXIMUM ALLOWABLE PANEL AS NOT TO CONFLICT WITH OTHER TRADES. COORDINATE COLOR OF PANEL WITH ARCHITECT.
22. PAINT INSIDE OF ALL VISIBLE PLENUMS FLAT BLACK.
23. THE CONTRACTOR SHALL PERFORM A PRE-CONSTRUCTION TEST AND BALANCE TO DOCUMENT EXISTING EQUIPMENT OPERATING CONDITIONS AND PROVIDE A BASELINE FOR THE MODIFIED SYSTEMS TO BE COMPARED TO. THE SCOPE SHALL APPLY TO SUPPLY DIFFUSERS, RETURN GRILLS, EXHAUST GRILLS, AND TRANSFER AIR OPENINGS WITHIN THE SCOPE OF WORK ONLY. FINAL TEST AND BALANCE PERFORMANCE SHALL BE AS INDICATED ON THE NEW WORK PLANS.
24. WORK SHALL BE IN ACCORDANCE WITH THE FOLLOWING CODES:
 - FLORIDA BUILDING CODE, BUILDING, 2017
 - FLORIDA BUILDING CODE, MECHANICAL, 2017
 - FLORIDA BUILDING CODE, ENERGY CONSERVATION, 2017
 - FLORIDA STATE FIRE PREVENTION CODE, 2017
 - NFPA 90A-2016 - STANDARD FOR THE INSTALLATION OF AIR CONDITIONING AND VENTILATION SYSTEMS
 - NFPA 101-2016 - LIFE SAFETY CODE

DUCT AND PIPE INSTRUCTION AND INSULATION REQUIREMENTS

SUPPLY AIR DUCT			
FROM AHU'S CONNECTION TO 50 FEET DOWNSTREAM ON SUPPLY SIDE FOR ALL AIR HANDLING UNIT SYSTEMS	1" INTERNALLY LINED	WITH PERFORATED INNER LINER AND MYLAR FILM SEPARATING INSULATION FROM AIR STREAM	DOUBLE WALL DUCT
AFTER 50 FEET DOWNSTREAM ON SUPPLY SIDE FOR ALL AIR HANDLING UNIT SYSTEMS		CONCEALED - 2" THICK EXTERNAL WRAP EXPOSED - 1 1/2" RIGID BOARD WITH CORNER ANGLES	
DOWN STREAM OF VAV TERMINAL		CONCEALED - 2" THICK EXTERNAL WRAP EXPOSED - 1 1/2" RIGID BOARD WITH CORNER ANGLES	
ALL LOW PRESSURE EXPOSED DUCTWORK IN PUBLIC AREAS	1" INTERNALLY LINED	WITH PERFORATED INNER LINER AND MYLAR FILM SEPARATING INSULATION FROM AIR STREAM	DOUBLE WALL DUCT
AC UNIT TO TERMINAL - BALANCE OF DUCTWORK TO TERMINAL 50 DEG AIR SYSTEM	INSTALLED R-6	EXPOSED: 2" RIGID FIBERGLASS WITH CORNER ANGLES CONCEALED 2" WITH 1.5# DENSITY BLANKET	
AC UNIT TO TERMINAL - BALANCE OF DUCTWORK TO TERMINAL EXPOSED 50 DEG AIR SYSTEM	INSTALLED R-6	EXPOSED: 2" RIGID FIBERGLASS WITH CORNER ANGLES CONCEALED: .75# DENSITY BLANKET	
TERMINAL TO OUTLET	INSTALLED R-6	.75# DENSITY BLANKET	
FIRE DAMPER AND REHEAT COILS IN INTERNALLY INSULATED DUCT		EXPOSED: 1" RIGID FIBERGLASS WITH CORNER ANGLES CONCEALED: INSTALLED R-6 .75# DENSITY BLANKET	
RETURN AIR DUCT			
FROM AHU'S CONNECTION TO 50 FEET DOWNSTREAM ON RETURN SIDE FOR ALL AIR HANDLING UNIT SYSTEMS	1" INTERNALLY LINED	WITH PERFORATED INNER LINER AND MYLAR FILM SEPARATING INSULATION FROM AIR STREAM	DOUBLE WALL DUCT
TERMINAL TO OUTLET		CONCEALED - 2" THICK EXTERNAL WRAP EXPOSED - 1 1/2" RIGID BOARD WITH CORNER ANGLES	
TRANSFER AIR DUCT			
ALL TRANSFER DUCTS		1 1/2" 1# DENSITY BLANKET. MECHANICAL SPACE OR EXPOSED: 1" RIGID FIBERGLASS WITH CORNER ANGLES	
EXHAUST AIR DUCTS			
ALL GENERAL RESTROOM EXHAUST DUCTS		NOT REQUIRED	
KITCHEN HOOD EXHAUST DUCTS		WRAPPED IN 2 HOUR FIRE RATED DUCT WRAP ENCLOSURE EQUAL TO 3M FIREMASTER	

NOTES:
 • REFER TO SPECIFICATION 23-07-00 FOR MORE DETAIL AND INFORMATION
 • INSULATION MUST MEET OR EXCEED ASHRAE 90.1, TABLE 6.8.3 (WHICHEVER IS GREATER)

DIFFUSER AND GRILLE SCHEDULE

PLAN MARK	MAKE	MODEL NUMBER	MODULE SIZE	NECK SIZE	FINISH	MATERIAL	MOUNTING	REMARKS
RG-1	TITUS	4FL	24x24	22x22	OFF-WHITE	ALUMINUM	LAY-IN	①②③

① CONFIRM ALL MOUNTING TYPES WITH ACTUAL CEILING CONSTRUCTION PRIOR TO ORDERING AND INSTALLATION.
 ② POSITION SO BLADES POINT TOWARDS THE WALL (CEILING MOUNTED) OR CEILING (WALL MOUNTED).
 ③ PROVIDE SHEET METAL PLENUM BOX ON TOP OF RA GRILLES WHERE REQUIRED FOR FLEX DUCT TAP.

DIFFUSER, AND GRILLE DESIGNATION

PLAN MARK:

CD = CEILING SUPPLY DIFFUSER
 RG = RETURN GRILLE

UNIT NUMBER
 CD-X
 XXX
 AIR QUANTITY IN CFM (CUBIC FEET PER MINUTE)

MECHANICAL SHEET LISTING

MO.1	MECHANICAL LEGEND, AND GENERAL NOTES
M1.1	FIRST FLOOR HVAC PLAN - NEW WORK

Comm. No: 16025.19
 Date: 07/23/2020
 Drawn: JMC/WTG

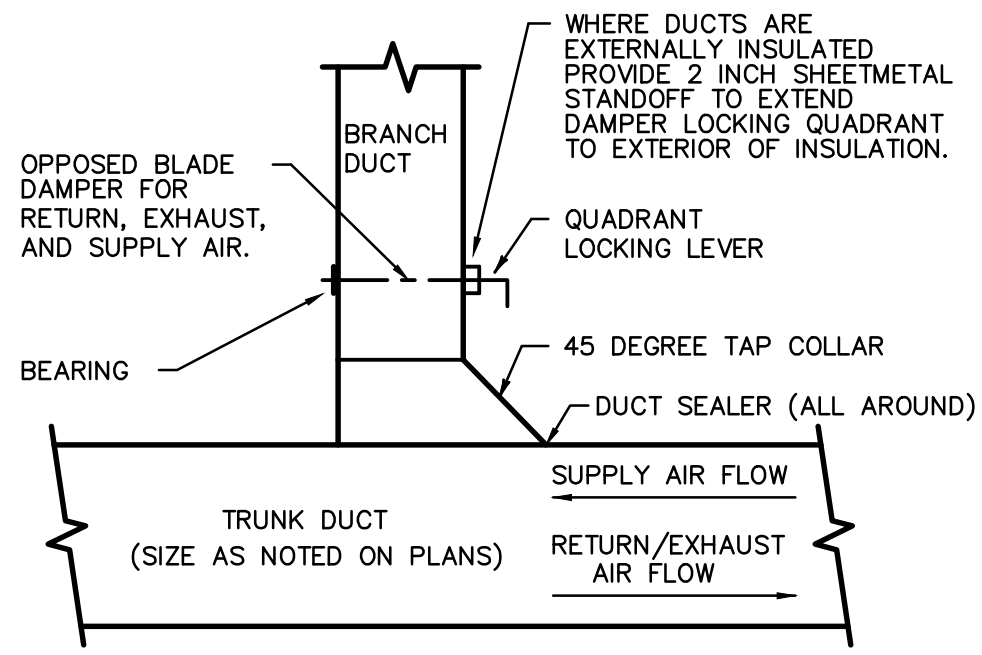
Revisions		
No.	Date	Note

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MECHANICAL LEGEND AND GENERAL NOTES

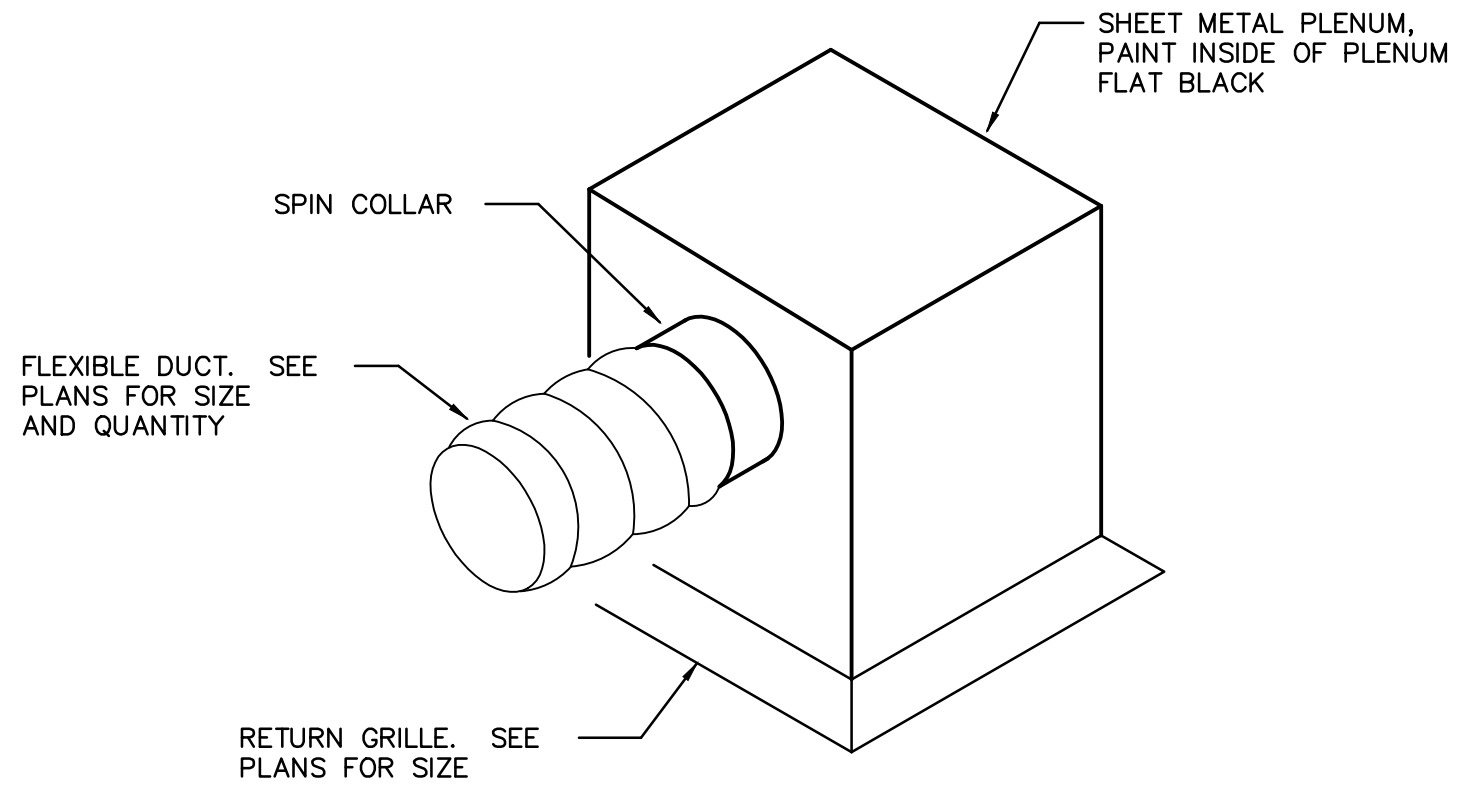
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BRANCH DUCT TAKE-OFF DETAIL

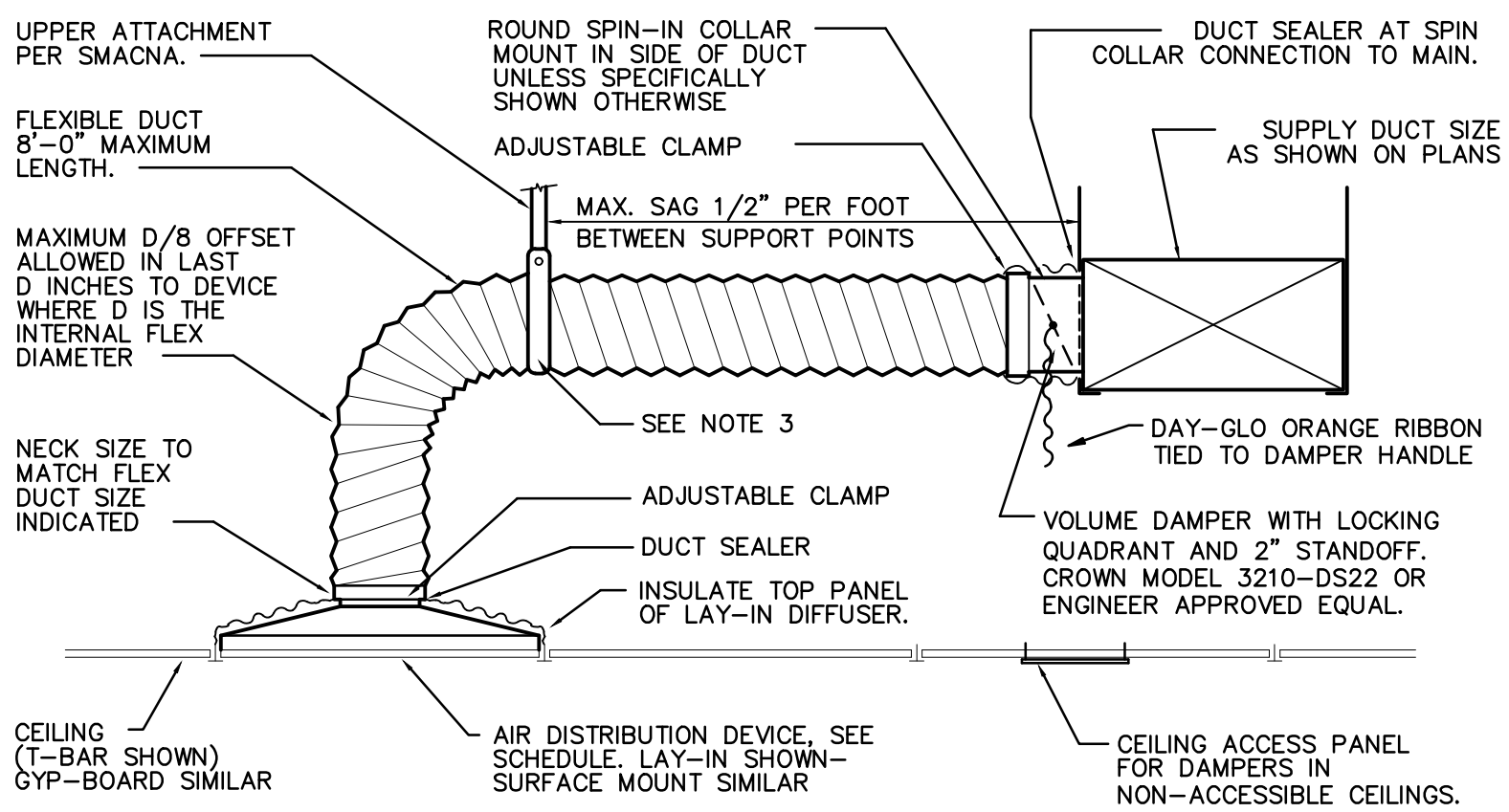
RECTANGULAR LOW PRESSURE

SCALE: NONE



RETURN GRILLE DETAIL

SCALE: NONE

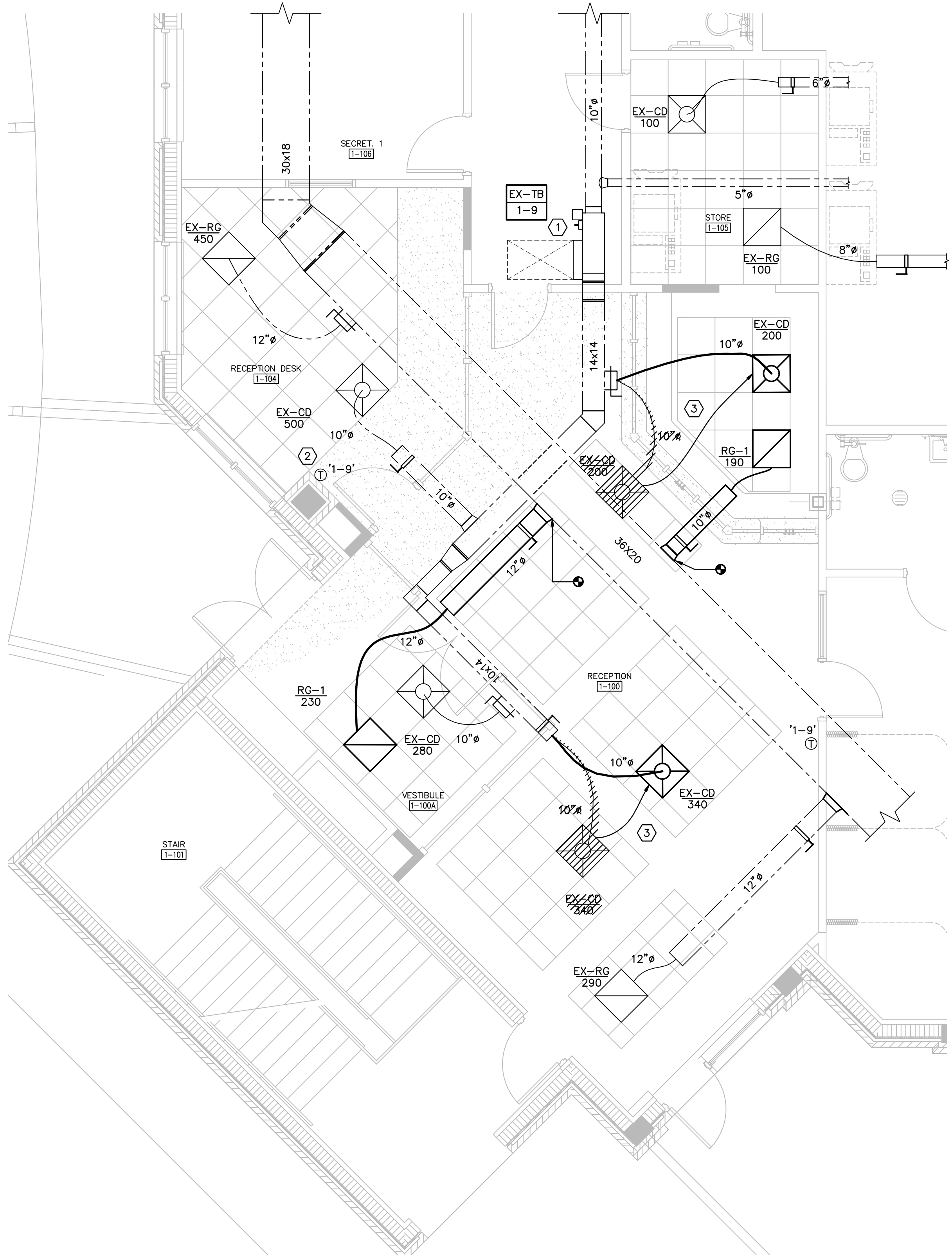


FLEXIBLE DUCT NOTES

1. FLEXIBLE DUCTS SHALL BE ONE-PIECE AND SHALL NOT BE SPLICED TOGETHER.
2. EXTEND FLEXIBLE DUCT INSULATION TO DUCT/DIFFUSER PANEL INSULATION AND SEAL WITH MASTIC.
3. MINIMUM 1-1/2" WIDE 22 GAUGE GALVANIZED STRAP HANGER WITH HEMMED EDGES PER SMACNA FIGURE 3-10.
4. FLEXIBLE AIR DUCT SHALL BE FULLY EXTENDED AND NOT COMPRESSED WITH ELBOW RADIUS NO LESS THAN R/D = 1.0.
5. WHEN AIRFLOW IS 75 CFM OR LESS, SPIN COLLAR SHALL BE PROVIDED LESS DAMPER AND A SEPERATE LOW LEAKAGE DAMPER INSTALLED ON OUTLET OF SPIN COLLAR

FLEXIBLE DUCT DETAIL

SCALE: NONE



1 FIRST FLOOR HVAC PLAN - NEW WORK PLAN

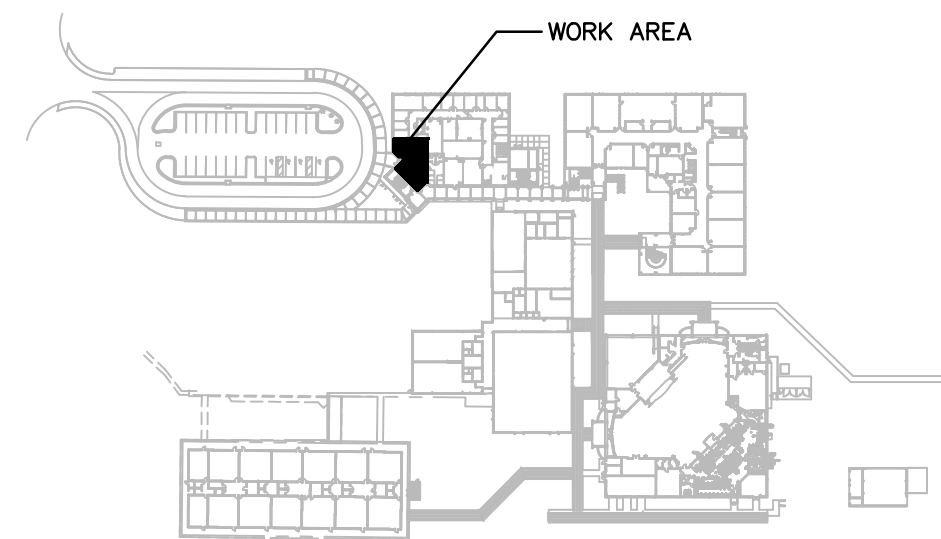
SCALE: 1/4" = 1'-0"

GENERAL NOTES

1. EXISTING DUCTWORK, AIR DEVICES, AND ASSOCIATED INSULATION SHALL BE PROTECTED FROM DAMAGE DURING CONSTRUCTION. CONTRACTOR SHALL REPLACE ANY INSULATION DAMAGED DURING CONSTRUCTION.
2. CONTRACTOR SHALL TAKE PRE-CONSTRUCTION AIRFLOW READINGS AT ALL SUPPLY DIFFUSERS AND RETURN GRILLES WITHIN THE SCOPE OF WORK. READINGS SHALL BE PERFORMED AND SUBMITTED TO THE ENGINEER PRIOR TO ANY DEMOLITION.
3. BALANCE ALL SUPPLY DIFFUSERS AND RETURN GRILLES TO AIR QUANTITIES (CFM) SHOWN.

PLAN NOTES

- ① REBALANCE EXISTING TERMINAL BOX TB 1-9 TO 1320 CFM.
- ② PROVIDE NEW TRANE WALL MOUNTED THERMOSTAT WITH ASYLUM COVER TO MATCH EXISTING. THERMOSTAT SHALL BE CONNECTED TO SECOND ZONE SENSOR INPUT AT EXISTING TERMINAL BOX CONTROLLER. PROVIDE PROGRAMMING TO CONTROL TO THE WORST CASE TEMPERATE BETWEEN THE EXISTING AND THE NEW THERMOSTATS.
- ③ EXISTING CEILING DIFFUSER TO BE RELOCATED AS SHOWN. PROVIDE NEW FLEXIBLE DUCTWORK AS REQUIRED TO RECONNECT DIFFUSER.



KEY PLAN

SCALE: NONE

Comm. No: 16025.19

Date: 07/23/2020

Drawn: JMC/WTG

Revisions

No.	Date	Note

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FIRST FLOOR
HVAC PLAN - NEW
WORK

M1.1

JLRD No. 120043

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ELECTRICAL SYMBOL LEGEND

	GROUND TYPE SINGLE RECEPTACLE 120V-20A. +18" AFF UNLESS NOTED OTHERWISE		EQUIPMENT SCHEDULE NOTATION
	GROUND TYPE DUPLEX RECEPTACLE 120V-20A. +18" AFF UNLESS NOTED OTHERWISE		T.V. ANTENNA OUTLET
	GROUND TYPE DUPLEX RECEPTACLE 120V-20A. MOUNT ABOVE COUNTER OR AT HEIGHT NOTED.		T.V. ORIGINATION OUTLET
	GROUND TYPE DUPLEX RECEPTACLE 120V-20A. WITH INTEGRAL GROUND FAULT INTERRUPT PROTECTION.		JUNCTION PULL BOX
	RECEPTACLE 120V-20A. MOUNT 18" AFF UNLESS OTHERWISE NOTED.		SECURITY JUNCTION BOX
	TAMPER RESISTANT GROUND TYPE DUPLEX RECEPTACLE 120V-20A. MOUNT 18" AFF UNLESS OTHERWISE NOTED.		VIDEO JUNCTION BOX
	GROUND TYPE DUPLEX RECEPTACLE 120V-20A. WITH BLUE FACE AND COVER. MOUNT 18" AFF UNLESS OTHERWISE NOTED.		CARD ACCESS JUNCTION BOX
	GROUND TYPE DOUBLE DUPLEX RECEPTACLE 120V-20A. MOUNT IN TWO GANG OUTLET BOX 18" AFF UNLESS OTHERWISE NOTED.		COMMUNICATIONS OUTLET
	TAMPER RESISTANT GROUND TYPE DOUBLE DUPLEX RECEPTACLE 120V-20A. MOUNT IN TWO GANG OUTLET BOX 18" AFF UNLESS OTHERWISE NOTED.		BELL
	GROUND TYPE DUPLEX RECEPTACLE 120V-20A. MOUNT IN FLUSH FLOOR BOX.		TELEPHONE OUTLET
	120V SPECIAL PURPOSE OUTLET (SUFFIX INDICATES AMPS)		FIRE ALARM HORN/STROBE
	3 WIRE 18 OR 4 WIRE 36 SPECIAL PURPOSE OUTLET (SUFFIX INDICATES AMPS)		FIRE ALARM STROBE LIGHT ONLY
	TRANSFORMER - SEE SCHEDULE FOR RATING		FIRE ALARM PULL STATION
	DISCONNECT SWITCH SEE SCHEDULE FOR RATING		COMBINATION FIXED TEMPERATURE AND RATE OF RISE HEAT DETECTOR
	120/208V PANELBOARD		CEILING MTD SMOKE DETECTOR (PHOTO ELECTRIC TYPE)
	277/480V PANELBOARD		DUCT MOUNTED SMOKE DETECTOR (PHOTO ELECTRIC TYPE)
	CELL BOOSTER ACCESS POINT		SMOKE DETECTOR REMOTE INDICATOR/RESET
	CELL BOOSTER ANTENNA		MAGNETIC DOOR HOLDER
	PATCH PANEL - (DEDICATED FOR CCTV)		POST INDICATING VALVE SWITCH
	NETWORK VIDEO RECORDER		TAMPER SWITCH
	POWER OVER ETHERNET		PRESSURE SWITCH
	WIRELESS ACCESS POINT		FLOW SWITCH
	SECURED ACCESS DOOR		CLOCK
	SECURITY - KEYPAD (ALARM COMMAND CENTER)		MICROPHONE OUTLET - WALL MOUNTED
	SECURITY - DOOR CONTACT		PUBLIC ADDRESS/INTERCOM SPEAKER-CEILING
	INDICATES 'TELECOM/POWER' POWER POLE		PUBLIC ADDRESS/INTERCOM SPEAKER-WALL
	CARD READER		PUSH BUTTON STATION (ONE OR MORE BUTTONS) *F* INDICATES PRIVACY TYPE *K* INDICATES KEY-OPERATED
	VIDEO INTERCOM		CAMERA - SINGLE HEAD VIEW
	LIGHT SWITCH WITH OCCUPANCY/VACANCY SENSOR - DUAL TECHNOLOGY		CAMERA - DOUBLE HEAD VIEW
	DIMMER SWITCH WITH OCCUPANCY/VACANCY SENSOR - DUAL TECHNOLOGY		CAMERA - TRIPLE HEAD VIEW
	EXIT LIGHT		CAMERA - FOUR HEAD VIEW
	LIGHTING FIXTURE		OCCUPANCY SENSOR
	EMERGENCY WALL PACK WITH BACKUP BATTERY		

HEIGHTS AND LOCATIONS:

WALL BRACKET FIXTURES	7'-0" TO CENTER OF OUTLET
INTERCOM SPEAKERS	7'-0" TO CENTER
CLOCKS	7'-0" TO CENTER (IN GENERAL)
FIRE ALARM HORN/STROBES AND STROBES	6'-8" TO CENTER
PANELBOARDS	6'-0" TO TOP
LIGHTING SWITCHES	42" TO CENTER
FIRE ALARM PULL STATIONS	42" TO CENTER
WALL MOUNTED TELEPHONE	42" TO CENTER
INTERCOM CALL BACK RECEPTACLES	42" TO CENTER
BROADBAND TV OUTLETS	18" TO CENTER
TELEPHONE OUTLETS	18" TO CENTER OR 6'-8" TO CENTER (● MIP)
OTHER DEVICES	18" TO CENTER

COORDINATE ALL DEVICE LOCATIONS WITH ARCHITECTURAL ELEVATIONS PRIOR TO ROUGH-IN.

GENERAL ELECTRICAL NOTES

- ALL ELECTRICAL WORK SHALL COMPLY WITH NATIONAL ELECTRICAL CODE, THE NATIONAL FIRE CODES, THE AMERICANS WITH DISABILITIES ACT, AND THE FLORIDA BUILDING CODE.
- THE CONTRACTOR SHALL THOROUGHLY REVIEW THE PROJECT TO ENSURE THAT ALL WORK SHALL MEET OR EXCEED THE ABOVE REQUIREMENTS. ANY ALLEGED DISCREPANCIES SHALL BE BROUGHT TO THE ENGINEER'S ATTENTION PRIOR TO BID.
- THE CONTRACTOR IS DIRECTED TO OBTAIN COPIES OF ALL RELATED PLANS, SPECIFICATIONS, SHOP DRAWINGS AND ADDENDUM TO COORDINATE THE RELATED WORK AND SCHEDULING.
- THE CONTRACTOR IS REMINDED THAT ELECTRICAL SERVICE TO AND FOR MECHANICAL AND OTHER EQUIPMENT ARE BASED ON EQUIPMENT DESIGN DATA. THE VALUES MAY DIFFER DEPENDING UPON THE ACTUAL EQUIPMENT TO BE FURNISHED. ANY MODIFICATION TO THE ELECTRICAL, BASED UPON ACTUAL EQUIPMENT SELECTION, SHALL RESULT IN NO ADDITIONAL COST TO THE OWNER.
- THE CONTRACTOR SHALL THOROUGHLY REVIEW THE ARCHITECTURAL AND MECHANICAL PLANS TO ASSURE THAT ELECTRICAL SERVICE FOR ALL ITEMS AND/OR EQUIPMENT REQUIRING ELECTRICAL SERVICE IS INCLUDED. ANY ITEM AND/OR EQUIPMENT NOT PROVIDED WITH ELECTRICAL SERVICE, REQUIRING ELECTRICAL SERVICE, SHALL BE BROUGHT TO THE ENGINEER'S ATTENTION.
- MECHANICAL AND ELECTRICAL EQUIPMENT HAVE BEEN LOCATED AND ARRANGED TO MINIMIZE THE INTERFERENCES OF EQUIPMENT AND STRUCTURE. THE CONTRACTOR SHALL THOROUGHLY FAMILIARIZE HIMSELF WITH THE WORK TO BE PERFORMED BY OTHER TRADES AND THE PHYSICAL CHARACTERISTICS OF THE STRUCTURE IN ORDER TO SCHEDULE AND INSTALL EQUIPMENT AND TO MINIMIZE POSSIBLE INTERFERENCE. FAILURE TO PROPERLY COMMUNICATE AND SCHEDULE WORK WITH OTHER TRADES RESULTING IN ADDITIONAL WORK AND MATERIAL SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR. THE MODIFICATIONS REQUIRED TO RESOLVE THE CONFLICT SHALL BE DECIDED BY THE ENGINEER.
- ALL PANELBOARDS SHALL BE PROVIDED WITH A TYPED SCHEDULE SHOWING CIRCUIT NUMBERS AND A COMPLETE DESCRIPTION OF EACH CIRCUIT.
- MINIMUM TRADE SIZE CONDUIT PERMITTED SHALL BE 1/2 INCH UNLESS NOTED OTHERWISE.
- ALL CONDUCTOR METAL SHALL BE COPPER WITH 600 VOLT INSULATION TYPE THHN. (MINIMUM SIZE SHALL BE #12AWG.) CONTRACTOR SHALL ADJUST WIRE AND CONDUIT SIZES IF OTHER INSULATION TYPES ARE USED.
- ALL LIGHT SWITCHES AND DUPLEX RECEPTACLES SHALL BE RATED FOR 20 AMPERE AT 125/277 VOLTS A/C. WIRING DEVICES SHALL BE MANUFACTURED BY HUBBELL OR APPROVED EQUAL. PROVIDE BARRIERS AT 277V SWITCHES WHERE REQUIRED BY N.E.C. ARTICLE 404-8(b).
- ALL ELECTRICAL WIRING DEVICES INDICATED TO BE INSTALLED IN MASONRY WALLS OR FLOORS SHALL BE FLUSH MOUNTED, INCLUDING BRANCH CIRCUIT PANELBOARDS, UNLESS OTHERWISE NOTED. THE CONDUITS TO ASSOCIATED ELECTRICAL EQUIPMENT SHALL BE CONCEALED IN WALLS OR FLOOR.
- ALL CONDUIT RUNS SHALL BE CONCEALED UNLESS SPECIFICALLY NOTED OTHERWISE.
- THE FIXTURE SCHEDULE IS FOR REFERENCE ONLY. MODEL NUMBERS LISTED MAY NOT INCLUDE ALL REQUIRED OPTIONS. REFER TO SPECIFICATIONS FOR ADDITIONAL INFORMATION. EQUAL FIXTURES OF OTHER MANUFACTURERS MAY BE SUBSTITUTED AS EQUAL. ALL SUBSTITUTIONS ARE SUBJECT TO APPROVAL AS EQUAL BY THE ENGINEER.
- ALL EXIT LIGHTS SHALL BE PROVIDED WITH UNIVERSAL MOUNTING BRACKETS. THE CONTRACTOR SHALL VERIFY ALL DIRECTIONAL ARROWS PRIOR TO ORDERING FIXTURES.
- THE CONTRACTOR SHALL FURNISH THE AIR CONDITIONING SUBCONTRACTOR AND THE CEILING SUBCONTRACTOR COPIES OF APPROVED LIGHT FIXTURE SHOP DRAWINGS.
- ALL RECESSED LIGHTING FIXTURES IN FIRE RATED CEILINGS SHALL BE TENTED TO COMPLY WITH THE APPLICABLE CEILING RATING. THE CONTRACTOR SHALL VERIFY REQUIREMENTS.
- THE CONTRACTOR SHALL COORDINATE WITH THE MECHANICAL SUBCONTRACTOR TO ENSURE THAT ALL NECESSARY CONDUITS FOR AIR CONDITIONING CONTROLS ARE INCLUDED. IT IS THE ELECTRICAL SUBCONTRACTOR'S RESPONSIBILITY TO ENSURE THAT ALL EQUIPMENT IS WIRED PROPERLY AND ALL CONTROLS ARE OPERATIONAL. THE ELECTRICAL SUBCONTRACTOR SHALL FURNISH ALL MATERIALS NOT SUPPLIED BY THE MECHANICAL SUBCONTRACTOR.
- COMMUNICATION CONDUITS ARE TO BE LONG RADIUS TYPE AND SHALL CONTAIN PULL WIRES. PROVIDE PLATES FOR ALL OUTLETS.
- ALL SPECIAL PURPOSE OUTLETS SHALL BE PROVIDED TO MATCH EQUIPMENT TO BE SUPPLIED.
- THE PLANS INDICATE THE DESIRED ARRANGEMENT AND GENERAL LOCATIONS OF LIGHT FIXTURES. THE ARCHITECTURAL PLANS INDICATE ADDITIONAL DATA AS TO THE FINAL FIXTURE PLACEMENT. THE CONTRACTOR SHALL VERIFY CEILING TYPES AND INSTALLATION REQUIREMENTS PRIOR TO ORDERING LIGHT FIXTURES.
- ALL PANELBOARDS, SWITCHES AND CIRCUIT BREAKERS SHALL BE SQUARE D, GE, SIEMENS OR CUTLER HAMMER.
- ALL CONDUITS SHALL HAVE A SEPARATE GREEN GROUND CONDUCTOR INSTALLED FOR GROUNDING.
- ANY EXISTING UTILITIES LOCATED IN THE AREA OF CONSTRUCTION WHICH REQUIRE RELOCATION BY THE OWNER SHALL BE COORDINATED WITH THE OWNER'S REPRESENTATIVE A MINIMUM OF TEN DAYS IN ADVANCE.
- ALL DISCONNECT SWITCHES SHALL BE THE HEAVY DUTY TYPE WITH BUSSMAN TIME DELAY, DUAL ELEMENT AND CURRENT LIMITING FUSES.
- THE CONTRACTOR SHALL CHECK THE ARCHITECTURAL DRAWINGS FOR EXACT LOCATION AND/OR DIMENSIONS FOR INSTALLATION OF ALL ELECTRICAL ITEMS. ALL QUESTIONABLE LOCATIONS SHALL BE APPROVED BY OWNER'S REPRESENTATIVE PRIOR TO INSTALLATION.
- ALL EMPTY CONDUITS SHALL CONTAIN JET LINE #232 POLYOFIN 200 LB. TEST.
- ALL WORK SHOWN ON THE ELECTRICAL PLANS SHALL BE PERFORMED BY THE CONTRACTOR UNLESS NOTED OTHERWISE.
- ALL EXIT FIXTURES SHALL BE CONNECTED TO THE BUILDING EMERGENCY PANEL UNSWITCHED.
- ALL SURGE PROTECTED OUTLETS SHALL BE EQUAL TO HUBBELL #5352 IS.
- EQUIPMENT INSTALLED WITHIN CONCEALED SPACES SHALL HAVE REASONABLE ACCESS PANELS PROVIDED NEARBY FOR INSPECTION, TESTING AND SERVICE CONSIDERATIONS.
- ALL SECURITY SYSTEM WIRING AND DEVICE INSTALLATIONS SHALL BE DONE BY THE PALM BEACH COUNTY SCHOOL DISTRICT.
- THE FIRE ALARM MANUFACTURER SHALL PROVIDE CERTIFIED TECHNICIAN TO SUPERVISE THE INSTALLATION, FINAL CONNECTIONS AND TESTING OF THE FIRE ALARM SYSTEM. AT THE COMPLETION OF THE PROJECT, THE MANUFACTURER SHALL INSPECT THE SYSTEM AND CERTIFY THAT IT IS INSTALLED IN ACCORDANCE WITH NFPA 72. ALL FIRE ALARM COMPONENTS SHALL COMPLY WITH ADA REQUIREMENTS.
- REFER TO SPECIFICATIONS FOR MORE INFORMATION.

DRAWING INDEX	
SHEET NO.	DESCRIPTION
E0.1	ELECTRICAL NOTES AND LEGEND
E1.1	ELECTRICAL PLAN - OVERALL
E2.1	LIGHTING PLAN - DEMOLITION
E2.2	LIGHTING PLAN - NEW WORK
E3.1	POWER AND SYSTEMS PLAN - DEMOLITION
E3.2	POWER AND SYSTEMS PLAN - NEW WORK
E4.1	ELECTRICAL RISERS AND SCHEDULES
E5.1	ELECTRICAL DETAILS

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Martin County School District
 Indiantown Middle School Enhanced Security A2
 16303 SW Farm Road
 Indiantown, Florida 34956
 Permit Documents Submittal

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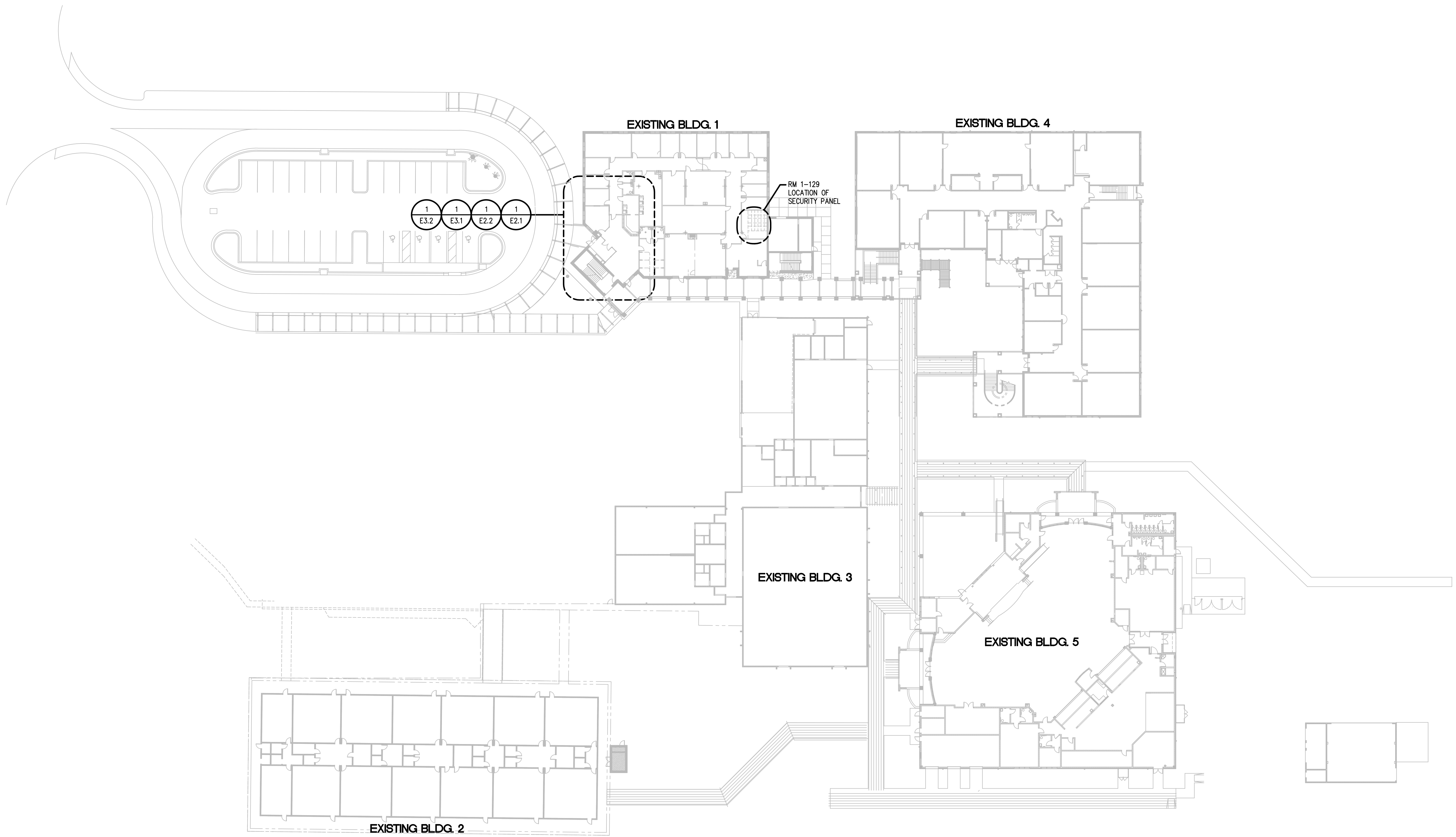
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ELECTRICAL NOTES AND LEGEND

E0.1

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ELECTRICAL PLAN - OVERALL
 SCALE: 1/32"=1'-0"

1
E1.1

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1 LIGHTING PLAN - DEMOLITION 1 2 3 SCALE: 1/4" = 1'-0"

GENERAL DEMOLITION NOTES

A. ALL EXISTING ELECTRICAL EQUIPMENT/FIXTURES/DEVICES IN THE REMODELING AREAS SHALL BE ADDRESSED AS INDICATED BY THE DEMO. PLAN NOTES.

B. DISCONNECT AND REMOVE ALL CONDUIT, CONDUCTORS, BOXES, SUPPORTS, ETC. ASSOCIATED WITH ELECTRICAL EQUIPMENT/FIXTURE/DEVICES TO BE REMOVED, AS DESCRIBED IN DEMO. PLAN NOTES. REMOVE CONDUIT AND CONDUCTORS BACK TO SOURCE - FOR THOSE CIRCUITS THAT SERVE OTHER EQUIPMENT/FIXTURES/DEVICES THAT ARE TO REMAIN, REMOVE CONDUIT AND CONDUCTORS SERVING DEMOLISHED EQUIPMENT, BACK TO NEAREST JUNCTION POINT, AND SAFELY DEAD-END.

C. THE CONTRACTOR IS CAUTIONED THAT EXISTING SERVICES ARE ROUTED CONCEALED IN PARTITIONS AND IN OR UNDER FLOOR SLABS. PRIOR TO DEMOLITION OR ANY CUTTING, DRILLING, BORING, ETC., THE CONTRACTOR SHALL CONFIRM THE LOCATION OF ANY SUCH SERVICES. ANY DISRUPTION OR DAMAGE TO SERVICES THAT MUST REMAIN IN-TACT, SHALL BE REPAIRED IMMEDIATELY BY THE CONTRACTOR, AT NO EXPENSE TO THE OWNER, EXCEPT IN THE CASE OF MUTUALLY AGREED UPON UNFORESEABLE CONDITIONS.

GENERAL NOTE

FIELD VERIFY ALL EXISTING CIRCUITS TO BE REUSED PRIOR TO ROUGH-IN.

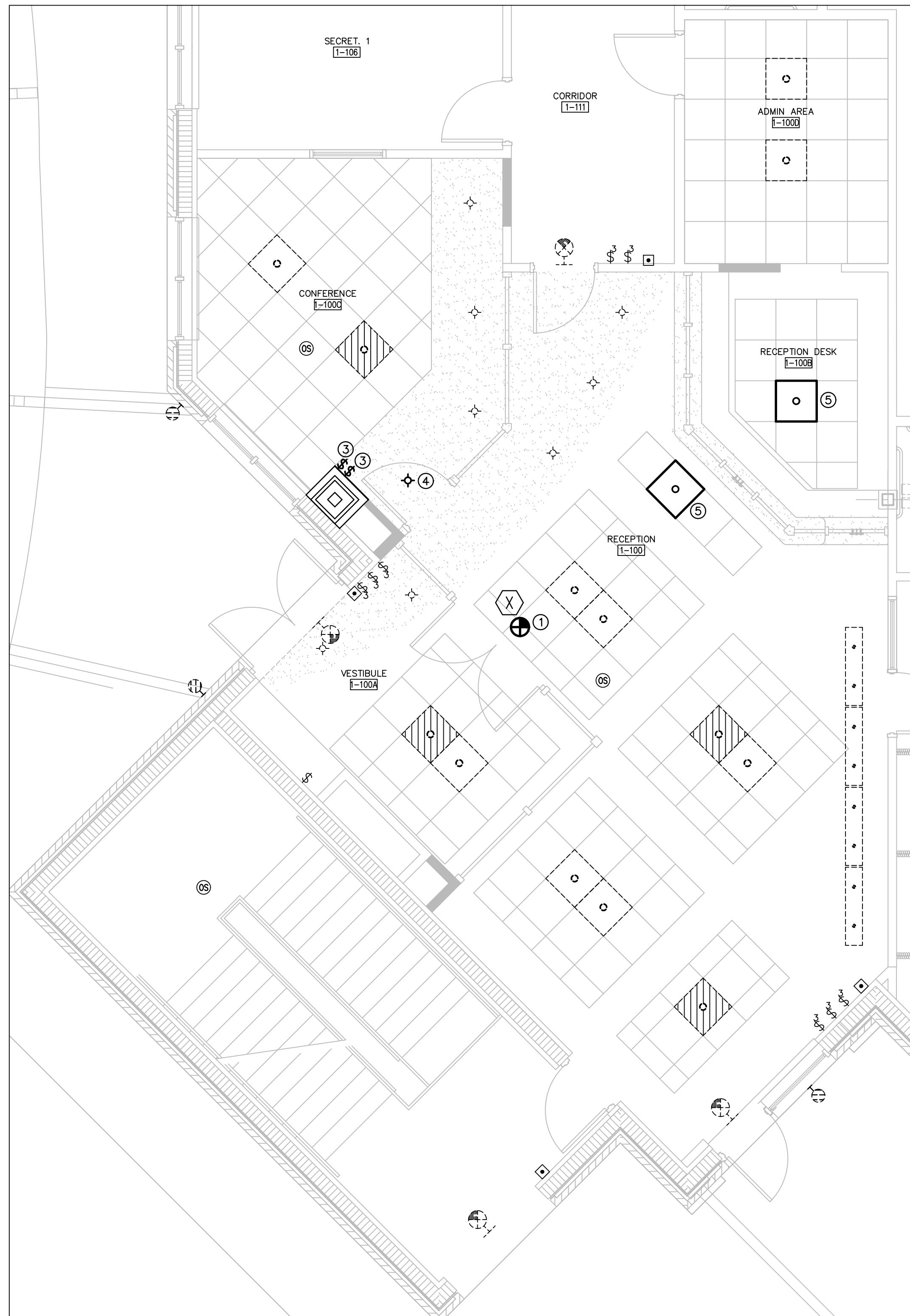
PLAN NOTES

- 1 ALL EXISTING CEILING DEVICES TO REMAIN AS PREVIOUSLY INSTALLED.
- 2 WALL SWITCHES TO REMAIN UNLESS NOTED OTHERWISE AND ARE SHOWN FOR REFERENCE ONLY.
- 3 FIRE ALARM DEVICES SHALL BE PROVIDED WITH APPROPRIATE DUST COVERS OR BAGGED DURING CONSTRUCTION.
- 4 EXISTING WALL SWITCH TO BE RELOCATED, SEE NEW WORK PLAN.
- 5 EXISTING LIGHT FIXTURE TO BE RELOCATED, SEE NEW WORK PLAN.

Revisions		
No.	Date	Note

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1
LIGHTING PLAN - NEW WORK
2
SCALE: 1/4" = 1'-0"

LIGHTING FIXTURE SCHEDULE									
FIX. TYPE	MANUFACTURER	CATALOG NUMBER	LAMPS	TYPE OF FIXTURE	MOUNTING			VOLTS	NOTES
					REC	SUR	SUS		
X	ISOLITE	SEE NOTE 1	LED 2W	LED EXIT SIGN				120-277	
	ABL								
	COMP								

FIXTURE SCHEDULE NOTES:
1. CONTRACTOR TO MATCH EXISTING FIXTURE TYPE ALREADY INSTALLED IN THE AREA OF WORK.

GENERAL NOTE

FIELD VERIFY ALL EXISTING CIRCUITS TO BE REUSED PRIOR TO ROUGH-IN.

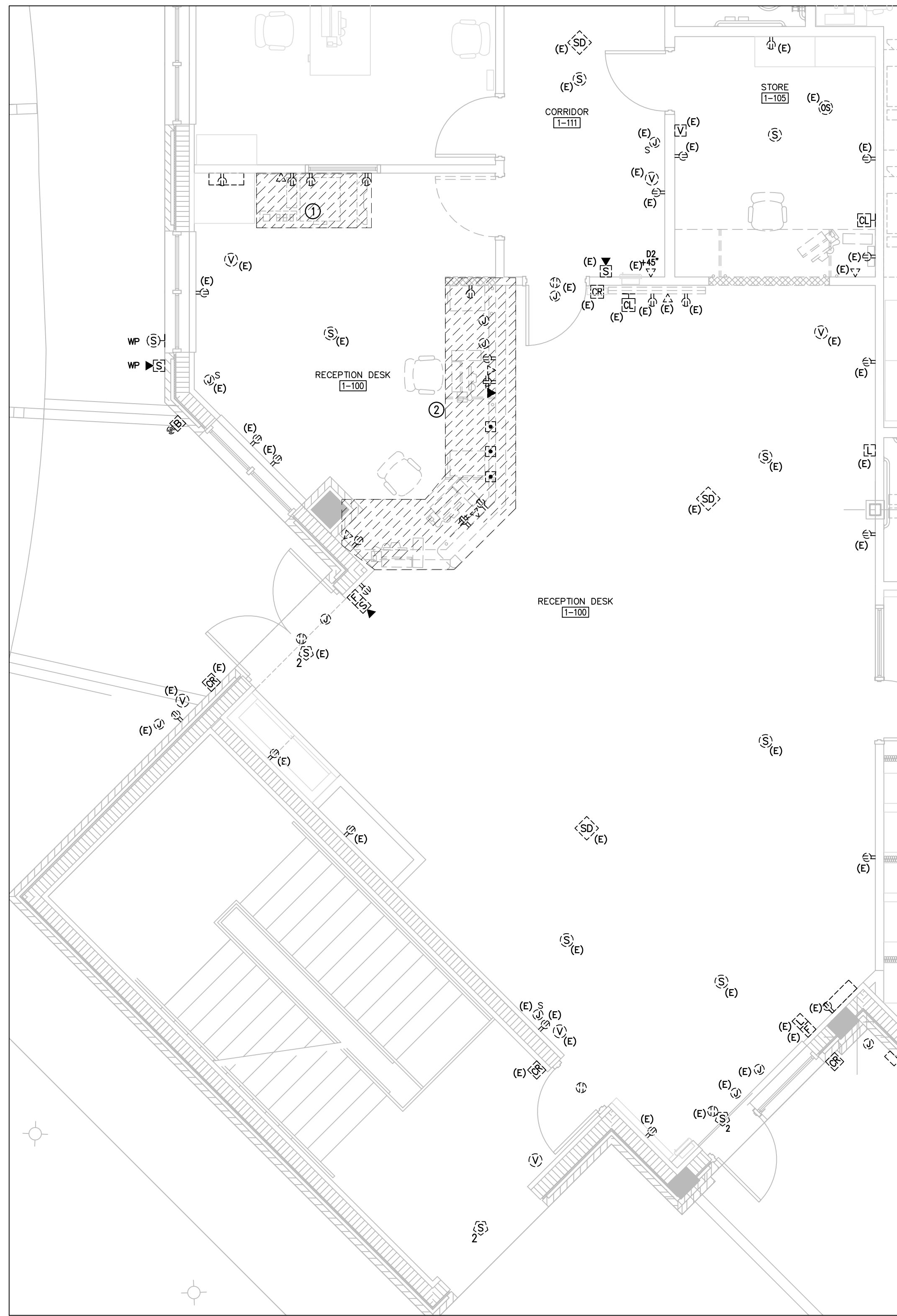
- NEW WORK NOTES**
- ① CONNECT TO NEAREST EXIT LIGHTING CIRCUIT, UN-SWITCHED WITH 2#12, 1#12G-3/4".
 - ② EXISTING LIGHTS AND SWITCHES SHOWN FOR REFERENCE ONLY.
 - ③ NEW LIGHT SWITCH. INTERCEPT EXISTING CIRCUIT FOR CONTROL OF NEWLY RENOVATED SPACE.
 - ④ RELOCATED LIGHT FIXTURE. REWORK CIRCUIT AS NECESSARY TO RETAIN ORIGINAL CONTROL.
 - ⑤ NEW LIGHT FIXTURE TO MATCH EXISTING FIXTURE TYPE ALREADY INSTALLED IN AREA. REWORK CIRCUIT AS NECESSARY TO RETAIN ORIGINAL CONTROL.

Revisions		
No.	Date	Note

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1
POWER AND SYSTEMS PLAN - DEMOLITION
1
 SCALE: 1/4" = 1'-0"

GENERAL DEMOLITION NOTES

A. ALL EXISTING ELECTRICAL EQUIPMENT/FIXTURES/DEVICES IN THE REMODELING AREAS SHALL BE ADDRESSED AS INDICATED BY THE DEMO. PLAN NOTES.

B. DISCONNECT AND REMOVE ALL CONDUIT, CONDUCTORS, BOXES, SUPPORTS, ETC. ASSOCIATED WITH ELECTRICAL EQUIPMENT/FIXTURE/DEVICES TO BE REMOVED, AS DESCRIBED IN DEMO. PLAN NOTES. REMOVE CONDUIT AND CONDUCTORS BACK TO SOURCE - FOR THOSE CIRCUITS THAT SERVE OTHER EQUIPMENT/FIXTURES/DEVICES THAT ARE TO REMAIN, REMOVE CONDUIT AND CONDUCTORS SERVING DEMOLISHED EQUIPMENT, BACK TO NEAREST JUNCTION POINT, AND SAFELY DEAD-END.

C. THE CONTRACTOR IS CAUTIONED THAT EXISTING SERVICES ARE ROUTED CONCEALED IN PARTITIONS AND IN OR UNDER FLOOR SLABS. PRIOR TO DEMOLITION OR ANY CUTTING, DRILLING, BORING, ETC., THE CONTRACTOR SHALL CONFIRM THE LOCATION OF ANY SUCH SERVICES. ANY DISRUPTION OR DAMAGE TO SERVICES THAT MUST REMAIN IN-TACT, SHALL BE REPAIRED IMMEDIATELY BY THE CONTRACTOR, AT NO EXPENSE TO THE OWNER, EXCEPT IN THE CASE OF MUTUALLY AGREED UPON UNFORESEEABLE CONDITIONS.

GENERAL NOTE

FIELD VERIFY ALL EXISTING CIRCUITS TO BE REUSED PRIOR TO ROUGH-IN.

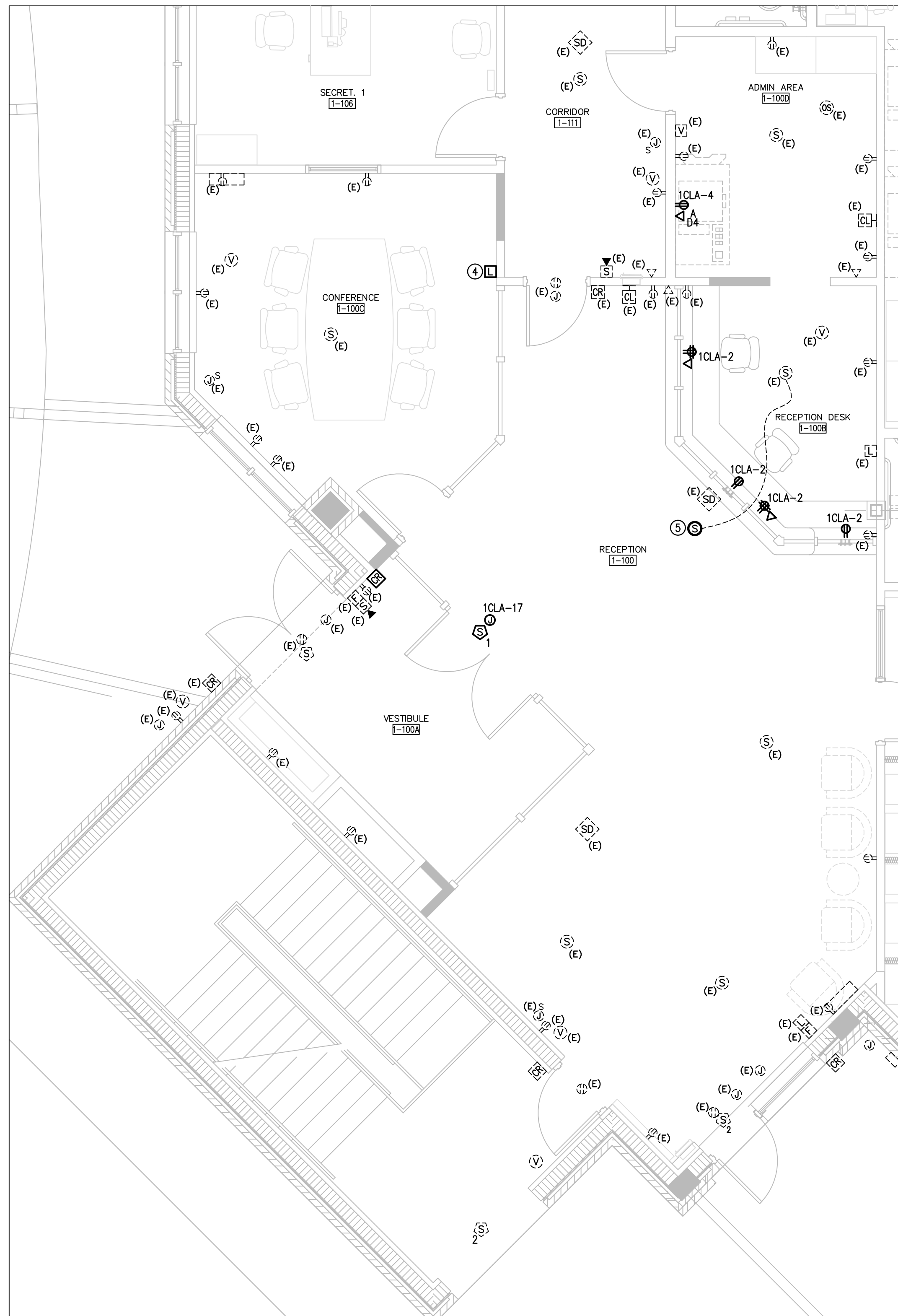
PLAN NOTES

- ① EXISTING COPY MACHINE TO BE RELOCATED. SEE NEW WORK PLAN SHEET E3.2.
- ② DISCONNECT AND REMOVE POWER AND DATA TO ACCOMMODATE REMOVAL OF EXISTING COUNTERS.
- ③ EXISTING DEVICES TO REMAIN UNLESS OTHERWISE NOTED.

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1 POWER AND SYSTEMS PLAN - NEW WORK
 E3.2 SCALE: 1/4" = 1'-0"

GENERAL NOTE
 FIELD VERIFY ALL EXISTING CIRCUITS TO BE REUSED PRIOR TO ROUGH-IN.

- PLAN NOTES**
- INTERCEPT AND EXTEND EXISTING POWER AND DATA FROM EXISTING COPIER LOCATION AND ROUTE TO NEW LOCATION SHOWN. CONNECT NEW OUTLETS TO EXISTING 120V CIRCUIT AND CONNECT DATA AS NECESSARY.
 - CONNECT NEW FIRE ALARM DEVICE TO EXISTING FIRE ALARM SYSTEM. ADD NAC PANEL BATTERY CAPACITY AS REQUIRED.
 - ADD NEW DATA DROP WITH 3/4" CONDUIT WITH PULL STRING ROUTED TO ACCESSIBLE CEILING SPACE.
 - CONNECT NEW FIRE ALARM DEVICE TO EXISTING FIRE ALARM SYSTEM. ADD NAC PANEL BATTERY CAPACITY AS REQUIRED.
 - PROVIDE AND INSTALL CEILING MOUNTED SPEAKER, CONNECT TO EXISTING SPEAKER AS REQUIRED.

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 16303 SW Farm Road
 Indiantown, Florida 34956
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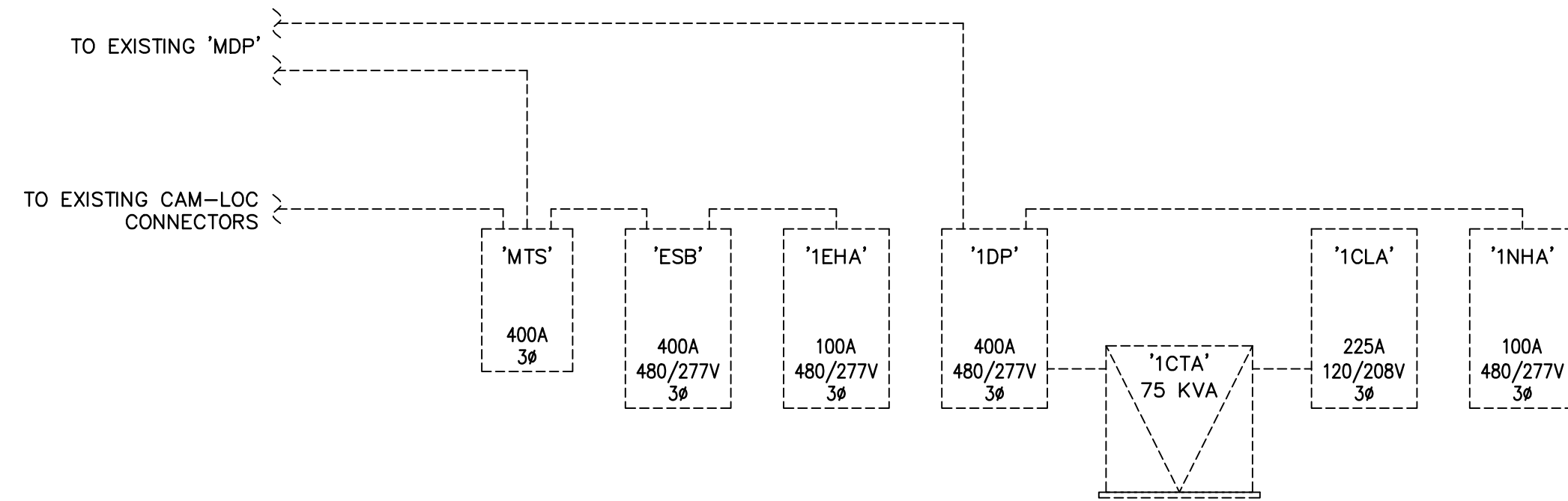
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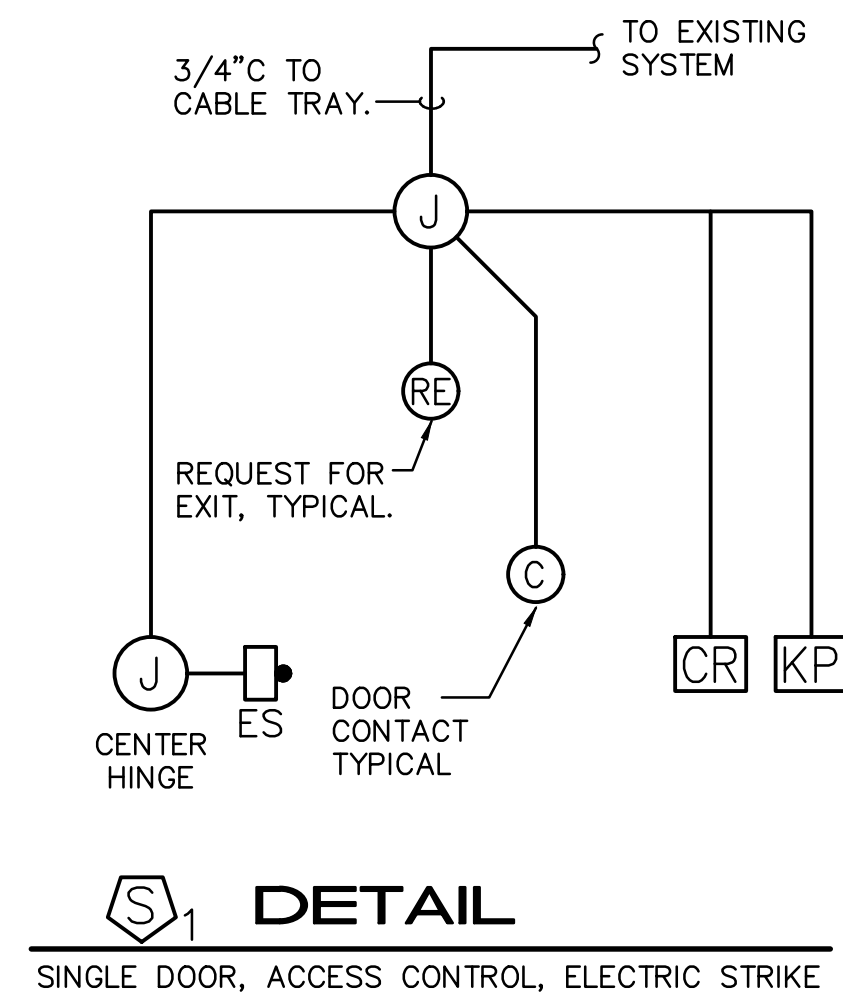
POWER AND SYSTEMS PLAN - NEW WORK

E3.2

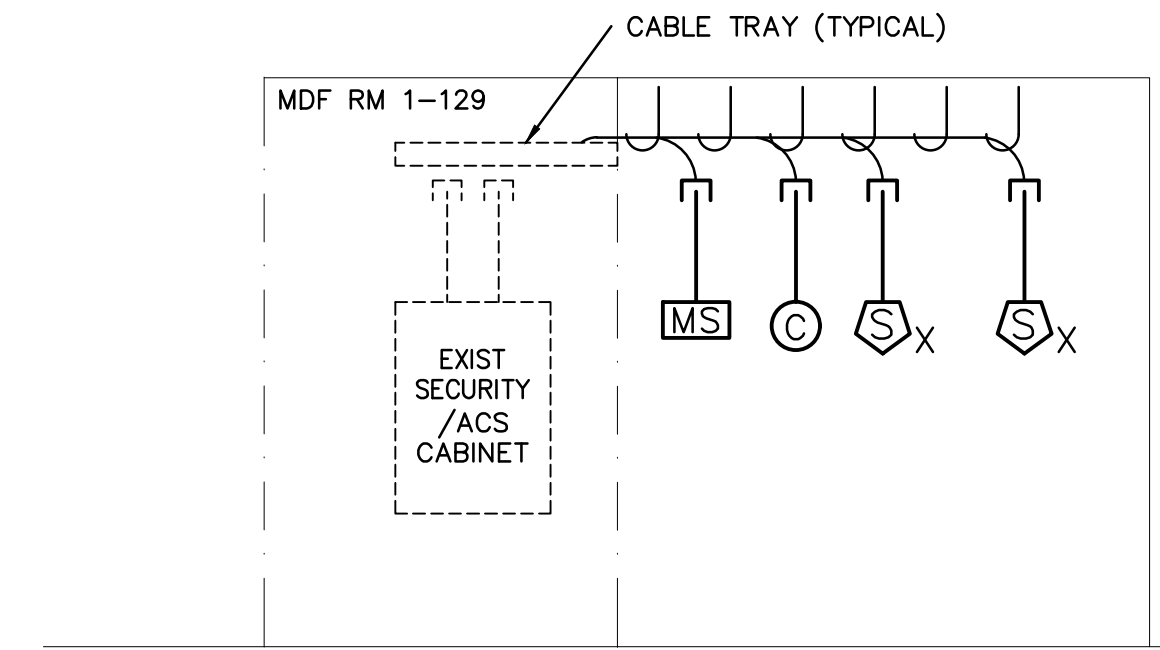


1 PARTIAL RISER DIAGRAM
E4.1

SCALE: NONE



2 ACCESS CONTROL DOOR DETAILS
E4.1



PANELBOARD SCHEDULE '1NHA'												
BUS KVA			LOAD			LOAD			BUS KVA			
A	B	C	POLES	TRIP	LOAD	LOAD	TRIP	POLES	LOAD	A	B	C
0.85			1	20	1	2	20	1	LIGHTING	0.95		
	0.37		1	20	3	4	20	1	LIGHTING		0.46	
		0.5	1	20	5	6	20	1	LIGHTING			0.21
0.36			1	20	7	8	20	1	LIGHTING		0.21	
	0.65		1	20	9	10	20	1	LIGHTING			0.25
		1.39	1	20	11	12	20	1	EXTERIOR LIGHTING			0.27
0.49			1	20	13	14	20	1	WALKWAY LIGHTING	0.3		
	0.57		1	20	15	16	20	1	SPARE			
		1	1	20	17	18	20	1	SPARE			
			1	20	19	20	20	1	SPARE			
			1	20	21	22	20	1	SPARE			
			1	20	23	24	20	1	SPARE			
			-	-	25	26	-	-	SPACE			
			-	-	27	28	-	-	SPACE			
			-	-	29	30	-	-	SPACE			
			-	-	31	32	-	-	SPACE			
			-	-	33	34	-	-	SPACE			
			-	-	35	36	-	-	SPACE			
			-	-	37	38	-	-	SPACE			
			-	-	39	40	30	3	SPD			
			-	-	41	42	-	-	SPACE			

RATED VOLTAGE: 480/277V 3 PHASE, 4 WIRE FEED IS (X) BOTTOM () TOP FROM '1DP'
 RATINGS IS TO BE 100 AMPS
 MAIN PROTECTION: MAIN LUGS ONLY
 BRANCH POLES: 42
 PANELBOARD IS () FUSED (X) BOLT IN CB TYPE
 ALL BREAKERS RATED: 35,000 AMPS, SYM RMS
 CONNECTED LOAD: 9 KVA
 $I = \frac{8830 VA}{480\sqrt{3}} = 10.6 A$

PANELBOARD SCHEDULE '1CLA'												
BUS KVA			LOAD			LOAD			BUS KVA			
A	B	C	POLES	TRIP	LOAD	LOAD	TRIP	POLES	LOAD	A	B	C
1.6			1	20	1	2	20	1	RECEPTACLES	1.6		
	1.6		1	20	3	4	20	1	RECEPTACLES		0.8	
		1.6	1	20	5	6	20	1	RECEPTACLES			1.6
1.6			1	20	7	8	20	1	RECEPTACLES	1.2		
	0.8		1	20	9	10	20	1	RECEPTACLES		1.6	
		0.8	1	20	11	12	20	1	RECEPTACLES			0.8
1.2			1	20	13	14	20	1	RECEPTACLES	1.2		
	1.6		1	20	15	16	20	1	RECEPTACLES		0.8	
		0.2	1	20	17	18	20	1	ACCESSES CONTROL			
			1	20	19	20	20	1	SPARE			
			1	20	21	22	20	1	SPARE			
			1	20	23	24	20	1	SPARE			
			1	20	25	26	20	1	SPARE			
			1	20	27	28	20	1	SPARE			
			1	20	29	30	20	1	SPARE			
			1	20	31	32	20	1	SPARE			
			1	20	33	34	20	1	SPARE			
			1	20	35	36	20	1	SPARE			
			1	20	37	38	-	-	SPACE			
			1	20	39	40	30	3	SPD			
			1	20	41	42	-	-	SPACE			

RATED VOLTAGE: 120/208V 3 PHASE, 4 WIRE FEED IS (X) BOTTOM () TOP FROM '1TC'
 RATINGS IS TO BE 225 AMPS
 MAIN PROTECTION: MAIN LUGS ONLY
 BRANCH POLES: 42
 PANELBOARD IS () FUSED (X) BOLT IN CB TYPE
 ALL BREAKERS RATED: 10,000 AMPS, SYM RMS
 CONNECTED LOAD: 21 KVA
 $I = \frac{20600 VA}{208\sqrt{3}} = 57.2 A$

PANELBOARD SCHEDULE '1EHA'												
BUS KVA			LOAD			LOAD			BUS KVA			
A	B	C	POLES	TRIP	LOAD	LOAD	TRIP	POLES	LOAD	A	B	C
0.09			1	20	1	2	20	1	LIGHTING	0.35		
	0.9		1	20	3	4	20	1	LIGHTING		0.25	
		0.42	1	20	5	6	20	1	LIGHTING			0.42
			1	20	7	8	20	1	SPARE			
			1	20	9	10	20	1	SPARE			
			1	20	11	12	20	1	SPARE			
			1	20	13	14	20	1	SPARE			
			1	20	15	16	20	1	SPARE			
			1	20	17	18	20	1	SPARE			
			1	20	19	20	20	1	SPARE			
			1	20	21	22	20	1	SPARE			
			1	20	23	24	20	1	SPARE			
			-	-	25	26	-	-	SPACE			
			-	-	27	28	-	-	SPACE			
			-	-	29	30	-	-	SPACE			
			-	-	31	32	-	-	SPACE			
			-	-	33	34	-	-	SPACE			
			-	-	35	36	-	-	SPACE			
			-	-	37	38	-	-	SPACE			
			-	-	39	40	30	3	SPD			
			-	-	41	42	-	-	SPACE			

RATED VOLTAGE: 480/277V 3 PHASE, 4 WIRE FEED IS (X) BOTTOM () TOP FROM 'ESB'
 RATINGS IS TO BE 100 AMPS
 MAIN PROTECTION: MAIN LUGS ONLY
 BRANCH POLES: 42
 PANELBOARD IS () FUSED (X) BOLT IN CB TYPE
 ALL BREAKERS RATED: 35,000 AMPS, SYM RMS
 CONNECTED LOAD: 2 KVA
 $I = \frac{2430 VA}{480\sqrt{3}} = 2.9 A$

1NHA	1CLA	1EHA
-------------	-------------	-------------

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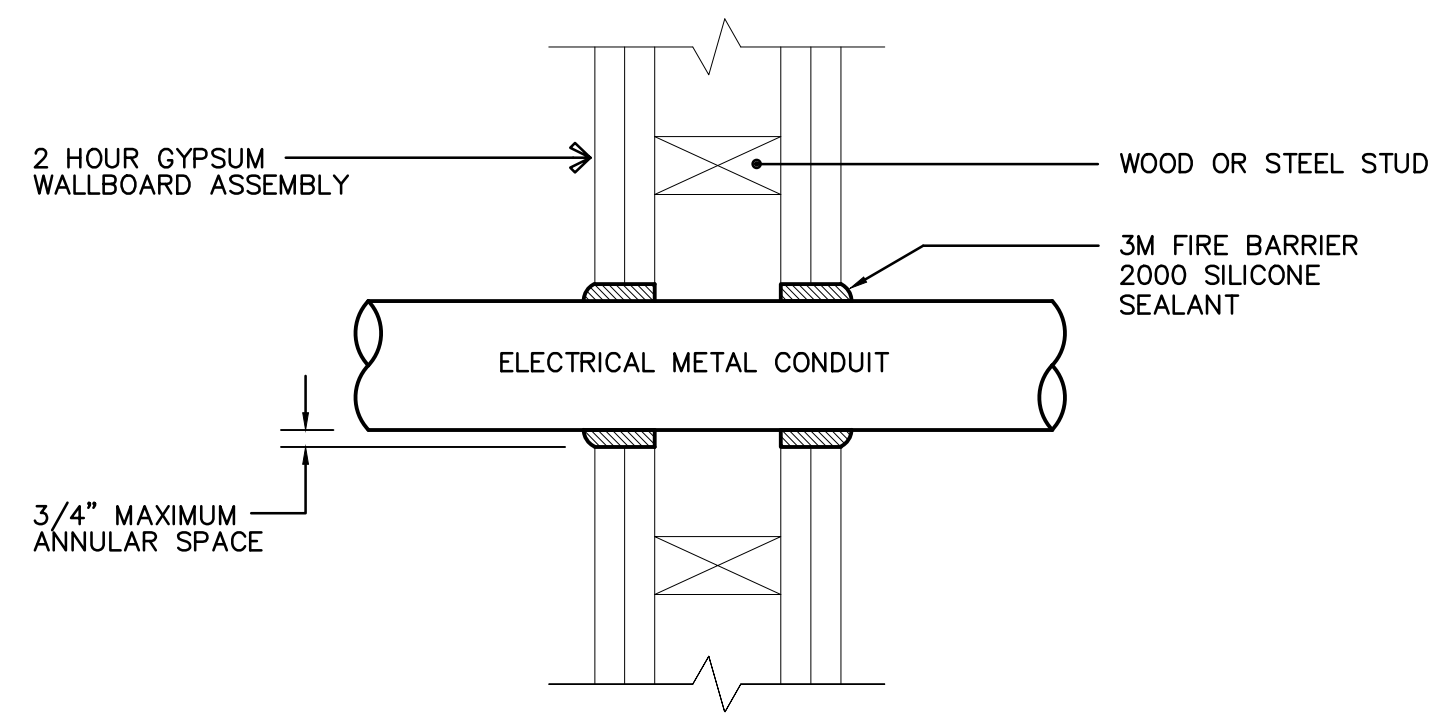
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Comm. No: 16025.19
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ELECTRICAL RISERS AND SCHEDULES
E4.1



1 CONDUIT PENETRATION THROUGH RATED GYPSUM WALL

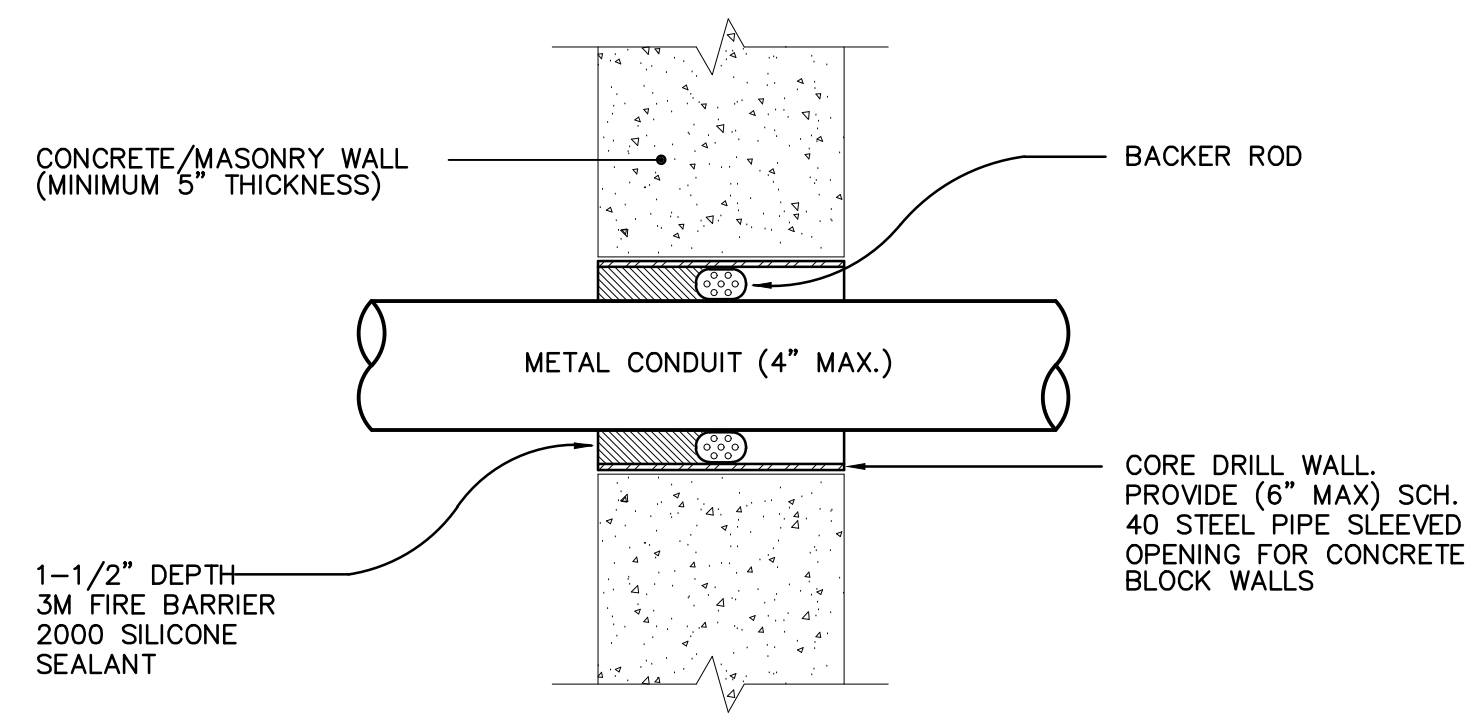
1
E5.1

(UL #W-L-1010)

SCALE: NONE

CONDUIT PENETRATION NOTES (GYPSUM):

1. MAXIMUM 3/4" ANNULAR SPACE.
2. INSTALL 3M FIRE BARRIER 2000 SILICONE SEALANT TO COMPLETELY FILL THE ANNULAR SPACE BETWEEN THE PIPE AND THE WALL ASSEMBLY. FILL TO THE FULL THICKNESS OF THE GYPSUM WALL (MINIMUM 1-1/4" SEALANT THICKNESS) PLUS AN ADDITIONAL 1/4" INCH CROWN AROUND THE PERIMETER OF THE CONDUIT.



2 CONDUIT PENETRATION THROUGH RATED CONCRETE/MASONRY WALL

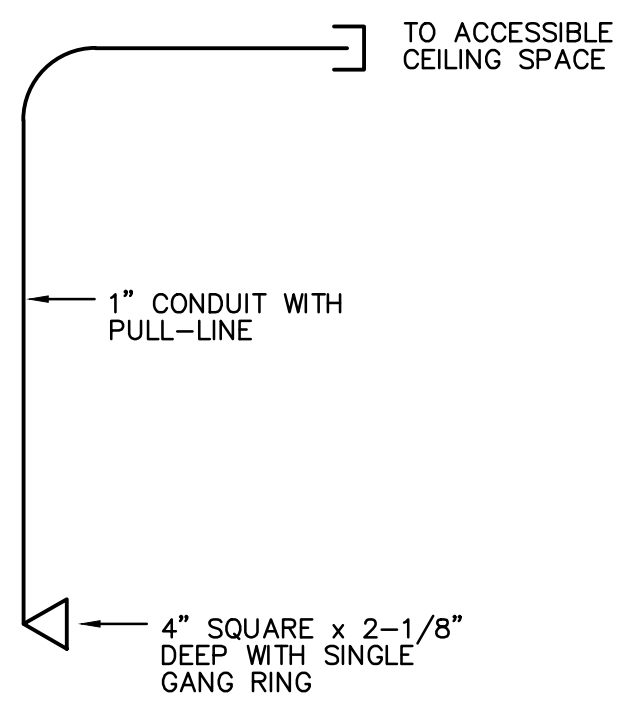
2
E5.1

(UL #C-AJ-1014)

SCALE: NONE

CONDUIT PENETRATION NOTES (CONCRETE/MASONRY):

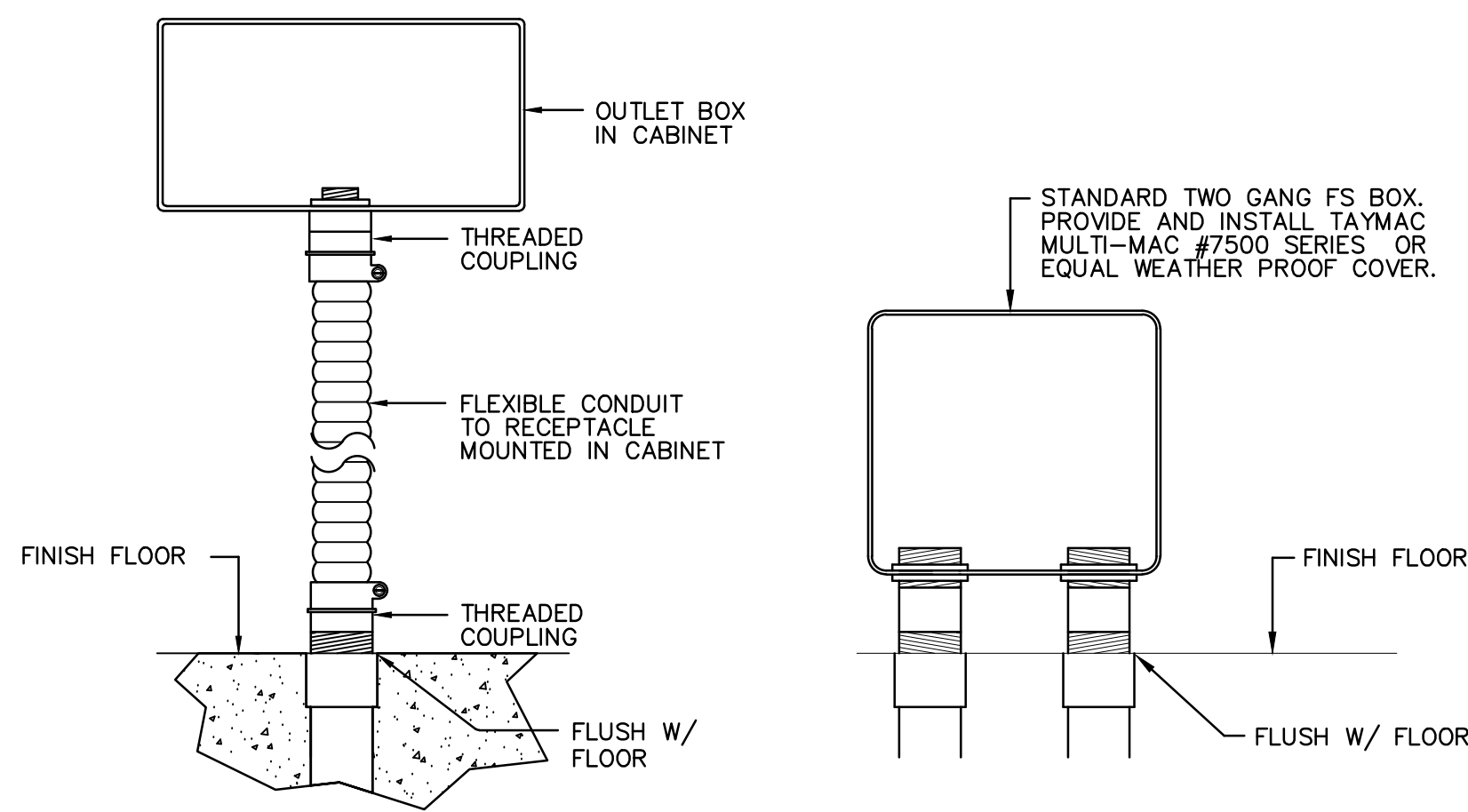
1. CORE DRILL FOR A MAXIMUM 6 INCH DIAMETER OPENING WITH MAXIMUM 6 INCH SCHEDULE 40 STEEL PIPE SLEEVED OPENING FOR CONCRETE BLOCK OR BRICK WALLS OR MAXIMUM 3/4 INCH ANNULAR SPACE.
2. INSTALL OPEN CELL POLYURETHANE BACKER ROD IN OPENING. RECESS 1-1/2 INCHES FROM WALL SURFACE.
3. INSTALL A MINIMUM OF 1-1/2 INCHES OF 3M FIRE BARRIER 2000 SILICONE SEALANT OVER BACKER ROD.



3 DATA OUTLET

3
E5.1

SCALE: NONE



4 OUTLET DETAILS

4
E5.1

SCALE: NONE

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ELECTRICAL
 DETAILS

E5.1

JLBD No. 120043

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ATTACHMENT C

J.D. PARKER ELEMENTARY SCHOOL

1010 East 10th Street, Stuart, FL 34996

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**PROJECT MANUAL
SPECIFICATIONS**



OWNER:

**MARTIN COUNTY SCHOOL
DISTRICT**

J.D. Parker Elementary School
Enhanced Security Project A2
1050 S.E. 10th Street, Stuart, Florida 34996

HJ COMM. NO: 16025.18

DATE OF ISSUE: JULY 23, 2020

HARVARD JOLLY, INC.

2047 VISTA PARKWAY, SUITE 100
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561-478-4457

HARVARD • JOLLY
ARCHITECTURE

PROJECT MANUAL SPECIFICATIONS

Martin County School District

J.D. Parker Elementary School

Enhanced Security Project A2

1050 S.E. 10th Street, Stuart, Florida 34996

HJ PROJECT. NO: 16025.18

DATE OF ISSUE: JULY 23, 2020

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West Palm Beach, Florida 33401
Phone: 561-689-2303

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NO SECTIONS IN THIS DIVISION.....	0
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DIVISION 32: EXTERIOR IMPROVEMENTS

32 00 00	SITE CLEARING/VEGETATION REMOVAL.....	3
32 13 13	CONCRETE SIDEWALKS.....	7

DIVISION 33: UTILITIES

NO SECTIONS IN THIS DIVISION.....	0
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DIVISION

1

GENERAL CONDITIONS

SECTION 01 10 00 – SUMMARY

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. The provisions of the General Conditions, Supplementary Conditions, Drawings, Specifications, and the Sections included under Division 1, General Requirements and References are included as a part of this Section as though bound herein.

1.2 SUMMARY

- A. Section Includes:
 - 1. Project information.
 - 2. Work covered by Contract Documents.
 - 3. Access to site.
 - 4. Coordination with occupants.
 - 5. Work restrictions.
 - 6. Specification and drawing conventions.
 - 7. Miscellaneous provisions.

1.3 PROJECT INFORMATION

- A. Project Identification: J.D. Parker Elementary School Enhanced Security Project A2.
 - 1. Project Location: 1050 East 10th Street, Stuart, Florida 34996
- B. Owner: Martin County School District, 1939 SE Federal Highway, Stuart, Florida 34994.
 - 1. Owner's Representative: Mark Sechrist; sechrim@martin.k12.fl.us; Phone: 772.219.1200 ext. 221
- C. Architect: Harvard Jolly Architecture.
- D. Architect's Consultants: The Architect has retained the following design professionals who have prepared designated portions of the Contract Documents:
 - 1. JLRD, Inc.
1450 Centrepark Blvd. Suite 350
West Palm Beach, Florida 33401
561-689-2303

1.4 WORK COVERED BY CONTRACT DOCUMENTS

- A. The Work of Project is defined by the Contract Documents and consists of the following:

1. Minor construction that consists of converting an exterior window to a storefront assembly door and building a new vestibule with impact resistant glass storefront assembly. A new reception desk shall be furnished and installed.

B. Type of Contract:

1. Project will be constructed under a single prime contract.

- C. In the event of conflicts between the Contractor Contract with the Owner and requirements as stipulated in Division 01 Requirements the Contractor /Owner Contract shall govern.

1.5 DOCUMENT PRIORITIES

- A. Anything shown on the drawings and not mentioned in the specifications or mentioned in the specifications and not shown on the drawings shall have the same effect as if shown or mentioned respectively in both.
- B. Detail drawings take precedence over general drawings. Any work shown on one drawing shall be construed to be shown in all drawings and the Contractor will coordinate the work and the drawings.
- C. If any portion of the Contract Documents shall be in conflict with any other portion, the various documents comprising the Contract Documents shall govern in the following order of precedence:
 1. The Owner-Contractor Agreement
 2. Modifications
 3. Addenda
 4. Supplementary Conditions
 5. General Conditions
 6. Specifications
 7. Drawings
 8. Between schedules and information given on Drawings, the schedules shall govern.
 9. Between figures given on Drawings and the scaled measurements, the figures shall govern.
 10. Between large-scale Drawings and small scale Drawings, the larger scale shall govern.
- D. Any such conflict or inconsistency between or in the drawings shall be submitted to the Design Consultant whose decision thereon shall be final and conclusive.

1.6 ACCESS TO SITE

- A. General: Contractor shall have limited use of Project site for construction operations as indicated on Drawings by the Contract limits and as indicated by requirements of this Section.
- B. Use of Site: Limit use of Project site to work in areas indicated. Do not disturb portions of Project site beyond areas in which the Work is indicated.

1. Driveways, Walkways and Entrances: Keep driveways parking areas and entrances serving premises clear and available to Owner, Owner's employees, and emergency vehicles at all times. Do not use these areas for parking or storage of materials.
 - a. Schedule deliveries to minimize use of driveways and entrances by construction operations.
 - b. Schedule deliveries to minimize space and time requirements for storage of materials and equipment on-site.
- C. Condition of Existing Building: Maintain portions of existing building affected by construction operations in a weathertight condition throughout construction period. Repair damage caused by construction operations.

1.7 COORDINATION WITH OCCUPANTS

- A. Full Owner Occupancy: Owner will occupy site and existing or adjacent building(s) during entire construction period. Cooperate with Owner during construction operations to minimize conflicts and facilitate Owner usage. Perform the Work so as not to interfere with Owner's day-to-day operations. Maintain existing exits unless otherwise indicated.
 1. Maintain access to existing walkways, corridors, and other adjacent occupied or used facilities. Do not close or obstruct walkways, corridors, or other occupied or used facilities without written permission from Owner and approval of authorities having jurisdiction.
 2. Notify Owner not less than 72 hours in advance of activities that will affect Owner's operations.

1.8 WORK RESTRICTIONS

- A. Work Restrictions, General: Comply with restrictions on construction operations.
- B. Comply with limitations on use of public streets and with other requirements of authorities having jurisdiction.
- C. On-Site Work Hours: Limit work to normal business working hours of 7:00 a.m. to 5:00 p.m., Monday through Friday, unless otherwise indicated.
- D. Existing Utility Interruptions: Do not interrupt utilities serving facilities occupied by Owner or others unless permitted under the following conditions and then only after providing temporary utility services according to requirements indicated:
 1. Notify and obtain written permission from the Architect not less than 72 hours in advance of proposed utility interruptions.
- E. Noise, Vibration, and Odors: Coordinate operations that may result in high levels of noise and vibration, odors, or other disruption to Owner occupancy with Owner.

1. Notify and obtain written permission from the Architect not less than 72 hours in advance of proposed disruptive operations.
- F. Controlled Substances: Use of tobacco products and other controlled substances on Project site is not permitted.
- G. Employee Identification: Provide identification tags for Contractor personnel working on Project site. Require personnel to use identification tags at all times.
- H. Employee Screening: Comply with requirements for drug and background screening of Contractor personnel working on Project site.
 1. Maintain list of approved screened personnel with Owner's representative.

1.9 SPECIFICATION AND DRAWING CONVENTIONS

- A. Division 01 General Requirements: Requirements of Sections in Division 01 apply to the Work of all Sections in the Specifications.
- B. Drawing Coordination: Requirements for materials and products identified on Drawings are described in detail in the Specifications. One or more of the following are used on Drawings to identify materials and products:
 1. Terminology: Materials and products are identified by the typical generic terms used in the individual Specifications Sections.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION (Not Applicable)

END OF SECTION 01 10 00

SECTION 01 25 13
PRODUCT SUBSTITUTION PROCEDURES

PART 1 GENERAL

1.1 SCOPE OF WORK

- A. Administrative and procedural requirements for consideration of request for substitution during the design and construction phases.
- B. Substitution Request Form.

1.2 REFERENCES

- A. Section 01 33 00 – Submittal Procedures.
- B. Section 01 42 00 – References.
- C. Section 01 45 00 – Quality Control.
- D. Section 01 78 00 – Closeout Submittals.

1.3 SUBMITTAL PROCEDURES

- A. Transmit each substitution request on company letterhead with completed Form 01 25 00 A. Form is as indicated in Para. 3.02.
 - 1. During bidding phase, substitution requests shall be directed to Project Architect.
 - 2. During construction phase substitution requests shall be directed to Contractor/CM.
- B. Substitution Form shall identify project, Contractor/CM and Architect during bidding phase plus Subcontractor or supplier during construction phase indicating Specification Section and Paragraph number of specified material and pertinent drawing and detail numbers, as appropriate.
- C. Include complete information as required in the Substitution Form. Incomplete information will result in automatic rejection of the substitution request.
- D. Apply contractor's stamp, signed or initialed certifying that review, approval, verification of products required, field dimensions, adjacent construction work, and coordination of information are in accordance with the requirements of the work and contract documents.
- E. Schedule submittals to expedite the project, and deliver to Architect or Contractor/CM at business address. Coordinate submission of related items.
- F. For each submittal for review, allow 15 days excluding delivery time to and from Architect or CM/Contractor.
 - 1. Identify variations from contract documents and product or system limitations, which may be detrimental to successful performance of the completed work.
 - 2. Provide space for Contractor/CM and Architect review stamps.
 - 3. When revised for resubmission, identify all changes made since previous submission.
 - 4. Distribute copies of reviewed submittals as appropriate. Instruct parties to promptly report any inability to comply with requirements.
 - 5. Submittals not requested will not be recognized or processed.

1.4 SUBSTITUTION REQUESTS

- A. Requests for substitutions shall be made not later than ten (10) calendar days prior to bid date by prospective bidders, or time set by Owner for receipt of GMP (Guaranteed Maximum Price) from CM. Requests received after the above dates may not be considered.

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PART 2 PRODUCTS

2.1 Not Used.

PART 3 EXECUTION

3.1 FORM EXECUTION

- A. Contractor/CM shall submit Product Substitution Request on Form 01 25 00A on following page with transmittal letter and self-addressed stamped envelope for Architect's use in returning response to substitution request.

3.2 SUBSTITUTION FORM 01 25 13A - PRODUCT SUBSTITUTION REQUEST

A. Specified Product _____

B. Sheet No./Specification Section and Paragraph _____

C. Contractor/CM has reviewed and approved proposed substitution?

Yes _____ No _____

D. Requested Product Substitution: _____

E. Does Product Meet or Exceed Specified Product Requirements? Yes ___ No ___
(If answer is no, explain.) _____

F. Does Product Substitution affect dimensions shown on Drawings? Yes ___ No ___
(If answer is no, explain.) _____

G. Reason for Requested
Substitution: _____

H. Cost Difference between Product Specified and Product Proposed:
Add \$ _____ Subtract \$ _____

I. Electrical Requirements equal to Specified Product: Yes ___ No ___ N/A ___
(If No or N/A,
explain): _____

J. Plumbing Requirements equal to Specified Product: Yes ___ No ___ N/A ___
(If No or N/A,
explain): _____

K. Mechanical Requirements equal to Specified Product: Yes ___ No ___ N/A ___
(If No or N/A,
explain): _____

L. Does the Product Substitution have any effect on other trades? Yes ___ No ___
(If yes, explain): _____

M. Contractor/CM agrees to pay for changes in building design, including engineering and
detailing costs, caused by requested product substitution. Yes ___ No ___

N. Signature of Bidder/Contractor/CM shall indicate function, appearance and quality of proposed
substitution is equivalent or superior to specified item.

O. Contractor/CM assumes responsibility for delay or claims arising from review and evaluation of
requested product substitution.

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P. Approval of proposed substitution shall have no effect on coordination and installation of work in accord with contract documents.

Submitted by:

For Use by the Architect and Owner:

Contractor/CM

_____ Received Too Late

Firm

_____ Not Accepted

_____ Approved As Noted

Submittal of Information in
Accord with this Section

_____ Approved For Bidding Only,
Final Approval Contingent Upon Address

Date

Architect

Date

Owner

Date

END OF SECTION

SECTION 01 29 00
PAYMENT PROCEDURES

PART 1 GENERAL

1.1 SCOPE OF WORK

- A. Procedures for preparation and submittal of Applications for Payment.
- B. Unit pricing shall be in conformance with 2007 Edition of AIA A201 General Conditions of the Contract and as amended by Owner on July 13, 2009. Copy is included in Division 1, Section 00 72 00 – General Conditions.

1.2 RELATED SECTIONS

- A. Section 01 22 00 – Unit Prices.
- B. Section 01 33 00 – Submittal Procedures.
- C. Section 01 78 00 – Closeout Submittals.

1.3 FORMAT

- A. Payment format shall in accord with AIA G702 - Application and Certificate for Payment and AIA G703 - Continuation Sheets.
- B. Contractor/CM's AIA G702/703 equivalent forms including continuation sheets may be substituted for AIA Payment Forms if preapproved by Owner's Project Manager.

1.4 PREPARATION OF APPLICATIONS

- A. Present handwritten pre-application draft payment forms to Owner for review before submitting applications for payment.
- B. After revising draft payment forms, prepare and submit six typewritten copies or on electronic media printout Pay Application as preapproved by Owner.
- C. Execute certification by signature of authorized officer.
- D. Use data from Owner preapproved Schedule of Values. Provide dollar value in each column for each line item for portion of work performed and for stored products.
- E. List each authorized Change Order as extension on AIA G703 - Continuation Sheet, listing Change Order number and dollar amount as for original item of Work.
- F. Prepare Application for Final Payment as specified in Section 01 78 00 – Closeout Submittals.

1.5 SUBMITTAL PROCEDURES

- A. Submit six copies of each Application for Payment.
- B. Submit an updated construction schedule with each Application for Payment.
- C. Payment Period: Submit at monthly intervals not later than the fifteenth of the month unless otherwise stipulated in the Agreement.
- D. Submit Release of Liens waivers with each Application for Payment.

1.6 SUBSTANTIATING DATA

- A. When Architect or Owner requires substantiating information, submit data justifying dollar amounts.
- B. Provide one copy of data with cover letter for each copy of submittal. Show application number and date, and line item by number and description.
- C. Include following data with application.
 - 1. Partial release of liens from major subcontractors and vendors.
 - 2. Affidavits attesting to off-site stored products.
 - 3. Construction progress schedule, revised and corrected to reflect project status at time of payment application.

1.7 PAYMENTS

- A. Payments may be made for materials stored off-site if preapproved by Owner's Project Manager and off-site facility is insured and bonded air conditioned warehouse, and only if project site doesn't allow storage or protection for equipment and supplies.
- B. Payments will normally be made to Contractor/CM by 10th of each month, if copies are preapproved by Owner's Project Manager and received by 25th of previous month, unless otherwise stipulated in Agreement.

PART 2 PRODUCTS (Not Used)

PART 3 EXECUTION (Not Used)

END OF SECTION

SECTION 01 31 00
PROJECT MANAGEMENT AND COORDINATION

PART 1 GENERAL

1.1 SCOPE OF WORK

- A. Project management, coordination of construction activities, interface with Owner's staff for existing facilities and project conditions related to project for new and existing facilities.
- B. Meetings for field engineering and project coordination, preconstruction, construction procedures, pay application and progress meetings, pre installation and project closeout meetings.
- C. Site mobilization, materials and equipment storage, site cleanup and demobilization.

1.2 RELATED SECTIONS

- A. Section 01 25 13 – Product Substitution Procedures.
- B. Section 01 29 00 – Payment Procedures.
- C. Section 01 33 00 – Submittal Procedures.
- D. Section 01 35 53 – Security.
- D. Section 01 42 00 – References.
- E. Section 01 45 00 – Quality Control.
- F. Section 01 66 00 – Project Storage and Handling Requirements.
- G. Section 01 78 00 – Closeout Submittals.
- H. Section 01 91 00 – Commissioning.

1.3 COORDINATION AND PROJECT CONDITIONS

- A. Coordinate scheduling, submittals, and to ensure efficient and orderly sequence of installation of interdependent construction elements, with provisions for accommodating Owner's occupancy of completed portions of project or existing building on site, and items to be furnished or installed by Owner.
- B. Verify utility requirements and characteristics of operating equipment are compatible with building utilities. Coordinate work of various sections having interdependent responsibilities for installing, connecting to, and placing in service, such equipment.
- C. Coordinate space requirements, supports and installation of mechanical and electrical work that is indicated diagrammatically on Drawings. Follow routing shown for pipes, ducts, and conduit, as closely as practicable; place runs parallel with line of building. Utilize spaces efficiently to maximize accessibility for other installations, for maintenance, and for repairs.
- D. In finished areas, except as otherwise indicated, conceal pipes, ducts, and wiring within the construction. Coordinate locations of fixtures and outlets with finish elements.
- E. In finished areas with exposed ceilings, piping and conduits shall either concealed or be run at right angles and be attached to underside of floor or deck above. Wiring shall not be exposed. Exposed ductwork shall be painted spiral duct.
- E. Coordinate completion and clean up of Work of separate sections in preparation for Substantial Completion and for portions of Work designated for Owner's partial occupancy.
- F. After Owner occupancy of premises, coordinate access to site for correction of defective Work and Work not in accord with Contract Documents, to minimize disruption of Owner's activities.

- G. Owner will not consider change orders for extra work required by Contractor due to his inadequate coordination.

1.4 FIELD ENGINEERING FOR PROJECT LAYOUT

- A. Employ Land Surveyor registered in State of Florida acceptable to Owner's Project Manager.
- B. Locate and protect survey control and reference points.
- C. Control datum for survey is that established by Owner's provided survey.
- D. Verify setbacks and easements; confirm drawing dimensions and elevations.
- E. Provide field engineering services. Establish elevations, lines, and levels, utilizing recognized engineering survey practices.
- F. Submit copy of site drawing and certificate signed by Land Surveyor that elevations and locations of Work are in accord with Contract Documents.

1.5 FLOOR SLAB VERIFICATION SURVEY

- A. Separate from Field Engineering noted above, Contractor/CM shall provide topographic survey of building floor slabs on grade to indicate that finish floor elevations and slab locations are per contract documents, water management and building department requirements.
- B. Survey shall be submitted upon completion of slabs on grade. Remaining work shall not proceed until Owner's Project Manager has reviewed survey information and verified that floor slabs are constructed at proper elevation and locations.
- C. Survey shall be prepared, signed and sealed by Florida licensed surveyor, other than the surveyor noted in Para. 1.04 Field Engineering.
- D. Surveyor shall be selected from one of Owner's annual surveying vendors. List may be obtained from Owner's Project Manager.

1.6 PRECONSTRUCTION MEETING

- A. Owner's Project Manager will schedule pre construction conference after Notice to Proceed.
- B. Attendance Required: Owner, Architect, and Contractor/CM.
- C. Agenda:
 - 1. Execution of Owner-Contractor Agreement, if not executed.
 - 2. Submission of executed bonds and insurance certificates.
 - 3. Distribution of Contract Documents.
 - 4. Submission of list of Subcontractors, list of Products, schedule of values, and progress schedule.
 - 5. Designation of personnel representing the parties in Contract, and Architect.
 - 6. Procedures and processing of field decisions, submittals, substitutions, applications for payments, proposal request, Change Orders and Contract closeout procedures.
 - 7. Scheduling.
 - 8. Scheduling activities of Geotechnical Engineer.
 - 9. Issuance of Notice to Proceed.
- D. Record minutes and distribute copies within two days after meeting to participants, with copies to Architect, Owner, participants, and those affected by decisions made.

1.7 SITE MOBILIZATION MEETING

- A. Owner will schedule meeting at Project site prior to Contractors start of work.

- B. Attendance Required: Owner, Architect, Special Consultants, and Contractor, Contractor's Superintendent, and major Subcontractors.
- C. Agenda:
 - 1. Use of premises by Owner and Contractor.
 - 2. Owner's requirements and partial occupancy.
 - 3. Construction facilities and controls provided by Owner.
 - 4. Temporary utilities provided by Owner.
 - 5. Survey and building layout.
 - 6. Security and housekeeping procedures.
 - 7. Schedules.
 - 8. Application for payment procedures.
 - 9. Procedures for testing.
 - 10. Procedures for maintaining record documents.
 - 11. Requirements for start-up of equipment.
 - 12. Inspection and acceptance of equipment put into service during construction period.
- D. Record minutes and distribute copies within two days after meeting to participants, with copies to Architect, Owner, participants, and those affected by decisions made.

1.8 PROGRESS MEETINGS

- A. Schedule and administer meetings throughout progress of work at weekly intervals. Less frequent meetings may be requested for projects or work stages if requested in writing to the Owner's Project Manager.
- B. Make arrangements for meetings, prepare agenda with copies for participants, and preside meetings.
- C. Attendance Required: Job superintendent, major Subcontractors and suppliers, Owner's Project Manager, Architect, as appropriate to agenda topics for each meeting.
- D. Agenda:
 - 1. Review minutes of previous meetings.
 - 2. Review previous Work progress.
 - 3. Field observations, problems, and decisions.
 - 4. Identification of problems that impede planned progress.
 - 5. Review of submittals schedule and status of submittals.
 - 6. Review of off-site fabrication and delivery schedules.
 - 7. Maintenance of progress schedule.
 - 8. Corrective measures to regain projected schedules.
 - 9. Planned progress schedule during succeeding work period.
 - 10. Coordination of projected progress.
 - 11. Maintenance of quality and work standards.
 - 12. Effect of proposed changes on progress schedule and coordination.
 - 13. Other business relating to work.
- E. Record minutes and distribute copies within two days after meeting to participants, with copies to Architect, Owner, participants, and those affected by decisions made.

1.9 PREINSTALLATION MEETINGS

- A. When required in individual specification section, convene pre-installation meeting at site prior to commencing work of section.
- B. Require attendance of parties directly affecting, or affected by, work of specific section.
- C. Notify Owner and Architect five working days in advance of meeting date.

- D. Prepare agenda and preside at meeting:
 - 1. Review conditions of installation, preparation and installation procedures.
 - 2. Review coordination with related work.
- E. Record minutes and distribute copies within two days after meeting to participants, with copies to Architect, Owner, participants, and those affected by decisions made.

PART 2 PRODUCTS

2.1 EQUIPMENT ELECTRICAL CHARACTERISTICS AND COMPONENTS

- A. Motors: Refer to Electrical Sections for specific motor types.
- B. Wiring Terminations: Provide terminal lugs to match branch circuit conductor quantities, sizes, and materials indicated. Size terminal lugs to NFPA 70, include lugs for terminal box.
- C. Cord and Plug: Provide minimum 6' cord and plug including grounding connector for connection to electric wiring system. Cord of longer length is specified in individual specification sections.

PART 3 EXECUTION

3.1 EXISTING BUILDING PROJECT PROCEDURES

- A. Materials: As specified in Product sections; match existing Products and work for patching and extending work.
- B. Employ skilled and experienced installer to perform alteration work.
- C. Close openings in exterior surfaces to protect existing work from weather and extremes of temperature and humidity.
- D. Remove, cut and patch Work in manner to minimize damage and to provide means of restoring Products and finishes to original or specified condition.
- E. Refinish existing visible surfaces to remain in renovated rooms and spaces, to specified condition for each material, with neat transition to adjacent finishes.
- F. Where new Work abuts or aligns with existing, provide smooth and even transition. Patch Work to match existing adjacent Work in texture and appearance.
- G. When finished surfaces are cut so that a smooth transition with new Work is not possible, terminate existing surface along a straight line at natural line of division and submit recommendation to Architect for review.
- H. Where change of plane of 1/4" or more occurs, submit recommendation for providing a smooth transition to Architect for review.
- I. Patch or replace portions of existing surfaces, which are damaged, lifted, discolored, or showing other imperfections.
- J. Work that penetrates fire or smoke rated partitions or floors shall be repaired to provide original fire or smoke rating.
- K. Finish surfaces as specified in individual Product Specification Sections.

END OF SECTION

SECTION 01 32 16
CONSTRUCTION PROJECT SCHEDULE

PART 1 GENERAL

1.1 SCOPE OF WORK

- A. Preparation of preliminary Construction Schedule, Contractor's/CM/GC final master Construction Schedule, hereinafter called the Construction Schedule, Short Interval Schedules (look ahead), and monthly updates.
- B. Scope of work and project completion are as indicated. Bidders shall include with their bid, a proposed project schedule indicating each item of work in CSI numbering format showing each work division in CPM (Critical Path Method) work sequencing. Schedule shall base critical path on Owner's providing pre purchase of long lead items, and assuming that those products and services are delivered to the Contractor/CM on time for meeting proposed project schedule.

1.2 SUBMITTALS

- A. Submit schedule in accord with Section 01 33 00 – Submittal Procedures.
- B. Preliminary Project Schedule:
 - 1. Purpose of preliminary schedule is to determine Bidder's intent as to how work can be prosecuted to allow project completion in specified time frame.
 - 2. Bidder's shall comply with "The Use of CPM in Construction – A Manual for General Contractors" published by Associated General Contractors of America, Inc. Schedules shall utilize nationally recognized scheduling format such as Primavera or Microsoft Project. Software version selected shall be compatible with Owner's Microsoft Word or Office software so that schedule can be reviewed and saved in Owner's computer system.
 - 3. Schedule shall be on 11" x17" paper indicating project activities, duration, start and finish dates of each activity, float or slack time, critical path, and total number of days for project.
 - 4. Include float or slack time in Schedule. Float is defined as amount of time between earliest start date and latest start date or days between earliest end date and latest end date.
 - 5. Construction schedule shall begin based on Owner's intent to issue Notice to Proceed Letter to Contractor/CM and be completed within "x" Calendar Days from NTP. Substantial Completion is "date", with "x" calendar days to Final Completion or "date".
 - 6. Preliminary Project Schedule shall be submitted with Bid Proposal. Failure to do so will be grounds for rejection of the Bid Proposal.

1.3 COORDINATION AND PROJECT CONDITIONS

- A. Bidders are responsible for verification of existing conditions to the extent that they are observable and can be inferred by visual inspection.
- B. Verify utility requirements and characteristics of operating equipment are compatible with building utilities. Coordinate work of various sections having interdependent responsibilities for installing, connecting to, and placing in service, such equipment.

- C. Coordinate space requirements, supports and installation of mechanical and electrical work that is indicated diagrammatically on Drawings. Follow routing shown for pipes, ducts, and conduit, as closely as practicable; place runs parallel with line of building. Utilize spaces efficiently to maximize accessibility for other installations, for maintenance, and for repairs.
- D. In finished areas, except as otherwise indicated, conceal pipes, ducts, and wiring within the construction. Coordinate locations of fixtures and outlets with finish elements.
- E. In finished areas with exposed ceilings, piping and conduits shall either concealed or painted and be run at right angles, and attached to underside of floor or deck above. Wiring shall not be exposed. Exposed ductwork shall be painted.
- F. Coordinate scheduling to allow time for submittals, Owner's approval, Building Dept. review, permitting and inspections to ensure efficient and orderly sequence of installation of interdependent construction elements. Schedule shall provide for accommodating Owner's occupancy of other buildings on site, and items to be furnished or installed by Owner.
- G. Owner will not consider change orders for extra work required by Contractor due to his inadequate coordination.

PART 2 – NOT USED

PART 3 – NOT USED

END OF SECTION

SECTION 01 33 00
SUBMITTAL PROCEDURES

PART 1 GENERAL

1.1 SCOPE OF WORK

- A. Administrative and procedural requirements for processing of submittals during construction process. Submittals may include the following:
1. Proposed Products Lists.
 2. Proposed Vendor List.
 3. Product Data.
 4. Shop Drawings.
 5. Samples.
 6. Design Data.
 7. Field Test Reporting.
 8. Quality Control Reporting.
 9. Certificates.
 10. Manufacturer's Installation, Handling and Storage Instructions.
 11. Manufacturer's Field Reports.
 12. Erection Drawings.
 13. Closeout Documents
 14. Warranties.
 15. Scheduling of Work.
 16. Construction Progress Schedule.
 17. Submittals Schedule.
 18. Survey and Layout Data.
 19. Construction Progress Reporting.
 20. Periodic Work Observation.
 21. Photographic Documentation.
 22. Purchase Order Tracking.
 23. Operation and Maintenance Documentation.

1.2 RELATED SECTIONS

- A. Section 01 29 00 – Payment Procedures.
- B. Section 01 31 12 – Project Coordination.
- C. Section 01 42 00 – References.
- D. Section 01 45 00 – Quality Control.
- E. Section 01 66 00 – Product Storage and Handling Requirements.
- F. Section 01 78 00 – Closeout Submittals.

1.3 SUBMITTAL PROCEDURES

- A. Submittal Procedures shall be in conformance with AIA A201 General Conditions of the Contract and as amended by Owner on July 13, 2009. Copy is included in Division 1, Section 00 72 00 – General Conditions.
- B. Transmit each submittal with AIA Form G810-2001 or Owner's Standard Transmittal form.
- C. Sequentially number each transmittal forms. Revise submittals with original number and a sequential alphabetic suffix.

- D. Identify project, Contractor/CM, subcontractor or supplier pertinent drawing and detail number, and specification section number, as appropriate.
- E. Apply Contractor/CM's stamp, signed or initialed certifying that review, approval, verification of products required, field dimensions, adjacent construction work, and coordination of information are in accord with requirements of the work and contract documents.
- F. Schedule submittals to expedite the project and deliver to Engineer and Contractor/CM at business address. Coordinate submission of related items.
- G. For each submittal for review, allow 15 days excluding delivery time to and from the Contractor/CM.
- H. Identify variations from contract documents and product or system limitations, which may be detrimental to successful performance of the completed work.
- I. Provide space for Contractor/CM and Engineer review stamps.
- J. When revised for resubmission, identify all changes made since previous submission.
- K. Distribute copies of reviewed submittals as appropriate. Instruct parties to promptly report any inability to comply with requirements.
- L. Submittals not requested will not be recognized or processed.

1.4 PROPOSED PRODUCTS LIST

- A. Within 15 work days after date of Notice to Proceed, submit list of major products proposed for use, with name of manufacturer, trade name, and model number of each product.
- B. For products specified only by reference standards, give manufacturer, trade name, model or catalog designation, and reference standards.

1.5 PRODUCT DATA

- A. Product Data for Review:
 - 1. Submit to Engineer for review for purpose of checking for conformance with information given and design concept expressed in Contract Documents.
 - 2. After review, provide copies and distribute per Submittal Procedures article above and for record documents purposes described in Section 01 78 00 – Closeout Submittals.
- B. Product Data for Information:
 - 1. Submittal for Engineer's knowledge as contract administrator or for Owner.
- C. Product Data for Project Close-out:
 - 1. Submit for Owner's benefit during and after project completion.
- D. Submit number of copies required by Contractor/CM plus two copies for transmittal to Engineer and two copies for transmittal to Owner's Project Manager.
- E. Mark each copy to identify applicable products, models, options, and other data.
- G. Supplement manufacturers' standard data to provide information unique to project.
- H. Indicate product utility and electrical characteristics, utility connection requirements, and location of utility outlets for service for functional equipment and appliances.
- I. After review, distribute in accord with Submittal Procedures article above and provide copies for record documents described in Section 01 78 00 - Closeout Documents.

1.6 CONSTRUCTION SUBMITTALS

- A. Submit one copy of Building Permit, Site Permits, Environmental Permits, or other permits required for construction of work.
- B. Submit Payment Applications to Engineer for review for purpose of checking conformance with information given and design concept expressed in Contract Documents.

- C. Shop Drawings: Provide following information:
 - 1. Fabrication and installation Drawings and details.
 - 2. Template placement diagrams.
 - 3. Manufacturer's installation instructions.
 - 4. Product patterns and colors.
 - 5. Coordination Drawings.
 - 6. Schedules.
 - 7. Product mix formulae.
 - 8. Product design or engineering calculations.
 - 9. Other information as required by project.
 - 10. After review, produce copies and distribute per Submittal Procedures article above and for record documents purposes described in Section 01 78 00 – Closeout Submittals.
 - 11. Submit to Engineer for purpose of checking conformance with information given and design concept and Owner's Project Manager.
- D. Project Closeout Documents:
 - 1. Indicate special utility and electrical characteristics, utility connection requirements, and location of utility outlets for service for functional equipment and appliances.
 - 2. Submit number of copies required by Contractor, plus one copy for Engineer and two copies for Owner.
 - 3. Submit to Engineer for Owner's benefit during and after project completion.
 - a. Indicate special utility and electrical characteristics, utility connection requirements, and location of utility outlets for service for functional equipment and appliances.
 - b. Submit one copy and one reproducible copy required by Contractor/CM, plus one copy for Engineer and two copies for Owner.
- E. Product Samples
 - 1. Submit to Engineer for purpose of checking conformance with information given and design concept expressed in the documents.
 - 2. After review, Engineer shall submit color board to Owner's Project Manager per Submittal Procedures.
 - 3. Sample finishes and colors shall be from full range of manufactures' standard colors, textures, and patterns for Engineer's selection and preparation of color board for Owner's approval.
 - 4. After review and approval by Owner, provide duplicates and distribute per Submittal Procedures.
 - 5. Submit samples to illustrate functional and aesthetic characteristics of the product, with integral parts and attachment devices. Coordinate sample submittals for interfacing work.
 - 6. Include identification on each sample, with full project information.
 - a. Submit number of samples specified in specification, one of which Engineer shall retain.
 - b. Reviewed samples may be used in work, if indicated.
- F. Product Design Data and Test Reports:
 - 1. Submit to Engineer as contract administrator and for Owner's Project Manager for purpose of checking conformance with information given and completed work on project.
- G. Certificates:
 - 1. When specified, submit certification by manufacturer, installation/application subcontractor, or contractor to Engineer, in quantities specified for Product Data.
 - 2. Indicate material or Product conforms to or exceeds specified requirements.
 - 3. Submit supporting reference date, affidavits, and certifications as appropriate.
 - 4. Certificates may be recent or previous test results on material or Product, but must be acceptable to Engineer.

H. Manufacturer's Instructions:

1. When specified, submit printed instructions for delivery, storage, assembly, installation, start-up, adjusting, and finishing, to Engineer for delivery to Owner in quantities specified for Product Data.
2. Indicate special procedures, perimeter conditions requiring special attention, and special environmental criteria required for application or installation.
3. Refer to Section 01 45 00 – Quality Control for quality assurance requirements.

J. Manufacturer's Field Reports:

1. Submit reports to Engineer and Owner's Project Manager.
2. Submit report within 30 days of observation to Engineer.
3. Submit for information for purpose of assessing conformance with information given and design concept expressed in Documents.

K. Erection Drawings:

1. Submit drawings to Engineer and Owner's Project Manager.
2. Submit for information for purpose of assessing conformance with information given and design concept expressed in Documents.
3. Data indicating inappropriate or unacceptable work is subject to rejection by Engineer or Owner.

PART 2 PRODUCTS (Not Used)

PART 3 EXECUTION (Not Used)

END OF SECTION

SECTION 01 35 53
SECURITY PROCEDURES

PART 1 GENERAL

1.1 SCOPE OF WORK

- A. Development of site security program, project entry control procedures, personnel screening and identification in compliance with Florida Statute FS1012.465 – Jessica Lunsford Act for vendors, and Contractor/CM's.

1.2 RELATED SECTIONS

- A. Section 01 31 00 – Project Management and Coordination.
- B. Section 01 33 00 – Submittal Procedures.
- C. Section 01 56 00 – Temporary Barriers and Enclosures.

1.3 JESSICA LUNSFORD ACT

- A. Contractor/CM, his subcontractors, vendors and suppliers who are to be permitted access to school grounds while students are present, or have direct contact with students or have access to or control of school funds shall obtain Level 2 background screening in accord with Florida Statute FS1012.465 – Jessica Lunsford Act.
 - 1. Level 2 screening excludes personnel working on school district property where students are present who have criminal records that include sexual offender, sexual misconduct with developmentally disabled or mental health patients, terrorism, murder, kidnapping, lewd, lascivious or indecent acts or exposure, incest, child abuse or neglect.
 - 2. Persons screened as noted above with other types of criminal history may be allowed on school grounds provided under following conditions:
 - a. Contractor/CM, subcontractors, vendors, and suppliers shall be under continuous direct supervision of school district employee or Level 2 screened and cleared employee as noted above.
 - b. Contractor/CM, subcontractors, vendors and suppliers may be allowed on a student occupied site if area of construction is isolated from students by continuous six foot high chain link fence separating work area and school.
 - c. Persons with current Level 2 clearance who are subsequently arrested for disqualifying offenses shall be disqualified from access to school sites and shall immediately surrender their Photo ID Badge to their employer who shall be responsible for returning badge to Martin County School District's Department of Human Resources within 48 hours of arrest or notice of arrest or criminal offense.
 - d. Persons failing to notify their employer and Martin County School District's Department of Human Resources within 48 hours of arrest will be charged with 3rd degree felony, punishable by up to five years imprisonment and \$1,000 fine.
 - e. Employers of persons having been arrested for disqualifying offenses who subsequently allows said employee to continue working on school property may also be charged with 3rd degree felony, punishable by up to five years imprisonment and \$1,000 fine.
- B. Contractor/CM, his subcontractors, vendors, and suppliers working on school board sites shall be fingerprinted and obtain work badges.
 - 1. Contractor/CM, his subcontractors, vendors, and suppliers have worked and obtained in other school districts must be screened to obtain new badges.

2. Questions regarding fingerprinting or identification badge processing may be directed to District Personnel Department at (772)219-1200, Ext. 30296.
 3. Fingerprinting services are provided by private vendor through Florida Dept. of Education. DOE sponsored website will direct individuals to nearest fingerprinting location.
 4. Cost of fingerprinting is (Check with the School District) per person and shall be prepaid either by money order to (Check with the School District) or by credit card payment via Internet. Website is <http://www.flprints.com>. For information, telephone (877) 357-7456.
 5. Money orders shall be made out to 3M Cogent. Money order must be brought to appointment.
 6. Individuals shall register online prior to their appointment:
 - a. Navigate to https://www.cogentid.com/fl/index_fdoe.htm and select "register online".
 - b. For County select Martin County from pull-down box.
 - c. For CRI Literal select: FL931392Z Contractors & Vendors.
 - d. Fill out remaining information and submit.
 - e. Use Internet Explorer.
 7. Individuals being fingerprinted shall provide valid, government issued driver's license, identification card or passport.
 8. After fingerprinting and criminal background check is complete, individuals shall make appointment for photo ID's by making appointments at Martin County School District Personnel Department located in Building 20 at School District Administration Center, 500 E. Ocean Blvd., Stuart, FL 34994.
 9. Appointments for ID photo badges shall be made after completion of fingerprinting with Martin County School District Personnel Department by phone at (772) 219-1200, Ext. 30296
 10. Photo ID applicants shall have registration confirmation receipt with them when they arrive for appointment.
 11. Cost of Photo ID's is (Check with the School District). Payment may be made with company check, money order or personal check. Checks shall be made payable to Martin County School District.
- C. Non-Instructional Contractors with current Martin County School District ID Photo Badges shall update their badges to the State Uniform Badge required by Florida Statute 1012.467, effective July 1, 2014.
1. There is no cost for individuals with current Martin County School District ID Photo Badges to upgrade their badges.
 2. Badges from other individual School Districts are no longer accepted on school sites in Florida.
 3. New state wide badges are accepted in any School District regardless of where it was issued.
 4. Non-Instructional Contractors and their employees working on School sites shall apply for State-Wide Badges as noted above.
 5. Non-Instructional Contractors shall submit lists of their badged employees via email to Eileen Loreti at the Martin County School District Personnel Department at loretie@martin.k12.fl.us.

1.4 SECURITY PROGRAM

- A. Protect new work, existing facilities and grounds from damage, theft, vandalism, and unauthorized entry.
- B. Initiate security program in coordination with Owner's existing security system at time of project mobilization to ensure safety of students, faculty and visitors to the unaffected portions of the school facilities.

- C. No student contact is permitted between the Contractor's personnel and students. Any breach of this requirement will result in the immediate removal of the personnel from the job site upon direction by the Owner.
- D. Smoking is not allowed on School Board property. Any breach of this restriction will result in immediate removal of personnel from the site upon direction by Owner's Project Manager.
- E. Maintain security program throughout construction period until Owner's project acceptance.

1.5 ENTRY CONTROL

- A. Restrict entrance of persons and vehicles into Project site and existing facilities as indicated by Owner approved security plan.
 - 1. Allow entrance only to authorized persons with proper identification.
 - 2. Maintain log of workers and visitors, make available to Owner on request.
 - 3. Coordinate access of Owner's personnel to site in coordination with Owner's security forces.

1.6 PERSONNEL IDENTIFICATION

- A. Contractor/CM on-site staff, subcontractors and vendors on site shall wear identification badges at all times on site.
- B. Identification badges shall be current at time of project and shall be reverified and reissued yearly if project extends past original badge expiration date.

1.7 SUBMITTALS

- A. Comply with Section 01 33 00 – Submittal Procedures.
- B. Provide list of personnel proposed to be used on project for fingerprinting and background checks (only required for existing school projects).
- C. Contractor/CM shall submit initial list of accredited persons and provide monthly updated lists to Owner.
- D. Provide security plan to Owner indicating how construction site is to be secured and separated from existing school and its operations including normal and emergency egress and exiting from the operational portion of school and for new additions and existing portion under construction.

PART 2 PRODUCTS

2.1 Not Used.

PART 3 EXECUTION

3.1 Not Used.

END OF SECTION

SECTION 01 42 00
REFERENCE STANDARDS

PART 1 GENERAL

1.1 REFERENCE STANDARDS

- A. Reference and design standards referenced in Florida Building Code and Florida Fire Prevention Code, 6th Editions are applicable.
- B. Documents listed shall be standard references currently in effect at time of project building permitting.
- C. American Society of Testing Materials (ASTM):
 - 1. See individual product specification sections for applicable ASTM standards.
- D. American National Standards Institute (ANSI)/Underwriters Laboratories (UL):
 - 1. See individual product specification sections for applicable ANSI standards.
- E. Underwriters Laboratories (UL) – Fire Resistance Directory.
- F. Warnock-Hersey – Product Directory.
- G. Building Industry Consulting Services International (BICSI):
 - 1. BICSI-568-2001: Installing Commercial Building Telecommunications Cabling.
 - 2. BICSI Telecommunications Distribution Methods Manual (TDMM).
 - 3. BICSI Telecommunications Cabling Installation Manual (TCIM).
 - 4. BICSI Outside Plant Design Reference Manual, 5th Edition.
- H. FCC (Federal Communications Commission) Rules.
- I. National Electrical Code (NEC):
 - 1. NFPA 70 National Electrical Code, 2008 Edition.
- J. National Fire Protection Association (NFPA):
 - 1. NFPA 101: Life Safety Code - National Fire Protection Association (NFPA).
 - 2. NFPA 70: National Electrical Code - National Fire Protection Association (NFPA).
- K. Occupational Health and Safety (OSHA): State and Federal Requirements.
- L. Telecommunications Industry Association (TIA)/Electronics Industry Association (EIA):
 - 1. TIA/EIA-568-B.1 and addenda: Commercial Building. Telecommunications Cabling Standard - Part 1: General Requirements.
 - 2. TIA/EIA-568-B.2 and addenda: Commercial Building Telecommunications Cabling Standard - Part 2: Balanced Twisted-Pair.
 - 3. TIA/EIA-568-B.2-1: Transmission Performance Specifications for 4-Pair 100 Ohm Category 6 Cabling.
 - 4. TIA/EIA-568-B.3 and addenda: Commercial Building Telecommunications Cabling Standard - Part 3: Optical Fiber Cabling and Components Standard.
 - 5. TIA/EIA-568-B.3-1: Additional Transmission Performance Specifications for 50/125 ohm Optical Fiber Cables.
 - 6. TIA/EIA-569-A and Addenda: Commercial Building Standard for Telecommunications Pathways and Spaces, CSA T530.
 - 7. TIA/EIA-606-A and Addenda: Administration Standard for Telecommunications Infrastructure of Commercial Buildings, CSA T528.
 - 8. ANSI-J-STD-607-A and Addenda: Commercial Building Grounding (Earthing) and Bonding Requirements for Telecommunications, CSA T530.
 - 9. TIA/EIA-526-7 and Addenda: Measurement of Optical Power Loss of Installed Single-Mode Fiber Cable Plant.
 - 10. TIA/EIA-526-14A and Addenda: Optical Power Loss Measurements of Installed Multimode Fiber Cable Plant.

11. TIA/EIA-758: Customer Owned Outside Plant Telecommunications Cabling Standard.
- M. International Electrical Code (IEC):
 1. TR3 61000-5-2 - Ed. 1.0 and amendments: Electromagnetic compatibility (EMC) - Part 5: Installation and mitigation guidelines – Section 2: Earthing and Cabling”.
 2. ISO/IEC 11801: 2000 Edition, 1.2 and amendments: Information Technology – Generic cabling for customer premises.
- N. International Standards Organization (ISO/IEC): 11801: 2000 Ed. 1.2 and amendments: Information technology - Generic cabling for customer premises.
- O. NACE (National Association of Corrosion Engineers) - Industrial Maintenance Painting.
- P. NPCA (National Paint and Coatings Association) - Guide to U.S. Government Paint Specifications.
- Q. PDCA (Painting and Decorating Contractors of America) - Painting - Architectural Specifications Manual.
- R. SSPC (Steel Structures Painting Council) - Steel Structures Painting Manual.
 1. SSPC-SP 1 – Solvent Cleaning.
 2. SSPC-SP 2 – Hand Tool Cleaning.
 3. SSPC-SP 3 – Power Tool Cleaning.
 4. SSPC-SP 13 – Nace No 6 Surface Preparation for Concrete.
- S. WDMA (Window and Door Manufacturer’s Association) I.S. 1-A-2004.

1.2 DEFINITIONS

- A. Communication Definitions:
 1. ITS: Information Transport System: Copper cabling or optical fiber for transmission of information on School District property. Transmission includes data, video, voice, fire alarm, security, access control, and other low-voltage networks. Information Transport System is not limited to School District-owned cabling, but includes copper and optical fiber, and equipment owned by outside providers carrying School District’s information. Pathways are not limited by School District’s ownership, but include those owned by third parties. Information Transport System may be referred to as “the network” within project documents.
 2. ICP: Inside Cable Plant: Part of Information Transport System running within buildings. ICP elements include workstation outlet assembly, cabling to the workstation from network rooms, backbone cabling within building, backbone cabling running between physically contiguous buildings, network racks and hardware (routers, switches, hubs, firewalls, etc.), patch panels, punch blocks, fiber distribution panels, patch cords, and cross-connect cables/wires.
 3. OCP: Outside Cable Plant: Part of Information Transport System running between buildings, from building to definable exterior point, between definable exterior points, or from non-School District source to School District building or definable exterior point. OCP includes termination punch blocks, fiber distribution panels, interior splices for outside to inside optical fiber transition, and other initial device into which outside cable attaches. OCP does not include backbone cable running between physically contiguous buildings unless cabling enters OSP pathway element (e.g. OSP conduits, maintenance holes, etc.). OCP includes underground cabling and aerial cabling.
 4. Cable: An assembly of one or more insulated conductors or optical fibers, within an enveloping sheath.
 5. DP: Dead pairs: Unused copper pairs terminating within splice case, but without being splices to outgoing cable.

6. GP: Grounding electrode: Conductor (rod, pipe or plate or group of conductors) in direct contact with earth for purpose of providing low-impedance connection to earth.
 7. GEC: Grounding electrode conductor: Conductor used to connect grounding electrode to equipment grounding conductor, or to grounded conductor of circuit at service equipment, or at source of separately derived system.
 8. Handbox: Rectangular or square underground pathway element similar to small maintenance hole, which cannot be fully entered, that allows for pulling point or splice point in power, security or communications pathway.
 9. Handhole: A round underground pathway element similar to a handbox, which cannot be fully entered, that allows for a pulling point in a pathway.
 10. Identifier: An item of information that links a specific element of the Information Transport System infrastructure with its corresponding record.
 11. Infrastructure (Information Transport System): A collection of those Information Transport System components, excluding equipment, that together provides the basic support for the distribution of all information within a building or campus.
 12. Linkage: A connection between a record and an identifier or between records.
 13. Maintenance (man) holes: Underground pathway element large enough for person to fully enter work, used to provide access to underground cable to pull, splice, and maintain.
 14. Media (Information Transport System): Wire, cable, or conductors used for Information Transport System.
 15. OB: Outlet box: Metallic or nonmetallic box used to hold Information Transport System outlets/connectors or transition devices.
 16. Outlet (Connector) (Information Transport System): Connecting device in work area on which horizontal cable or outlet cable terminates.
 17. Pathway: Facility for the placement of Information Transport System cable.
 18. Record: Collection of detailed information related to specific element of Information Transport System infrastructure.
 19. Report: Presentation of collection of information from various records.
 20. Space (Information Transport System): Area used for housing installation and termination of Information Transport System equipment and cable, e.g., equipment rooms, network rooms, work areas, and maintenance holes/handboxes/handholes.
 21. Splice: Joining of conductors in splice closure, meant to be permanent.
 22. Splice box: Box, located in pathway run, intended to house cable splice.
 23. Splice closure: Device used to protect splice.
 24. Termination position: Discrete element of termination hardware where information Transport System conductors are terminated.
 25. Work Area (work station): Building space where occupants interact with Information Transport System terminal equipment.
- B. Painting Definitions:
1. ASTM D16 - Definitions of Terms Relating to Paint, Varnish, Lacquer, and Related Products for interpretation of terms used herein.

1.3 ABBREVIATIONS AND ACRONYMS

- A. Abbreviations noted in Florida Building Code, Chapter 2 are applicable.
- B. General Abbreviations:
1. AC: Above Counter/Air Conditioning.
 2. ACR: Attenuation-to-Crosstalk Ratio.
 3. ADA: Americans with Disabilities Act.

4. AFF: Above finished floor.
5. AFG: Above finished grade.
6. ANSI: American National Standards Institute.
7. ARCH: Architect or Architectural.
8. ASTM: American Society for Testing and Materials (ASTM International).
9. AWG: American Wire Gauge.
10. BD: Building distributor (replacing main-cross connect and MDF as “building service” room identifiers).
11. BICSI®: Building Industry Consulting Service International, Inc.
12. BTU: British Thermal Unit.
13. CAT6: Category 6 cable.
14. CATV: Community Antenna Television (cable television).
15. CD: Campus distributor (replacing main-cross connect and MDF as “campus-wide service” room identifiers). Also, compact disk for storage of audio or video information.
16. CO: Communications Outlet.
17. COAX: Coaxial Cable.
18. CP: Communications Panel.
19. dB: Decibel.
20. EMS: Energy Management System or Emergency Management System.
21. EMT: Electrical metallic tubing.
22. ENT: Electrical nonmetallic tubing.
23. EDPM: Ethylene-polypropylene-diene membrane.
24. EF: Entrance Facility.
25. EIA: Electronic Industries Alliance.
26. ELFEXT: Equal Level Far-End Crosstalk.
27. EMC: Electromagnetic Compatibility.
28. EMI: Electromagnetic Interference.
29. ER: Equipment Room. Replacing “TR”
30. FMC: Flexible metallic conduit.
31. FCC: Federal Communications Commission.
32. FD: Floor distributor (replacing network room, intermediate and horizontal cross-connect, and telecommunications as “building service” room identifiers). Also, Floor Drain as part of building plumbing system.
33. FDDI: Fiber Distribution Data Interface.
34. FEXT: Far-End Crosstalk.
35. FO: Fiber Optic.
36. Freq: Frequency.
37. GE: Grounding equalizer (replacing TBBIBC).
38. Gnd: Ground.
39. HB: Handbox. Also, hose bibb for water supply part of plumbing system.
40. HC: Horizontal Cross-Connect (replaced by floor distributor “FD”).
41. HH: Handhole.
42. HVAC: Heating, Ventilation, and Air Conditioning.
43. Hz: Hertz.
44. IC: Intermediate Cross-Connect (replaced by building distributor “BD”).
45. IDC: Insulation Displacement Connectors.
46. IDF: Intermediate Distribution Frame (replaced by “BD” or “FD”).
47. IEEE: Institute of Electrical and Electronics Engineers.
48. IMC: Intermediate metal conduit.
49. IN: Inches.

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50. ISO: International Organization for Standardization.
51. ISP: Inside Cable Plant.
52. JB: Junction Box.
53. LBS: Pounds.
54. LED: Light Emitting Diode.
55. LFMC: Liquidtight flexible metal conduit.
56. LFNC: Liquidtight flexible nonmetallic conduit.
57. Mbps: Megabits per second.
58. MC: Main Cross-Connect (replaced by campus distributor “CD”).
59. MDF: Main Distribution Frame (replaced by “CD” or “BD”).
60. MER: Main Equipment Room.
61. MH: Maintenance Hole.
62. MHz: Megahertz.
63. NBR: Acrylonitrile-butadiene rubber.
64. NEC: National Electrical Code, NFPA 70.
65. NEMA: National Electrical Manufacturers Association.
66. NESC: National Electric Safety Code, C2-1997.
67. NFPA: National Fire Protection Association.
68. NIC: Not in Contract.
69. NR: Network Room.
70. #: Number.
71. OFCI: Owner Furnished Contractor Installed.
72. OFOI: Owner Furnished Owner Installed.
73. OSHA: Occupational Safety and Health Administration.
74. OCP: Outside Cable Plant.
75. OTDR: Optical Time Domain Reflectometer.
76. PR: Pair.
77. PVC: Polyvinyl Chloride.
78. RCDD®: Registered Communications Distribution Designer.
79. RFI: Radio Frequency Interference.
80. RGC or GRC: Rigid Galvanized Conduit.
81. RH: Relative Humidity.
82. RNC: Rigid nonmetallic conduit.
83. SCS: Structured Cabling System.
84. SS: Stainless Steel.
85. SM: Single Mode.
86. TIA/EIA: Telecommunications Industry Association/Electronic Industry Association.
87. TBB: Telecommunication Bonding Backbone.
88. TBBIBC: Telecommunication Bonding Backbone Interconnecting Bonding Conductor (replaced by grounding equalizer “GE”).
89. TE: Telephone Equipment (Wall Mounted Equipment Rack).
90. TEL: Telephone.
91. TGB: Telecommunications Grounding Buss bar.
92. TMGB: Telecommunications Main Grounding Buss bar.
93. TR: Telecommunications Room. (Replaced with Main-MDF or Intermediate-IDF Distribution Frame Locations).
94. TYP: Typical.
95. UL: Underwriters Laboratory.
96. UPS: Uninterruptible Power Supply.
97. UTP: Unshielded Twisted Pair.

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- 98. V: Volt.
- 99. WAO: Work Area Outlet.

1.4 UNITS OF MEASURE

- A. Weights and Measures shall be as identified by Weights and Measures Division, NIST, U. S. Department of Commerce, 100 Bureau Dr., Stop 2600, Gaithersburg, MD 20899-2600.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION

SECTION 01 45 00
QUALITY CONTROL

PART 1 GENERAL

1.1 SCOPE OF WORK

- A. Quality assurance procedures to control labor and product installation including tolerances, adherence to references and standards.
- B. Construction of mockups and field samples to set standard of quality for product installation.
- C. Independent inspecting and testing laboratory services for quality control and adherence to contract documents.
- D. Manufacturers' field services for quality control and adherence to contract documents.
- E. Work shall be in conformance with 2007 Edition of AIA A201 General Conditions of the Contract and as amended by Owner on July 13, 2009. Copy is included in Division 1, Section 00 72 00 – General Conditions.

1.2 RELATED SECTIONS

- A. Section 01 22 00 – Unit Prices.
- B. Section 01 29 00 – Payment Procedures.
- C. Section 01 31 00 – Project Management and Coordination.
- D. Section 01 33 00 – Submittal Procedures.
- E. Section 01 42 00 – References.
- F. Section 01 66 00 – Product Storage and Handling Requirements.
- G. Section 01 78 00 – Closeout Submittals.
- H. Section 01 91 00 – Commissioning.
- I. Section 23 05 93 – Testing, Adjusting and Balancing of HVAC.
- J. Section 23 08 00 – Commissioning of HVAC.

1.3 COORDINATION AND PROJECT CONDITIONS

- A. Coordinate scheduling, submittals, and work to ensure efficient and orderly sequence of installation of interdependent construction elements, with provisions for accommodating items installed later.
- B. Verify utility requirements and characteristics of operating equipment are compatible with building utilities. Coordinate work of various sections having interdependent responsibilities for installing, connecting to, and placing in service, such equipment.
- C. Coordinate space requirements, supports and installation of mechanical and electrical work that is indicated diagrammatically on Drawings. Follow routing shown for pipes, ducts, and conduit, as closely as practicable; place runs parallel or perpendicular with line of building. Conduits and piping shall be spaced neatly, consistently and uniformly when in groupings. Utilize spaces efficiently to maximize accessibility for other installations, for maintenance, and for repairs.
- D. In finished areas, except as otherwise indicated, conceal pipes, ducts, and wiring within the construction. Coordinate locations of fixtures and outlets with finish elements.
- E. Coordinate completion and clean up of Work of separate sections in preparation for Substantial Completion and for portions of Work designated for Owner's partial occupancy.

- F. After Owner occupancy of premises, coordinate access to site for correction of defective Work and Work not in accordance with Contract Documents, to minimize disruption of Owner's activities.
- G. Owner will not consider change orders for extra work required by Contractor/CM due to improper or untimely coordination.

1.4 FIELD ENGINEERING

- A. Employ a Land Surveyor registered in the State of Florida, acceptable to Architect and Owner for construction layout.
- B. Contractor/CM shall locate and protect survey control and reference points.
- C. Control datum for survey is that established by Owner provided survey.
- D. Verify setbacks and easements; confirm drawing dimensions and elevations.
- E. Provide field engineering services. Establish elevations, lines, and levels, utilizing recognized engineering survey practices.
- F. Upon completion of project, surveyor noted above, shall prepare and submit copy of site drawing and certificate signed by Land Surveyor that elevations and locations of Work are in accord with Contract Documents.

1.5 QUALITY ASSURANCE

- A. Monitor quality control over suppliers, manufacturers, products, services, site conditions, and workmanship, to produce work of specified quality.
- B. Comply fully with manufacturers' instructions, including each step in sequence.
- C. Should manufacturers' instructions conflict with contract documents, request clarification from Architect before proceeding, and document any instructions or directions that may invalidate warranty.
- D. Comply with specified standards as a minimum quality for work except when more stringent tolerances, codes, or specified requirements indicate higher standards or more precise workmanship.
- E. Perform work by persons qualified to produce workmanship of specified quality.
- F. Verify that field measurements are as indicated on shop drawings or as instructed by manufacturer.
- G. Secure products in place with positive anchorage devices designed and sized to withstand stresses, vibration, physical distortion or disfigurement.
- H. Schedule work so no absorbent materials are installed and no concealed areas are closed up until building is dried-in and permanent doors and windows are installed to prevent development of mold or entrapment of mold or moisture inside concealed spaces or moisture absorption into interior materials.
- I. See Section 01 31 00 – Project Management and Coordination for services of Florida licensed land surveyor to verify locations and elevation of floor slabs after floor slab placement and before continuation of construction activities.

1.6 TOLERANCES:

- A. Monitor fabrication and installation tolerance control of products to produce acceptable work. Do not permit tolerances to accumulate.
- B. Comply with manufacturers' tolerances. Should manufacturers' tolerances conflict with contract documents, most stringent tolerance shall prevail.
- C. Adjust products to appropriate dimensions; position before securing products in place.

1.7 REFERENCES AND STANDARDS:

- A. Comply with Section 01 42 00 – References for reference standards, definitions, abbreviations and acronyms applicable to project.
- B. Workmanship shall comply with requirements of standards specified by product or trade association, or other consensus standards of specified products, except when applicable code requirements are more stringent.
- C. Use current reference standard(s) in effect at time of contract execution.
- D. Obtain copies of standards where required by product specification sections.
- E. Contractual relationships, duties, nor responsibilities of parties in Contract nor those of Architect shall be altered from contract documents by mention or inference otherwise in reference documents.

1.8 MOCKUPS AND FIELD STANDARDS:

- A. Comply with Section 01 43 39 – Mockups general requirements and individual product sections for specific requirements. Construct mockups as indicated for review by Architect and Owner's Project Manager.
- B. Assemble and erect specified items with required attachment and anchorage devices, flashings, seals, and finishes.
- C. Accepted mock-ups shall be basis of work quality standard for work.
- D. Where Architect accepts mockups as quality standard of work required, maintain mockups until work is complete.
- E. Upon Architect's approval mockups and work samples may be incorporated in completed work. Otherwise, remove mock-up and clear area.

1.9 TESTING SERVICES:

- A. Owner will appoint and pay for services specified for independent firm to perform testing.
- B. Independent firm will perform tests and other specified services as outlined in individual specification sections and as required by Owner.
- C. Testing and quality control may occur on or off project site.
- D. Independent firm shall submit reports to Owner and Architect and Contractor/CM, indicating observations and results of tests and compliance or non-compliance with contract documents.
- E. Cooperate with independent firm; furnish samples of materials, design mix, equipment, tools, storage, safe access, and assistance by incidental labor as requested.
 - a. Notify Owner, Architect and independent firm 24 hours prior to expected time for operations requiring services.
 - b. Make arrangements with independent firm and pay for additional samples and tests required for Contractor's use.
 - c. Testing does not relieve Contractor to perform work per contract requirements.
 - d. As directed by Architect, independent testing firm shall re-test as result of non-conformance with requirements. Contractor shall pay for re-testing cost by deducting testing charges from the Contract Sum/Price.

1.10 BUILDING INSPECTION SERVICES:

- A. Owner will employ in-house Building Official, or hire independent Building Official and Construction Inspectors as required to perform Document review and approval, and on-site building inspections in accord with Florida Building Code, Section 423 State Requirements for Educational Facilities and other applicable codes.
- B. Building Official and Inspectors will perform code interpretation, document review, project inspections, and other services specified and required in individual specification sections, and shall be paid by Owner.
- C. Inspections firm will conduct inspections and observations of work, indicate compliance or non-compliance with applicable codes and contract documents, and will submit reports to Architect, Contractor/CM and Owner.
- D. Cooperate with inspection firm; provide safe access and assistance by incidental labor as requested.
- E. Notify Owner and Architect and inspection firm 24 hours prior to expected time for operations requiring services.
- F. Inspection of work does not relieve Contractor of performing work in accord with contract requirements.

1.11 MANUFACTURERS' FIELD SERVICES:

- A. Where specified, require material or product suppliers or manufacturers to provide qualified staff personnel to observe site conditions, conditions of surfaces and installation, quality of workmanship, start-up of equipment, test, adjust and balance of equipment and as applicable, and to initiate instructions when necessary.
- B. Submit qualifications of observer to the Architect 30 days in advance of required observations, the observer is subject to Owner's approval.
- C. Report observations and site decisions or instructions given to applicators or installers that are supplemental or contrary to manufacturers' written instructions.
- D. Comply with Section 01 33 00 – Submittal Procedures.

1.12 COMMISSIONING

- A. Comply with Section 01 91 00 – Commissioning for training of Owner's personnel in operation and maintenance of equipment identified in this Section.

PART 2 PRODUCTS (Not Used)

PART 3 EXECUTION

3.1 EXAMINATION:

- A. Verify that existing site conditions and substrate surfaces are acceptable for subsequent work, beginning new work means acceptance of existing conditions.
- B. Verify that existing substrate is capable of structural support or attachment of new work.
- C. Examine and verify specific conditions described in individual specification sections. Immediately notify AE or Owner's Project Manager of conditions that would prevent meeting contractual requirements.
- D. Verify that utility services are available, of correct characteristics, and in correct locations.

3.2 PREPARATION:

- A. Clean substrate surfaces prior to applying next material or substance.
- B. Seal cracks or openings of substrate prior to applying next material or substance in manner approved by product manufacturer.
- C. Apply manufacturer's required or recommended substrate primer, sealer, or conditioner prior to applying any new material or substance in contact or bond.

3.3 CLEANING AND WASTE MANAGEMENT

- A. Comply with Section 01 74 00 – Cleaning and Waste Management.

END OF SECTION

SECTION 01 66 00
PRODUCT STORAGE AND HANDLING REQUIREMENTS

PART 1 GENERAL

1.1 SCOPE OF WORK

- A. Packaging and transportation, delivery and receiving, product handling, storage, conditions and location, maintenance, protection, repair and replacement of products damaged while handling or in storage.

1.2 RELATED DOCUMENTS

- A. Section 01 31 00 – Project Management and Coordination.
- B. Section 01 33 00 – Submittal Procedures.
- C. Section 01 35 53 – Security Procedures.
- D. Section 01 45 00 – Quality Control.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION

3.1 TRANSPORTATION AND HANDLING

- A. Packaging and Transportation:
 - 1. Supplier shall package finished products in boxes or crates to provide protection during shipment, handling and storage at site.
 - 2. Products shall be protected against exposure to outside storage against damage due to weather conditions.
 - 3. Protect products sensitive to damage against impact, abrasion, puncture and other damage during handling and transport to project.

3.2 DELIVERY AND RECEIVING

- A. Arrange deliveries of products in accord with project schedule to allow installation and project completion per approved project schedule.
- B. Prior to project commencement, Contractor's personnel shall meet with Owner's Project Manager and School staff for renovation and new construction to delineate areas for materials storage lay-down areas.
- C. Restrict access of persons to storage areas in accord with Section 01 35 33 – Security Procedures.
- D. Material deliveries to Owner occupied sites shall be coordinated with Owner's Project Manager to ensure availability of personnel and handling equipment for safe and secure unloading and storage of equipment.
- E. Deliver products in undamaged, dry condition, in original unopened containers or packaging with identifying labels intact and legible.
- F. Clearly mark partial deliveries of component parts of equipment to identify equipment and contents, to permit easy accumulation of parts, and to facilitate assembly.
- G. Upon delivery, Contractor/CM shall inspect shipments for following items:
 - 1. Products received match reviewed submittals and Contract Documents.

2. Correct quantities.
 3. Accessories and installation hardware are included.
 4. Containers and packages are intact and labels are legible.
 5. Products are adequately protected for conditions and are undamaged.
- H. Product Handling:
1. Provide equipment and personnel to handle products to prevent product damage.
 2. Handle products to avoid bending, flexing or overstressing.
 3. Lift large or heavy components by using designated lifting points in accord with manufacturers written directions.

3.3 STORAGE AND PROTECTION

- A. General Requirements:
1. Store products immediately upon delivery in accord with manufacturers written directions.
 2. Arrange for storage location to allow access, maintenance and inspection of products.
 3. Stored products shall not conflict with work conditions. construction is contiguous to or within existing school, Provide demising walls to physically separate new or renovation work from existing on-going school operations.
- B. Enclosed Storage:
1. Store products subject to damage by weather in weathertight enclosure.
 2. Maintain temperature and humidity within ranges stated in manufacturer's instructions.
 4. Provide temperature and humidity control within ranges stated in manufacturer's instructions.
 5. Store unpacked or loose products on shelves, in bins, or in neat groups of like items.
- C. Exterior Storage:
1. Provide platforms, blocking or skids to support fabricated products above ground, and sloped to allow drainage.
 2. Protect products to avoid soiling or staining.
 3. Provide product cover to prevent water or condensation on product while allowing ventilation.
 4. Store loose granular materials on clean, solid surfaces such as pavement or on rigid sheet materials to prevent mixing with foreign matter.
 5. Provide for surface drainage to prevent humidity, mold or algae growth.
- D. Maintenance of Storage:
1. Periodically inspect stored products on scheduled basis.
 2. Verify storage facilities and environmental conditions are in compliance with manufacturer's written requirements.
 3. Verify that product surfaces exposed to weather are undamaged, stolen, or have otherwise been adversely affected.
- E. Maintenance of Equipment Storage:
1. Stored mechanical and electrical equipment shall comply with manufacturer's written service instructions for each item, with notice of instructions attached to each item of equipment.
 2. Stored equipment shall be serviced on regular basis, maintaining log of services, and submitted to Architect in accord with Section 01 78 00 – Submittal Procedures as part of Project Record Documents.
- F. Storage of Owner's Salvaged Furnishings and Equipment:
1. Contractor/CM shall provide temporary storage facilities for items to be salvaged and reinstalled.

3.4 PROTECTION OF FINISHED WORK

- A. Protect finished surfaces, including doors, door jambs, soffits of openings used as passageways, through which equipment and materials are handled.
- B. Protect finished floor surfaces in traffic areas prior to allowing equipment or materials to be moved.
- C. Keep finished surfaces clean, unmarked, and suitably protected until Owner's project acceptance.

3.5 REPAIRS AND REPLACEMENTS

- A. Promptly replace or repair damaged equipment or building surfaces caused by moving equipment at no additional cost to Owner.
- B. Additional time required to repair or replace damaged equipment or building surfaces shall not be grounds for Contract time extension or Contractor's additional expense, unless Owner specifically authorizes time extension or additional costs.

END OF SECTION

SECTION 01 74 00
CLEANING AND WASTE MANAGEMENT

PART 1 GENERAL

1.1 SCOPE OF WORK

- A. Administrative and procedural requirements for waste management and cleaning during construction and final cleaning at Substantial Completion.
- B. Development and implementation of Waste Management Plan to indicate following procedures:
 - 1. Limiting amount of project waste through planning, scheduling, and project management.
 - 2. Recycling demolished structures and construction and waste materials, and reuse of recycled or salvaged materials whenever possible.
 - 3. Procedures to reduce construction noise, fumes, vibration, dust or other airborne contaminants.
 - 4. Adherence to Federal, State and local environmental and anti-pollution regulations and ordinances.
 - 5. Waste materials shall be suitably disposed off site in approved landfill sites.
 - 6. Development of contamination containment plan to include procedures for addressing volatile and hazardous materials or their waste products, cleaning materials and residue.
- C. Cleaning and Protection:
 - 1. Development of daily and periodic construction cleaning and protection of products stored on site or erected in project, and shall include sequence and frequency policy and schedule for project duration.
 - 2. Development of evacuation, fire and life safety plan, staff training procedures in handling and disposal of materials deleterious to human contact or exposure.
 - 3. Final cleaning leaving project ready for Owner's acceptance.

1.2 RELATED SECTIONS

- A. Section 01 31 00 – Project Management and Coordination.
- B. Section 01 33 00 – Submittal Procedures.
- C. Section 01 42 00 – References.
- D. Section 01 66 00 – Product Storage and Handling Requirements.
- E. Section 01 78 00 – Closeout Submittals.

1.3 SUBMITTALS

- A. Comply with Section 01 33 00 – Submittal Procedures.
- B. Submit MSDS sheets for products requiring special care or handling in storage, application or cleanup.
- C. Submit Waste Management and Cleaning Plans identifying and providing operational procedures for each item noted in Scope of Work.

1.4 COORDINATION

- A. Coordinate scheduling and implementation of Waste Management and Cleaning Plans with each trade on site.

- B. Ensure enforcement to promote efficient and orderly sequence of installation of interdependent construction elements, with intent to reduce waste maximize efficient and safe work environment.
- C. Coordinate periodic and final clean up of Work of each trade in preparation for Substantial Completion and for portions of Work designated for Owner's partial occupancy.

1.5 QUALITY ASSURANCE

- A. Monitor each trade, product suppliers, product deliveries, waste generation, site conditions, and workmanship, to minimize waste and maximize recycled materials and reuse of retained materials.

PART 2 – PRODUCTS

NOT USED (See individual product specifications for cleaning products recommended by manufacture.)

PART 3 – EXECUTION

NOT USED (See individual product specifications for written cleaning procedures and instructions recommended by manufacture.)

END OF SECTION

SECTION 01 78 00
CLOSEOUT SUBMITTALS

PART 1 GENERAL

1.1 SCOPE OF WORK

- A. Closeout procedures.
- B. Final cleaning.
- C. Adjusting.
- D. Project record documents.
- E. Operation and maintenance data.
- F. Spare parts and maintenance Products.
- G. Warranties and bonds.
- H. Maintenance service.
- I. Training.

1.2 RELATED SECTIONS

- A. Section 01 29 00 – Payment Procedures.
- B. Section 01 33 00 – Submittal Procedures.
- C. Section 01 91 00 – Commissioning.
- D. Section 27 60 00 – Integrated Audio System.

1.3 CLOSEOUT PROCEDURES

- A. Submit written certification that contract documents were reviewed, work inspected, and that work is complete in accord with contract documents and ready for Owner's Project Manager and AE's review.
- B. Provide submittals to AE and Owner's Project Manager that are required by building and fire authorities.
 - 1. Submit final application for payment identifying total adjusted contract sum, previous payments, and sum remaining due.
 - 2. Owner may opt to occupy all or portions of completed facilities upon substantial completion of those portions of work.
 - 3. Contractor/CM shall provide punch list to AE identifying items remaining to be completed.
 - 4. AE shall inspect project to determine completion of punch list and project compliance with Contract Documents.

1.4 FINAL CLEANING

- A. Execute final cleaning prior to final project assessment.
- B. Clean interior and exterior surfaces exposed to view; remove temporary labels, stains and foreign substances.
- C. Clean equipment and fixtures to sanitary condition with cleaning materials per manufacturer's written recommendations.
- D. Remove waste and surplus materials, rubbish, and construction facilities from the site.

1.5 ADJUSTING

- A. Adjust operating products and equipment to ensure smooth and unhindered operation.

1.6 PROJECT RECORD DOCUMENTS

- A. Maintain on site one set of record documents, recording accurate field revisions to contract documents to include:
 - 1. Drawings/specifications and addenda.
 - 2. Change orders and other modifications to work.
 - 3. Reviewed shop drawings, product data, and samples.
 - 4. Manufacturer's instruction for assembly, installation, and adjusting.
- B. Ensure entries are complete and accurate, enabling ready access and reference by Owner's Project Manager.
- C. Store record documents separate from documents used for construction.
- D. Record information concurrent with construction progress.
- E. Specifications shall be legibly marked and recorded for each product used indicating the following:
 - 1. Manufacturer's name, product model and number.
 - 2. Product substitutions or alternates utilized.
 - 3. Changes made by addenda and modifications.
- F. Record drawings and shop drawings shall be legibly marked with each item recorded to indicate actual construction as follows:
 - 1. Measured depths of foundations in relation to finish first floor datum.
 - 2. Measured horizontal and vertical locations of underground utilities and appurtenances, referenced to permanent surface improvements.
 - 3. Measured locations of internal utilities and appurtenances concealed in construction, referenced to visible and accessible features of the work.
 - 4. Field changes of dimension and details.
 - 5. Details not on original contract drawings.
- H. Upon project completion, transfer project record drawing information to Autocad (2010 or later format) files and provide four copies of CD's to Architect for review and transmitted to Owner, prior to claim for final Application for Payment.
 - 1. Contractor/CM shall also submit two hard copies of record drawings and project manual maintained during project to Owner's Project Manager.
 - 2. Owner will be responsible for making prints from CD's and for their distribution to Owner's user groups.

1.7 OPERATION AND MAINTENANCE DATA

- A. Submit documentation as noted in individual product specifications and as noted herein.

1.8 SPARE PARTS AND MAINTENANCE PRODUCTS

- 1. Provide spare parts, maintenance, and extra products in quantities specified in specification.
- 2. Deliver to Owner; obtain receipt prior to final payment.

1.9 WARRANTIES

- A. Submit documentation as noted in individual product specifications and as noted herein.
- B. Provide duplicate notarized copies.
- C. Execute and assemble transferable warranty documents from subcontractors, suppliers, and manufacturers.
- D. Provide Table of Contents and assemble in D-side 3-ring white binders with typed title sheet of contents inside durable plastic front cover.
- E. Submit prior to final application for payment.
- F. For items of work delayed beyond date of substantial completion, provide updated submittal within ten days after acceptance, listing date of acceptance as start of warranty period.

1.10 MAINTENANCE SERVICE

- A. Furnish service and maintenance of components indicated in specification sections for one-year from date of project substantial completion.
- B. Examine, clean, adjust, and lubricate system components as required for reliable operation.
- C. Include systematic examination, adjustment, and lubrication of components repairing or replacing parts as required with parts produced by the manufacturer of the original component.
- D. Owner shall approve in writing of transfers or reassignments of maintenance service tasks.

1.11 ASBESTOS CERTIFICATION

- A. Provide notarized letter from Contractor/CM certifying that “to the best of his/her knowledge no asbestos containing building materials were used as a building material in the project”, per FS 255.40.

1.12 PROJECT CLOSE-OUT PROCEDURES

- A. Items are to be submitted to the School District’s Construction Manager’s Office once the request for final payment has been submitted.
 - 1. ____ 4 Copies: AIA Application For Payment, Signed and Sealed, Noted as Final Payment.
 - 2. ____ Consent of Surety to make final payment.
 - 3. ____ Release of Lien from all Sub-Contractors or Laborers who have filled an Intent to Lien.
 - 4. ____ Warranty/Guarantee from Construction Manager for one-year from the date of Substantial Completion.
 - 5. ____ Warranty/Guarantee from each Sub-Contractor for one-year from the date of Substantial Completion.
 - 6. ____ Copy of the approval by the Architect-Engineer and the transmittal to the end user of manuals, shop drawings, as-builds, brochures, warranties, list of sub-contractors with phone numbers, addresses and contact persons.
 - 7. ____ Verification that all applicable district personnel have been trained in the operation of their new equipment (per system: HVAC, controls, etc.)

8. ____ Executed Roof Warranty in the name of the Martin County School District.
9. ____ 4 Copies: OEF Form 209, Certificate of Final Inspection.
10. ____ 4 Copies: Completed Punch-list.
11. ____ SREF 4.2(3)(e) Architect's Certificate of Specification of Asbestos Containing Materials.
12. ____ SREF 4.2(3)(e) Contract's Certificate of Asbestos Use.
13. ____ SREF 4.2(3)(d) Threshold inspector's statement that building complies with Threshold Plan.
14. ____ 4 Copies: OEF Form 110B, Certificate of Occupancy.
15. ____ OEF Form 564 for new construction or additions to existing schools only (Return to Director's Secretary)
16. ____ Inspection Log Book

PART 2 – PRODUCTS

2.1 APPROVED PRODUCTS

- A. Use only cleaning and maintenance products approved for use in Florida Educational Facilities.

PART 3 – EXECUTION

- 3.1 Not used.

END OF SECTION

SECTION 01 91 00
COMMISSIONING

PART 1 GENERAL

1.1 SCOPE OF WORK

- A. Administrative and procedural requirements for commissioning facilities and facility systems.
- B. Demonstration and training.
- C. Starting systems.
- D. Demonstration and instructions.

1.2 RELATED SECTIONS

- A. Section 01 31 00 – Project Coordination.
- B. Section 01 78 00 – Closeout Documents.
- C. Section 23 05 93 – Testing, Adjusting, and Balancing HVAC.
- D. Section 23 08 00 – Commissioning of HVAC.

1.3 STARTING SYSTEMS

- A. Coordinate schedule for start-up of various equipment and systems.
- B. Notify Architect and Owner seven days prior to startup of each item.
- C. Verify that each piece of equipment or system has been checked for proper lubrication, drive rotation, belt tension, control sequence, or other conditions which may cause damage.
- D. Verify that tests, meter readings, and specified electrical characteristics agree with those required by the equipment or system manufacturer.
- E. Verify wiring and support components for equipment are complete and tested. Execute startup under supervision of responsible Contractors' personnel in accordance with manufacturers' instructions.
- F. When specified in individual specification sections, require manufacturer to provide authorized representative to be present at site to inspect, check and approve equipment or system installation prior to startup, and to supervise placing equipment or system in operation.
- G. Submit written reports per section 01 78 00 - Execution and Closeout Documents that equipment or system is installed and functioning correctly.

1.4 DEMONSTRATION AND INSTRUCTIONS

- A. Demonstrate operation and maintenance of Products to Owner's personnel two weeks prior to date of Substantial Completion.
- B. Demonstration of equipment shall be performed by qualified manufacturers' representative who is knowledgeable about the Project and equipment.
- C. For equipment or systems requiring seasonal operation, perform demonstration for other season within six months.
- D. Utilize operation and maintenance manuals as basis for instruction. Review contents of manual with Owners' personnel in detail to explain all aspects of operation and maintenance.
- E. Demonstrate start-up, operation, control, adjustment, trouble-shooting, servicing, maintenance, and shutdown of each item of equipment at agreed-upon times, at equipment location.
- F. Prepare and insert additional data in operations and maintenance manuals when need for additional data becomes apparent during instruction.

- G. Amount of time required for instruction in each piece of equipment and system is indicated in individual equipment and system specification sections.

1.5 TESTING, ADJUSTING, AND BALANCING

- A. Contractor/CM shall employ, and pay for commissioning services other than TAB firm to perform testing, adjusting and balancing of other systems as indicated or require for fully functional systems
- B. Independent TAB firm shall perform services specified in section 23 05 93 – Testing, Adjusting, and Balancing for HVAC system(s).
- C. The Contractor/CM shall submit reports to Architect indicating observations, results of tests and compliance or non-compliance with specified requirements and with requirements of contract documents.

PART 2 – PRODUCTS

2.1 Not Used.

PART 3 – EXECUTION

3.1 LIST OF EQUIPMENT TO BE COMMISSIONED:

- A. Communications System
- B. Fire Alarm System
- C. Intercom System
- D. Kitchen Equipment
- E. HVAC Equipment.
- F. Gymnasium Equipment including bleachers, scoreboards, basketball backstops, sound system, playcourt surface, equipment with floor inserts
- G. Lighting Systems
- H. Stage, Auditorium, Gym and Instructional Spaces Sound Reinforcement Systems
- I. Irrigation System
- J. Fire Protection System
- K. Movable Interior Partitions
- L. Emergency Generator

3.2 EQUIPMENT COMMISSIONING REQUIREMENTS

- A. Comply with individual specification sections for equipment start-up, operation and training.

END OF SECTION

SECTION 01 91 01
COMMISSIONING OF HVAC

PART 1 GENERAL

1.1 SCOPE OF WORK

- A. Independent commissioning of heating, ventilation, and air conditioning in accord with project documents and include:
 - 1. Evaluate proposed HVAC and electrical systems design and control system documents.
 - 2. Review and document HVAC and Electrical control interface systems interface.
 - 3. Coordinate start-up of HVAC and Electrical systems.
 - 4. Coordinate and review operation, training procedures, demonstration and instructions for HVAC equipment use by Owner.
 - 5. Review, evaluate, and document HVAC equipment operation and performance.
- B. Work with TAB contractor for testing, adjusting, and balancing to ensure HVAC system performance is maximized for operational efficiency.
- C. Coordinate HVAC Commissioning scheduling and activities with GC/CM.
- D. Commissioned Systems Include:
 - 1. HVAC components and equipment.
 - 2. HVAC interaction of cooling, heating, and comfort delivery systems.
 - 3. Building Automation System (BAS): control hardware and software, sequences of operation, and integration of factory controls with BAS.
 - 4. Plumbing: Domestic hot water systems.
 - 5. Lighting Control System with interface with daylighting.

1.2 RELATED SECTIONS

- A. Section 01 31 00 – Project Coordination.
- B. Section 01 33 00 – Submittal Procedures.
- C. Section 01 42 00 – References.
- D. Section 01 45 00 – Quality Control.
- E. Section 01 78 00 – Closeout Submittals.
- F. Section 01 91 00 – Commissioning
- G. Section 23 05 93 – Testing, Adjusting and Balancing For HVAC.

1.3 REFERENCES

- A. See Section 01 42 00 – References for additional reference standards, definitions, abbreviations and acronyms.
- B. American Society of Heating, Refrigeration and Air Conditioning Engineers (ASHRAE):
 - 1. ASHRAE Guideline 0-2005 with Amendments a, b, c & d - The Commissioning Process.
 - 2. ASHRAE Guideline 1.1-2007, The HVAC Commissioning Process.
 - 3. ASHRAE 110-95 – An Introduction to Laboratory Fume Hood Performance Testing.
- C. NEBB Whole Building Systems Commissioning of New Construction, 2009 (3rd Edition).
- D. American National Standards Institute/American Industrial Hygiene Association/American Society of Safety Engineers (ANSI/AIHA/ASSE):
 - 1. ANSI/AIHA/ASSE Z9.5-2012 – American National Standard for Laboratory Ventilation.

1.4 DEFINITIONS

A. Definition of terms used are as follows:

1. Acceptance Phase: Phase of construction after initial start-up and check-out when functional performance testing, operational training, and operating and maintenance documentation development and review occurs.
2. Basis of Design: Documentation of primary thought processes and assumptions for design decisions made to meet Owner's Project Requirements as reflected in construction documents (drawings and specifications). Basis of design describes intent of project, systems, components, conditions, and methods chosen to meet Owner's Project Requirements. Design professionals (Architect and Engineer) are responsible for interpretation of the basis of design.
3. Commissioning Provider: Independent entity, not otherwise associated with design team or Contractor/CM, who directs and coordinates day-to-day commissioning activities. Commissioning Provider does not have construction oversight or design role.
4. Commissioning Plan: Overall plan providing structure, schedule, and coordination planning for commissioning process.
5. Commissioning Team: Group responsible for accomplishing commissioning process.
6. Data Logging: Monitoring flows, currents, status, and pressures of equipment using stand-alone recording equipment, separate from control system. Additional monitoring may be provided through capabilities of control system.
7. Deferred Functional Performance Tests: Functional tests performed after date of substantial completion due to partial occupancy, equipment and seasonal testing requirements, design or other site conditions precluding testing of system or piece of equipment during normal commissioning sequence.
8. Owner's Project Requirements: Documents prepared by Owner providing explanation of concepts, criteria, and work scope critical to Owner's expectations.
9. Factory Testing: Testing of equipment at factory (or on-site) by factory personnel in Owner's representative and commissioning agent's presence.
10. Functional Performance Tests: Tests of dynamic function and operation of equipment and systems using manual (direct observation) or monitoring methods. Functional testing is dynamic testing of systems (rather than just components) under full operation. Systems are tested under various modes, such as during low cooling or heating loads, high loads, component failures, unoccupied modes, varying outside air temperatures, fire alarm modes, and power failure. Systems are run through control system's sequences of operation and components are verified to respond properly. Commissioning Provider develops Functional Performance Test procedures in sequential written form, coordinates, oversees and documents actual testing performed by GC/CM. Functional Performance Tests are performed after Test and Balance, pre-functional checklists and start-up is complete.
11. Indirect Indicators: Indicators of response or condition, such as reading from control system screen reporting damper to be 100% closed.
12. Manual Tests: Using hand-held instruments, immediate control system read-outs or direct observation to verify performance (contrasted to analyzing monitored data taken over time to make observations).
13. Monitoring: Recording of parameters (flow, current, status, or pressure) of equipment operation using data loggers or trending capabilities of control systems.

14. Over-written Value: Writing over sensor value in control system to determine response of system (e.g., changing outside air temperature value from 50°F to 75°F to verify economizer operation). See “Simulated Signal.
15. Owner-contracted Tests: Tests paid by Owner outside GC/CM’s contract and for which Commissioning Provider does not oversee. Tests shall not be repeated during functional testing if properly documented.
16. Phased Commissioning: Commissioning completed in phases (by floors, for example) due to size of structure or other scheduling issues, to minimize total construction time.
17. Pre-functional Checklists: Lists of items to inspect and elementary component tests to conduct to verify proper installation of equipment, provided by GC/CM to Commissioning Authority who shall review and approve scope of tests. Pre-functional checklists are primarily static inspections and procedures to prepare equipment or system for initial operation (e.g., belt tension, oil levels, labels affixed, gauges in place, sensors calibrated). Some pre-functional checklist items may entail simple testing of function of components, piece of equipment or systems. Pre-functional refers to testing to be accomplished prior to formal functional testing of installed equipment. Pre-functional checklists augment and may be combined with manufacturer’s start-up checklist. GC/CM shall execute checklists.
18. Sampling: Functional Performance Testing of fraction of total number of identical or near identical pieces of equipment. Sampling population is at discretion of commissioning firm and is subject to modification based upon sampling results (i.e. will be expanded if initial results warrant).
19. Simulated Condition: Condition created for purpose of testing response of system (e.g., blowing hair dryer on space sensor to determine response of variable volume terminal unit).
20. Simulated Signal: Disconnecting sensor and using signal generator to send amperage, resistance or pressure to transducer and control system to simulate sensor value.
21. Start-up: Initial starting or activating of dynamic equipment, including executing pre-functional checklists.
22. Test, Adjust, and Balance: Process of measuring actual flows of air and hydronic systems, adjusting flows to required values, and documenting results.
23. Trending: Monitoring of equipment performance over time, using data logging equipment or building control system.

1.5 QUALITY ASSURANCE

- A. Supervision, coordination, and documentation of commissioning process shall be responsibility of Commissioning Provider.
- B. Commissioning Provider shall become familiar with Owner's Project Requirements, Basis of Design documentation, project documents, and shall assume responsibility for overall system commissioning effort.
- C. Acceptable Commissioning Firms:
 1. OCI Associates, Inc., 181 Melody Lane, Ft. Pierce, FL 34905; Tel: 772-465-1165; Fax: 772-466-1134; Website: www.ociassociates.com
 2. Johnson, Levinson, Ragan, Davila, Inc., 1450 Centrepark Blvd., Suite 350, West Palm Beach, FL 33401; Tel: 561-689-2303; Fax: 561-689-2302; Website: www.jlrdinc.com.
 3. TLC Engineering, 874 Dixon Blvd., Cocoa, FL 32922; Tel: 321-636-0274; Fax: 321-639-8986; Website: www.tlc-eng.com.

1.6 COORDINATION:

- A. Commissioning Provider will be hired by Owner. Commissioning Provider shall direct and coordinate activities of commissioning team.
- B. Commissioning team shall consist of Commissioning Provider, Owner, GC/CM, and associated subcontractors.
- C. Scheduling: Commissioning Provider shall schedule commissioning activities of and shall coordinate schedule with GC/CM. Commissioning Provider shall generally provide not less than two (2) weeks notice to GC/CM of commissioning activities, except where retesting is required or commissioning activities have been delayed by no fault of commissioning firm.

1.7 COMMISSIONING PROCESS:

- A. Commissioning Provider shall develop and coordinate execution of commissioning plan; observe and document installation, check-out, start-up, and equipment and system testing to establish that equipment and systems are functioning in accord with project requirements, and to assist in developing correct and complete documentation of construction effort.
- B. Commissioning Provider shall not be responsible for design concept, design criteria, compliance with codes, design, construction scheduling, cost estimating, construction management, or construction supervision.
- C. Commissioning Provider may assist design team with problem-solving, or GC/CM with correction of non-conformance items or deficiencies.
- D. Commissioning Provider is not responsible for providing tools required to start, check-out and perform functional tests of equipment and systems, except for specified testing with supplemental portable data-loggers, which shall be supplied and installed by Commissioning Provider.
- E. Work Required during Construction Phase:
 - 1. Ensure compliance with construction documents, and achieve following objectives:
 - 2. Review the engineer of records basis of design as well as the project design documents and make comments pertaining to the execution of commissioning.
 - 3. Develop commissioning plan and distribute to GC/CM, Owner and Engineer.
 - 4. Coordinate commissioning activities during construction with GC/CM and ensure that commissioning activities are included in master project schedule.
 - 5. Review submittals applicable to systems being commissioned, including GC/CM proposed detailed start-up procedures, concurrent with Engineer's reviews and provide review comments to Engineer and Owner.
 - 6. Commissioning provider's review shall be for compliance with commissioning needs, and to aid in development of functional testing procedures and only secondarily to review for compliance with equipment specifications. Design professional remains responsible for interpretation of compliance with contract requirements.
 - 7. Request and review additional information as required to perform assigned commissioning tasks, including review of operations and maintenance materials, and GC/CM's start-up and check-out procedures.
 - 8. Develop specific Functional Performance Test procedures and forms to document proper operation of equipment and system.

9. Submit proposed functional tests to Engineer for review and general conformance to requirements of contract documents and provide copy of proposed functional performance test procedures to GC/CM who shall review proposed tests for feasibility, safety, equipment, and warranty protection.
 10. Required performance testing includes control system trending, stand-alone data logger monitoring, or manual logging of system operation to demonstrate proper operation. Functional Performance Test forms shall include following information:
 - a. Date.
 - b. Project name.
 - c. System and equipment or component name(s).
 - d. Equipment location and identification number.
 - e. Test identification number, and reference to pre-function checklist and start-up documentation identification numbers for each piece of equipment.
 - f. Participating parties.
 - g. Reference to specification describing specific sequence of operations or parameters being tested or verified.
 - h. Formulae used in calculations.
 - i. Required pre-test field measurements.
 - j. Instructions for setting up test.
 - k. Special cautions or alarm limits.
 - l. Specific step-by-step procedures to execute test, in clear, sequential, and repeatable format.
 - m. Acceptance criteria of proper performance with provisions for clearly indicating whether or not proper performance of each part of test was achieved.
 - n. Section for comments.
 - o. Signature and date block for Commissioning Provider and participating parties.
 11. Review GC/CM start-up and pre-functional testing reports and provide on-site observation of start-up and pre-functional testing as specified herein.
 12. Review proposed testing, adjusting, and balancing execution plan for completeness and requirements of commissioning process and provide comments to GC/CM, Engineer, and Owner.
 13. Perform site visits, monthly until pre-functional testing of equipment and systems begins, and then weekly throughout Project, to review component and system installations. Concurrently, schedule and conduct commissioning planning and coordination meetings to review construction progress and to assist in resolving discrepancies or issues relating to commissioning process.
- F. Acceptance Phase: Demonstrate that performance of equipment and systems installed during construction phase meets requirements of construction documents. Notify Owner and Engineer of deficiencies in results or procedures. Commissioning activity shall achieve following objectives:
1. Coordinate, witness, and approve functional tests of equipment and systems performed by GC/CM. Review functional test reports and analyze trend logs, data logger reports, and other monitoring data to evaluate equipment and system performance.
 2. Document performance of functional testing and provide comparison to required performance, as defined by project documents.
 3. Coordinate retesting as necessary until satisfactory performance is demonstrated.

4. Maintain master deficiency and resolution log, separate testing record log, and provide written progress reports and test results with recommended corrective actions for observed deficiencies.
 5. Compile and submit commissioning report to Owner and Engineer documenting results of the Start-Up, Pre-Functional Performance Testing, and Functional Performance Testing.
 6. Review GC/CM's proposed training of Owner's operating personnel and provide comments to Engineer and Owner.
 7. Coordinate and attend GC/CM provided training sessions. Verify approved training has been properly completed.
- G. Warranty period: assist Owner in identifying defects in installed equipment or system operation to accomplish following objectives:
1. Review equipment warranties to ensure that Owner's responsibilities are clearly defined.
 2. Verify that warranty items have been corrected properly.
 3. Coordinate and supervise required seasonal or deferred testing and deficiency corrections, as specified, or required by commissioning plan.
 4. Return to site, approximately 10 months into warranty period and review with Owner building operation and condition of outstanding issues related to original and seasonal commissioning.
 5. Assist Owner in reviewing failure and repair records of equipment during warranty period and in evaluation of GC/CM's corrective actions. Identify areas that may come under warranty or under original construction contract.
 6. Interview Owner and identify problems or concerns regarding operating building as originally intended and shall make suggestions for improvements.
 7. Assist the Owner in developing reports, documents, and requests for services to remedy outstanding problems.

PART 2 – PRODUCTS

- 2.1 Not Used.

PART 3 – EXECUTION

3.1 REPORTING:

- A. Provide final commissioning report to Owner with following reports:
1. Copies of periodic commissioning reports.
 2. Copies of Pre-Functional Performance Test reports.
 3. Copies of Functional Performance Test reports.
 4. Copies of the Training Report.

3.2 SYSTEMS TO BE COMMISSIONED:

- A. As defined previously herein under item 1.1, F.

3.3 START-UP, PREFUNCTIONAL CHECKLISTS, AND INITIAL CHECK-OUT:

- A. GC/CM shall be responsible for initial check-out and pre-functional testing of installed equipment and systems.

- B. Commissioning Provider shall monitor activities of parties responsible for executing required start-up, and pre-functional testing, as identified in commissioning plan.
- C. Commissioning Provider shall review GC/CM furnished documentation of start-up, initial check-out, and pre-functional test procedures for equipment and systems to ensure that there is written documentation that each manufacturer-recommended procedure has been completed.
- D. Observe first pre-functional test procedures for each type and size equipment to ensure that approved procedures are being followed.
 - 1. For lower-level components of equipment, (e.g., variable volume terminal units, sensors, controllers), observe sampling of pre-functional and start-up procedures.
 - 2. In no case, shall number of units witnessed be less than 20% of total number of identical or very similar units.

3.4 FUNCTIONAL PERFORMANCE TESTING:

- A. Functional Performance Testing of equipment or systems shall be conducted only after pre-functional testing and start-up has been satisfactorily completed. Schedule functional tests with GC/CM. Direct, witness, and document Functional Performance Testing of equipment and systems to be commissioned. GC/CM shall be responsible for execution of Functional Performance Tests.
- B. Functional Performance Testing shall demonstrate that each item of equipment and each system is operating according to requirements of construction documents as defined by A/E. Each item of equipment and system undergoing Functional Performance Testing shall be operated through all modes of operation where there is required system response. Verify each action required in sequences of operation has been accomplished according to requirements, or A/E shall revise sequences as deemed appropriate.
- C. Functional Performance Testing shall proceed from components to subsystems to systems. When proper performance of interacting individual systems has been achieved, interface or coordinated responses between systems shall be tested.
- D. Proper and accurate operation of control system shall be proven by functional testing and approved by Commissioning Provider before it may be used for testing, adjusting and balancing activities or to verify performance of other components or systems. If authorized by Commissioning Provider, portions of control system may be tested and approved before functional testing of the entire system is completed.
- E. Air and water balancing shall be completed and corrected as necessary before Functional Performance Testing of air-related or water-related equipment or systems.
- F. Test Methods:
 - 1. Functional Performance Testing and verification shall be achieved by manual testing (direct manipulation of equipment and observation of its response and performance) or by monitoring performance using control system's trend log capabilities.
 - 2. Functional Performance Test procedures shall specify which methods shall be used for each test. Determine which method is most appropriate for tests that do not have method specified.
 - 3. Commissioning Provider may substitute specified methods or require additional method to be executed, other than that specified, if required to demonstrate proper operation of equipment or system being tested.
 - 4. Develop Functional Performance Testing plans that define allowable sampling procedures and that specify procedures to be followed in case of observed discrepancies

or failures in sample chosen for functional testing.

5. AHU operation (leaving air temperature, VFD speed) shall be trend logged with VAV box and air valve flow rates, as well as space temperatures to demonstrate modulation of system components with changing loads, as well as occupied/non-occupied status and control strategies such as optimum static pressure reset and temperature set-up/set-back.

6. Sampling: Multiple identical pieces of non-life-safety or otherwise non-critical equipment may be functionally tested using sampling strategy, as defined in functional test procedures.
 - a. Significant application differences and significant sequence of operation differences in otherwise identical equipment invalidates their common identity.
 - b. Small size or capacity difference, alone, does not constitute difference.
 - c. The following equipment may be sample tested: Reheat coils, terminal boxes, occupancy sensors, and lighting controls.
7. If 10% or 3 or more identical pieces of equipment (size alone does not constitute a difference) fail to perform to requirements of project documents (mechanically or substantively) due to manufacturing defects or application error not allowing it to meet performance specifications, identical units may be considered unacceptable by Commissioning Provider. In such case, GC/CM shall provide Commissioning Provider with the following:
 - a. Within 1 week of notification from Commissioning Provider, GC/CM or manufacturer's representative shall examine other identical units making record of findings. Findings shall be provided to Commissioning Provider within 2 weeks of original notice.
 - b. Within 2 weeks of original notification, GC/CM shall provide signed and dated, written explanation of problem, cause of failures, and proposed solution, including full equipment submittals for corrective or replacement equipment, if appropriate. Proposed solutions shall meet requirements of original installation.
 - c. Commissioning Provider shall evaluate proposed solution and submit recommendation of approval or disapproval to Owner and Engineer.
 - d. When approved, 2 examples of proposed solution shall be installed by GC/CM and Commissioning Provider shall schedule and conduct functional testing of proposed solution. Upon completion of functional testing of proposed solution, Commissioning Provider shall recommend acceptance or disapproval of proposed solution to Owner.
 - e. Upon acceptance of proposed solution by Owner, GC/CM shall replace or repair identical items and extend warranty accordingly, if original equipment warranty had begun. Replacement/repair work shall proceed with reasonable speed beginning within 2 weeks of approval of proposed solution.
8. Ensure that each Functional Performance Test is performed under conditions that simulate actual operating conditions as closely as is practically possible.
9. Simulation of operating conditions (not by overwritten value) may be allowed, at Commissioning Provider's discretion. Simulation of conditions shall be accomplished by subjecting the equipment to actual operating conditions by artificial means whenever possible.
10. Where actually achieving simulated operating condition is impractical, as determined by Commissioning Provider or as identified in Functional Performance Test procedure, use of signal generators to create simulated signal may be used to test and calibrate transducers and DDC constants instead of using sensor to act as signal generator via simulated conditions or overwritten values. Signal generators or simulators shall be provided by GC/CM.
11. Overwriting sensor values to simulate conditions, such as overwriting outside air temperature reading in control system to be different than it really is, may be allowed if approved by Commissioning Provider. Simulation of operating conditions is preferable.

12. Altering setpoints: rather than overwriting sensor values, and when simulating conditions is difficult, altering setpoints shall be used to test sequences.
13. Indirect indicators: relying on indirect indicators for responses or performance may be allowed only after the Commissioning Provider has visually and directly verified that indirect readings represent actual conditions and responses over range of test parameters.

3.5 RETESTING OF EQUIPMENT AND/OR SYSTEMS:

- A. Prior to retesting of functional performance tests found to be deficient, submit data indicating that deficient items have been completed and corrected to Commissioning Provider.
- B. After review of submitted data, if corrective measures are acceptable, Commissioning Provider shall schedule and conduct recheck.
- C. If during retesting it becomes apparent that deficient items have not been completed and corrected as indicated in data provided by GC/CM, retesting shall be stopped. Costs for commissioning team to further supervise retesting of Functional Performance Test shall be the responsibility of GC/CM.

3.6 DOCUMENTATION, NONCONFORMANCE, AND APPROVAL OF TESTS:

- A. Documentation: Witness and document results of functional tests using specific procedural forms developed for that purpose. Deficiencies or nonconformance issues shall be noted and reported with test results. Include completed test forms in final commissioning report.
- B. As Functional Performance Testing progresses and deficiencies are identified, discuss issues and attempt to resolve discrepancies with GC/CM.
- C. Approval: Note each satisfactorily demonstrated function on functional test form. Formal approval of functional tests shall be made after review of test reports by Commissioning Provider and Owner. Recommend acceptance of each test to the Owner using standard form. Owner shall give final approval on each test using same form, providing signed copy to Commissioning Provider and GC/CM.

3.7 DEFERRED TESTING:

- A. Deferred testing: If required pre-functional or functional test cannot be completed as scheduled, execution of checklists and functional testing may be delayed upon approval of Commissioning Provider and Owner. Deferred tests shall be conducted in same manner as seasonal tests as soon as possible.
- B. Schedule and coordinate any required seasonal testing, tests delayed until weather or other conditions are suitable for demonstration of equipment or system's performance. Seasonal testing shall be executed, documented, and deficiencies corrected as specified herein for functional testing. Adjustments or corrections to operations and maintenance manuals and record documents due to test results of shall be made before seasonal testing process is considered complete. Schedule deferred testing with GC/CM and Owner.

3.8 OPERATION AND MAINTENANCE MANUALS:

- A. Prior to beginning specified training programs, review draft operations and maintenance manuals, equipment documentation, and as-installed drawings for systems that were commissioned and verify compliance with documents. Communicate deficiencies in documents to Owner and Contractor. When identified deficiencies have been corrected, recommend approval and acceptance of operations and maintenance manuals to Owner. Review equipment warranties and verify that requirements needed to keep warranty valid are clearly identified.
- B. Ensure that Owner's Project Requirements, basis of design, are included in the first section of operations and maintenance manuals. Narrative sections shall be updated by responsible parties to record status.

END OF SECTION

DIVISION

2

SITE CONSTRUCTION

SECTION 02 41 13
SELECTIVE DEMOLITION

PART 1 GENERAL

1.1 RELATED DOCUMENTS

- A. The provisions of the General Conditions, Supplementary Conditions, Drawings, Specifications and the Sections included under Division 1, General Requirements and References are included as a part of this Section as though bound herein.

1.2 SECTION INCLUDES

- A. Provide labor, materials, services, and equipment necessary to furnish and install work as indicated and as specified herein, which includes, but is not limited to:
 - 1. Required demolition of designated existing elements
 - 2. Salvage of designated items

1.3 REFERENCES

- A. Comply with NFPA 1 – Chapter 29 and NFPA 241 Standard for Safeguarding Construction Alteration and Demolition Operation 2000 Edition
- B. Florida Building Code – FBC

1.4 NOTIFICATION OF OWNERS OF UTILITY LINES AND EQUIPMENT

- A. Notify the Owner or local authority owning any conduits, wires, pipes, or equipment affected by demolition work.
- B. Arrange for removal or relocation of affected items and pay fees or costs in conjunction with removal or relocation, except as otherwise noted.

1.5 PROTECTION

- A. Prior to starting any work on site, provide a safety plan as outlined in Section 453 FBC to the Building Department for approval.
- B. Coordinate the implementation of the safety plan with the Building Department, Campus Police, School Representative, and Program Management.
- C. Prior to starting demolition operations, provide necessary protection of existing spaces and items to remain.
- D. Owner may be continuously occupying areas of the building immediately adjacent to areas of selective demolition. If Owner continues to occupy the facility comply with the following:
 - 1. Conduct demolition work in a manner that will minimize need for disruption of the Owners normal operations.
 - 2. Provide protective measures as required to provide free and safe passage of Owner's personnel and public to and from occupied portions of the facilities.
 - 3. Provide minimum of 72 hours advance notice to Owner of demolition activities that will impact Owners normal operations.
 - a. Obtain specific approval from Owner for impact.
- E. Owner assumes no responsibility for actual condition of items to be demolished.
 - 1. Owner will maintain conditions at time of commencement of contract insofar as practical.

- F. Protect any exposed existing finish work that is to remain during demolition operations.
- G. Erect and maintain dust proof partitions, closures, and ventilator system as required preventing the spread of dust or fumes to occupied portions of the building.
 - 1. Take whatever precautions necessary to minimize impact on occupied areas.

1.6 REGULATORY REQUIREMENTS

- A. Conform to applicable codes for demolition of structures, safety of adjacent structures, dust control, runoff, and erosion control, and disposal of demolished materials.
- B. Obtain required permits from authorities having jurisdiction.
- C. Notify affected utility companies before starting work and comply with their requirements.
- D. Do not close or obstruct roadways, sidewalks, and hydrants, without permits.
- E. Conform to applicable regulatory procedures when discovering hazardous or contaminated materials.
 - 1. Contact the Architect and Owner immediately.
- F. Test soils around buried tanks for contamination.
- G. No demolition will occur during school hours without the written permission of the Owner.

1.7 EXPLOSIVES

- A. The use of explosives is strictly prohibited.

PART 2 PRODUCTS - (Not applicable)

PART 3 EXECUTION

3.1 PREPARATION

- A. Verify the proper disconnection and capping of all abandoned utilities.
- B. Verify that required barricades and other protective measures are in place.
- C. Provide necessary shoring, bracing, and other precautions required for proper support of existing structure during cutting and demolition operations.
- D. Photograph existing conditions of structure, surfaces, equipment and surrounding spaces that could be misconstrued as damage resulting from selective demolition work; submit photographs and written report of existing damage to Architect prior to starting work.
 - 1. Contractor shall repair damage caused to existing facilities at no cost to Owner unless they can provide documentation is indicating pre-existing damage.

3.2 DEMOLITION OPERATIONS

- A. Cut and remove elements and equipment as designated on Drawings.
 - 1. Remove elements in their entirety unless otherwise indicated.
- B. Execute demolition in a careful and orderly manner with least possible disturbance or damage to adjoining surfaces and structure.
- C. Exercise extreme caution in cutting and demolition of portions of existing structure.
 - 1. Obtain approval of Architect prior to cutting or removing structural members for any reason.
- D. Avoid excessive vibrations in demolition procedures that may transmit through existing structure and finish materials.

- E. If hazardous materials are encountered during demolition operations, comply with applicable regulations, laws, and ordinances concerning assessment, removal, handling, and protection against exposure or environmental pollution and immediately contact the District's ECO.

3.3 DISPOSAL

- A. Materials, equipment, and debris resulting from demolition operations shall become property of Contractor.
 - 1. Remove demolition debris at least once each day in accordance with applicable City, State, and Federal Laws.
- B. Cover debris in trucks with approved netting to prevent spillage during transportation.
- C. Do not store except in approved containers or burn materials on site.
 - 1. Remove combustible waste materials in a manner approved by local Fire Department.
 - 2. Remove, handle, and dispose of any hazardous waste and debris in accordance with applicable City, State, and Federal Laws.
- D. Transport demolition debris to off-site disposal area and legally dispose of debris.
- E. Use street routes specifically designated by City for hauling debris.
- F. When possible dispose of material to recycling centers.

3.4 CLEANING AND REPAIR

- A. Leave building broom clean and free of debris, ready to receive new work.
- B. Repair demolition performed in excess of that required.
 - 1. Return structures and surfaces to remain to condition existing prior to commencement of selective demolition.

END OF SECTION

DIVISION

3

CONCRETE

SECTION 03 00 00
CONCRETE

PART 1 GENERAL

1.1 RELATED DOCUMENTS

- A. Work of this section shall conform to the requirements of the Contract Documents, including the General Conditions, Supplementary General Conditions, Special Conditions, and Division 1 General Requirements.

1.2 DESCRIPTION

- A. Work Included: The extent of the concrete work is indicated on drawings and specified herein. Concrete Work includes, but is not limited to, the following:
 - 1. Cast-in-place stone concrete.
 - 2. Reinforcing steel.
 - 3. Concrete admixtures.
 - 4. Formwork.
 - 5. Curing of concrete.
 - 6. Finishing of concrete.
 - 7. Protection of concrete.
 - 8. Plastic water-stops.
 - 9. Expansion Joint Fillers.

1.3 QUALITY ASSURANCE

- A. Codes and Standards: Comply with the provisions of the following codes, specifications and standards, except where more stringent requirements are shown or specified:
 - 1. ACI 301 "Specifications for Structural Concrete for Buildings".
 - 2. ACI 318 "Building Code Requirements for Reinforced Concrete".
 - 3. Concrete Reinforcing Steel Institute, "Manual of Standard Practice".
- B. For any item not specifically covered in these specifications, ACI 301-81 "Structural Concrete for Buildings" will govern.

1.4 SUBMITTALS

- A. Product Data: Submit manufacturer's product data with applications and installation instruction for materials and items, including but not limited to, reinforcement and forming accessories, admixtures, water-stops, and others as requested.
- B. Shop Drawings: Reinforcement - Submit shop drawings for fabrication, bending, and placement of concrete reinforcement. Comply with ACI 315 "Manual of Standard Practice for Detailing Reinforced Concrete Structures" and as shown on the drawings, showing bar schedules, stirrup spacing, diagrams of bent bars, arrangement of concrete reinforcement. Include special reinforcement if required.

1. All reinforcing steel is to be precut off-site in an approved fabricating shop by an approved Subcontractor for reinforcing steel fabrication.
- C. Laboratory Test Reports: Submit laboratory test reports for mix designs as specified.
- D. Mix Design: This Contractor shall submit a mix design for each type of concrete required for approval by the Engineer. Refer to Part 4 of this Section for additional requirements.
- E. Material Certificates: Submit certificates for reinforcing steel as hereinafter specified.
- F. Admixture(s) Certification(s): Submit certifications(s) as hereinafter specified.

1.5 JOB CONDITIONS

- A. Time of Completion and Procedure of Construction: Time of Completion is a matter of utmost importance in connection with this Contract. By the submission of a bid, this Contractor agrees to diligently perform his work so as to assure completion within the time limits and Pre-Bid CPM Schedule.

PART 2 PRODUCTS

2.1 FORM MATERIALS

- A. Forms for Concrete: Construct all formwork for concrete surfaces with plywood, lumber, or metal. Provide lumber dressed on at least two (2) edges and one (1) side for tight fit. Provide form material with sufficient thickness to withstand pressure of newly-placed concrete without objectionable bow or deflection.
- B. Form Coatings: Provide commercial formulation form-coating compounds that will not bond with, stain, nor adversely affect concrete surfaces, and will not impair subsequent treatments of concrete surfaces.

2.2 REINFORCING MATERIALS

- A. Reinforcing Bars: Reinforcing steel must be correctly rolled to section and free from all surface defects and shall be in accordance with ASTM A-615, Grade 60, as evidenced by manufacturer's certificates. The grade of steel shall be intermediate, new billet stock. All bars shall be deformed and rolled with raised symbols to identify the manufacturer and the size of the bar.
- B. Tie wire shall be No. 18 U.S. Steel wire gauge black annealed wire.
- C. Supports for Reinforcement: Spacerbars, slab bolsters, chairs, wiring, nails, and other accessories shall be standard commercial metal supports and plastic where exposed to weather or where rust will impair architectural finish.

2.3 CONCRETE MATERIALS

- A. Portland Cement: ASTM C-150, Type 1.

- B. Supplementary Cementitious Materials:
 - 1. Fly Ash: ASTM C618, Type F may be used up to a maximum of 25% of the total cementitious content.
 - 2. Ground Granulated Blast-Furnace Slag: ASTM C989, Grade 100 or 120 may be used up to a maximum of 40% of the total cementitious content.
 - 3. The exact percentages used shall be based on a successful test placement on-site.
- C. Fine Aggregate: Clean, natural siliceous sand, consisting of hard, strong, durable, uncoated particles, and shall conform to the requirements of ASTM C-33.
- D. Coarse Aggregate: Clean, hard, uncoated, strong, durable gravel, or crushed stone, and shall conform to the requirements of ASTM C-33. The maximum size of coarse aggregate shall be 1 inch.
- E. Water: Potable for mixing and curing concrete and shall not contain amounts of impurities injurious to the concrete.
- F. Light Weight Aggregate: Conform to ASTM C-330.

2.4 ADMIXTURES

- A. General: No admixtures shall be used in concrete unless otherwise specified herein and except with the permission of the Structural Engineer and after laboratory design mix approval. This Contractor shall provide the services of the admixture manufacturer's representative to assure proper use of admixtures if required.
 - 1. Prohibited Admixtures: Calcium chloride, thiocyanates containing more than 0.05% chloride ions are not permitted. Admixtures containing more than 0.05% chloride ions are not permitted.
 - 2. Certification: Written conformance to the above-mentioned requirements and the chloride ion content of the admixture will be required from the admixture manufacturer prior to mix design review by the Engineer.
- B. Water Reducing Admixture: Conform to ASTM C-494, Type A. Provide one of the following products:
 - 1. W.R. Grace & Co. - "WRDA with Hycol"
 - 2. Master Builders - "Pozzolith 322N"
 - 3. The Euclid Chemical Company - "Eucon WR-75"
 - 4. Sika Chemical Corp - "Plastocrete 161"
- C. Accelerating Admixture: Non-chloride, non-corrosive and conform to ASTM C-494, Type C & E.

1. The Euclid Chemical Co. - "Accelguard 80"
 2. W.R. Grace & Co. - "Daraset"
 3. Master Builders - "Pozzolith 500A"
- D. Air Entraining Admixture: The air-entraining admixture shall conform to ASTM C-260 and shall be used where necessary to achieve the specified air content.
- E. Water Reducing Retarder Admixture: Conform to ASTM C-494, Type D.
1. The Euclid Chemical Co. - "Eucon Retarder-75"
 2. W.R. Grace & Co. - "Daratard-17"
 3. Sika Chemical Corp - "Plastocrete 161-R"
 4. Master Builders - "Pozzolith 100-XR"
- F. High Range Water Reducing Admixture: Conform to ASTM C-494, Type F. These admixtures shall be used in strict accordance with the manufacturer's recommendations. Provide one of the following products:
1. W.R. Grace & Co. - "Daracem - 100"
 2. Sika Chemical Corp - "Sikament"
 3. The Euclid Chemical Co - "Eucon-37"
 4. Master Builders - "Rheobuild 716"

2.5 RELATED MATERIALS

- A. Anchor Bolts: Anchor bolts shall be ASTM A-307. For size and length of anchor bolts refer to the Structural drawings.
- B. Joint Fillers: Expansion joint fillers shall be asphalt impregnated fiberboard conforming to ASTM D-1751. Joint fillers shall extend full depth of joint and be of thickness indicated on drawings.
- C. Water-stops: Provide flat, dumbbell type or center bulb type waterstops at construction joints and other joints as shown. Size to suit joints.
- D. Non-Shrink Grout: Pre-mixed non-shrink grout as called for on drawings shall be as manufactured by:
1. The Euclid Chemical Co. - "Euco N-S Grout" (All exposed grout).
 2. The Euclid Chemical Co. - "Firmix"

3. Master Builders - "Masterflow 713 Grout"
 4. U.S. Grout Corporation - "Five Star Grout"
 5. Lambert Corp. - "Vibropruf #11"
- E. Curing Compounds: Curing compounds shall be manufactured by:
1. "Super Floor Coat" or "Super Rez Seal" by the Euclid Chemical Company, "Masterseal" by Master Builders, or approved equal, for curing and sealing all garage, exterior exposed, and mechanical room floors. The compound shall be a clear styrene acrylate type, 30% solids content minimum moisture loss of 0.030 grams per sq. cm. when applied at a coverage rate of 300 sq. ft. per gallon. Manufacturer's certifications required.
 2. Other interior slabs shall be cured with the dissipating resin type compound, "Kurez DR" by The Euclid Chemical Company or approved equal. The compound shall conform to ASTM 309 and chemically break down in a two to four-week period. The curing compounds must be applied immediately after finishing and on formed surfaces following form removal.
- F. Plastic Reglets: Provide "Type A" prefilled P.V.C. reglets where indicated, made by Superior Concrete Accessories, Inc. Install in strict accordance with manufacturer's details and directions.
- G. Bonding Compound: The compound shall be polyvinyl acetate, rewettable type, "Euco Weld" by The Euclid Chemical Company or "Weldcrete" by The Larsen Company.
- H. Epoxy Adhesive: The compound shall be a two (2) component, 100% solids, 100% reactive compound suitable for use on dry or damp surfaces, "Euco Epoxy #463 or #615 " by The Euclid Chemical Company or "Sikadur Hi-Mod by Sika Chemical Corporation.
1. Polyvinyl chloride (PVC) water-stops: Corps of Engineers CRD-C 572.

2.6 CONCRETE PROPORTIONS

- A. All mix designs shall be proportioned in accordance with Section 4.3, "Proportioning on the Basis of Field Experience and/or Trial Mixtures" of ACI 318-83. Submit mix designs on each class of concrete for review. If trial batches are used, the mix design shall be prepared by an independent testing laboratory and shall achieve a compressive strength 1200 psi higher than the specified strength. This over-design shall be increased to 1400 psi when concrete strengths over 5000 psi are used. All proposed mixes shall be submitted for approval prior to the start of concrete operations.
- B. Cement, aggregate and other materials required for design or verification mixes by the laboratory shall be supplied by this Contractor.
- C. Measurements of fine and coarse aggregate shall be made separately by weight. The proportioning of aggregate for fractional sacks of cement will not be permitted unless the

- cement is weighed for each batch. Weighing equipment shall be arranged to permit making compensation for changes in the weight of moisture contained in the aggregate.
- D. Batching equipment shall be subject to inspection and approval.
- E. Design Mixes to provide normal weight concrete with the following properties, as indicated below, unless otherwise indicated on drawings and schedules.
1. Self-Consolidating Concrete: Use where indicated on the plans. Minimum flow of 20” or as required by the successful test placement. All self-consolidating concrete shall contain the specified high-range water-reducing admixture and viscosity-modifying admixture as required. Required workability, pumpability, surface finish, and setting time must be verified with a successful test placement onsite.
 2. “Quick Dry” Concrete: Maximum W/cm – 0.40, superplasticized, 3% maximum air content. The floor finish shall be as required by the manufacturer of the specified floor coating or covering.
- F. Water-Cement Ratio: Design mixes to provide normal weight concrete with the following properties, as indicated on drawings and schedules:
- 5000-psi, 28-day compressive strength; W/C ratio, 0.42 maximum (non-air-entrained), 0.32 maximum (air-entrained).
- 4000-psi, 28-day compressive strength; W/C ratio, 0.45 maximum (non-air-entrained), 0.35 maximum (air-entrained).
- 3500-psi, 28-day compressive strength; W/C ratio, 0.48 maximum (non-air-entrained), 0.40 maximum (air-entrained). Use for all steel troweled interior slabs subject to vehicular traffic. Include structural fibers in all loading dock slabs and toppings at the rate of 5 lbs. per cubic yard
- 3000-psi, 28-day compressive strength; W/C ratio, 0.52 maximum (non-air-entrained), 0.46 maximum (air-entrained).
- 2500-psi, 28-day compressive strength; W/C ratio, 0.54 maximum (non-air-entrained), 0.50 maximum (air-entrained).
- G. Lightweight Concrete - Proportion mix as specified. Design mix to produce strength and modulus of elasticity as noted on drawings, with a splitting tensile strength factor (Fct) of not less than 5.5 for 3000-psi concrete and a dry weight of not less than 95 lbs. or more than 110 lbs. after 28 days. Limit shrinkage to 0.03 percent at 28 days.
- H. Admixtures
1. Use water-reducing admixture or high range water-reducing admixture (super plasticizer) in all concrete.

2. Use accelerating admixture in concrete slabs placed at ambient temperatures below 50 deg. F. (10 deg. C.).
 3. Use air-entraining admixture in exterior exposed concrete unless otherwise indicated. Add air-entraining admixture at manufacturer's prescribed rate to result in concrete at point of placement having air content within following limits:
 - a. Concrete structures and slabs exposed to freezing and thawing or subjected to hydraulic pressure:
 - b. 3% to 5% for maximum 1" aggregate.
 4. Use admixtures for water-reducing and set-control in strict compliance with manufacturer's directions.
- I. Slump Limits: Proportion and design mixes to result in concrete slump at point of placement of 4 inches plus or minus 1 inch. Concrete containing HRWR admixture (superplasticizer): Not more than 8 inches.

2.7 MIXING

- A. Job Site Mixing: Mix materials for concrete in appropriate drum type batch machine mixer. For mixers of one cu. yd., or smaller capacity, continue mixing at least 1-1/2 minutes, but not more than 5 minutes after ingredients are in mixer, before any part of batch is released. For mixers of capacity larger than one cu. yd., increase minimum 1-1/2 minutes of mixing time by 15 seconds for each additional cu. yd., or fraction thereof.
1. Provide batch ticket for each discharged and used in work, indicating project identifications name and number, date, mix type, mix time, quantity, and amount of water introduced.
- B. Ready-Mix Concrete: Comply with requirements of ASTM C-94, and as herein specified.
1. During hot weather, or under conditions contributing to rapid setting of concrete, a shorter mixing time than specified in ASTM C-94 shall be required. When air temperature is between 85°F (30°C), reduce mixing and delivery time from 1-1/2 hours to 75 minutes, and when air temperature is above 90°F (32°C), reduce mixing and delivery time to 60 minutes.

PART 3 EXECUTION

3.1 FORMS

- A. Forms shall be so constructed that the finished concrete will conform to the shapes, lines, and dimensions shown on the Contract drawings. They shall be substantially built and sufficiently tight to prevent leakage of water or paste and securely braced in order to maintain their true position and shape. If any form loses its proper shape or position, it shall immediately be repaired to the satisfaction of the Architect or removed and replaced with a new form. Provide cleanout openings.

- B. Earth cuts shall not be used as forms for vertical surfaces.
- C. The design and engineering of the formwork, as well as its construction, shall be the sole responsibility of this Contractor.
 - 1. Formwork design, tolerances of finished lines, and camber to compensate for deflections due to weight of concrete shall conform to "Recommended Practice for Concrete Formwork (ACI-347)", or as otherwise noted.
- D. Form Ties
 - 1. Factory-fabricated, adjustable length, removable, or snap off metal form ties designed to prevent deflection and to prevent spalling concrete surfaces upon removal.
 - a. Provide ties so that portion remaining within concrete after removal of exterior parts is at least 1-1/2 inches from the outer concrete surfaces.
- E. Provisions for Other Trades: Provide openings in concrete formwork to accommodate work of other trades. Determine size and location of openings, recesses and chases from trades providing such items. Accurately place and securely support items built into forms.
- F. Cleaning and Tightening: Thoroughly clean forms and adjacent surfaces to receive concrete. Remove chips, woods, sawdust, dirt or other debris just before concrete is placed. Retighten forms and bracing after concrete placement is required to eliminate mortar leaks and maintain proper alignment.

3.2 PLACING REINFORCEMENT

- A. Reinforcement fabricated to the shapes and dimensions shown or required shall be placed where indicated on the Contract Documents.
- B. Before any reinforcement is placed, any loose rust of mill scale or coatings, including ice or oil, which would reduce or destroy the bond, shall be removed. Reinforcement materially reduced in section shall not be used.
- C. Concrete cover over steel reinforcement shall be as shown on the drawings.
- D. Bar reinforcement shall be carefully formed to the shapes shown and required to resist most effectively the stresses involved. Bars with kinks or bends not required shall not be used. The reinforcing shall not be bent or straightened in a manner which would injure the material. The heating or reinforcement for bending or straightening will not be permitted.
- E. Bends or hooks, unless otherwise shown or required, shall be cold formed around pins. Hooks shall be ACI Standard.
- F. Reinforcement shall be wired securely at intersections and shall be held in place with approved bars, spacers, chairs, high chairs, bolsters, or other supports so that it will not be dislocated or otherwise disturbed during the depositing of concrete.

- G. Steel reinforcement shall not be spliced at points of maximum stress. Laps in adjacent bars shall be staggered. Laps shall be tied and seized tight at both ends.
- H. All dowels shall be secured and tied in place before pouring concrete.
- I. Reinforcing steel shall be stored under cover and protected from rusting, oil, grease, or distortion.

3.3 CONSTRUCTION JOINTS

- A. Where indicated, construction joints shall be of the types and at the locations indicated on the drawings and specified hereinafter. All other construction joints shall be submitted to the Structural Engineer for approval.
- B. Construction joints shall be provided with adequate shear keys for succeeding placements and reinforcement shall be continuous through such joints. No bars shall be continuous through two construction joints.
- C. The Contractor shall have means at hand to bring any grade beam placement to an emergency construction joint provided with the proper shear key and/or dowels if an interruption in the supply of concrete or inclement weather makes such a procedure necessary.
- D. Water-stops as specified shall be provided at all construction joints in concrete work in elevator pit walls, piping pits, and where indicated on drawings.
- E. No horizontal joints will be permitted in walls and grade beams except as shown in the drawings.
- F. Unless otherwise noted, the maximum spacing of construction joints should be as follows:
 - 1. Foundation walls and grade beams - forty (40) feet.

3.4 INSTALLATION OF EMBEDDED ITEMS

- A. Provide anchor bolts for steel column template at correct elevations as shown on the drawings.
- B. Anchor bolts shall be set in location in plan and shall not exceed tolerances specified in AISC "Specifications for Design, Fabrication, and Erection of Structural Steel for Buildings", including the "Commentary" and Supplements thereto as issued.

3.5 CONVEYING AND PLACING

- A. Concrete shall be conveyed from the mixer to the forms as quickly as possible by a method which will prevent segregation and loss of materials.
- B. Delivery carts and/or buggies where used shall be kept on temporary runways built over the construction, and runway supports shall not bear upon reinforcing steel or fresh concrete.
- C. Belt conveyors, chutes or similar equipment will be permitted.

- D. Concrete shall not be placed on loose fill, mud or standing water.
- E. Concrete shall be deposited continuously. Deposit concrete as nearly as practicable to its final location to avoid segregation.
- F. Concrete shall not be incorporated in the work after it has attained its initial set not in any event more than one hour after water has been added to the aggregate.
This period may be reduced at the option of the Joint Venture if it develops that presetting is taking place, particularly in hot weather.
- G. Concrete shall be deposited in the forms as nearly as practicable in its final position to avoid re-handling. Special care shall be exercised to prevent splashing of forms or reinforcement with concrete in advance of pouring.
- H. Pumped Concrete - All concrete placed by pumping method shall be proportioned in accordance with the provisions of ACI 211.1 to meet the requirements of strength, slump, and air content in these specifications. Test cylinders for strength and tests for slump air content shall be taken at the point of discharge from the pumping line.
- I. Concrete shall not be allowed to drop freely more than 6 feet. Provide pour holes in formwork for placement of concrete where the drop exceeds 6 feet.
- J. Chute shall be thoroughly cleaned before and after each run. All waste materials and flushing water shall be discharged outside of the forms.
- K. After form removal, all tie holes and other repairable defective areas shall be immediately patched.

3.6 COMPACTION AND VIBRATION

- A. Concrete shall be compacted with the aid of mechanical internal vibrating equipment supplemented by hand spading, rodding and tamping to force out air pockets, to work the materials into the corners and around reinforcement and embedded items, and to eliminate honeycomb.

3.7 COLD WEATHER PLACEMENT

- A. In temperatures of 40 deg. F. and above, when it is not anticipated that temperatures will drop below 40 deg. F, comply with the requirements of ACI.
- B. For temperatures below 40 deg. F, concrete must be delivered to the project site between 55 deg. F. and 70 deg. F, comply with the requirements of ACI. Water shall not be heated over 180 deg. F.
- C. Use only the specified non-corrosive, non-chloride accelerator. Calcium Chloride, thiocyanates or admixtures containing more than 0.05% chloride ions are not permitted.

- D. All methods proposed for heating materials and protecting the concrete shall be subject to approval by the Structural Engineer. Concrete shall never be heated over 90 deg. F, nor will any other overheating which would produce a flash set be permitted.
- E. Do not place concrete on frozen subgrade or subgrade containing frozen materials, snow or ice.

3.8 WARM AND INCLEMENT WEATHER PLACEMENT

- A. During hot weather, the concrete shall be delivered to the forms at the coolest practicable temperature. In no case shall concrete above 90 deg. F. be placed. When high temperatures and/or placing conditions dictate, the Contractor shall use the water-reducing, retarding formulation (Type D) in lieu of the specified water-reducing admixture (Type A) as specified. Concrete shall not be placed when the sun, heat, wind, rain, sleet, or humidity would prevent proper placement.

3.9 CONCRETE FINISHES

- A. Troweled Finish: All concrete slabs, except as noted below, but including those that shall receive resilient flooring, tile with a thin set application, or carpet shall be screeded level to the established elevations, thoroughly consolidated and bull floated. When slabs have set sufficiently, machine float and then trowel with a steel trowel. Concrete shall be in condition acceptable to trades that will furnish and install the finish materials.
 - 1. During the floating and troweling operations, care shall be taken that no holes or depressions are left from the removal of coarse aggregate and that no excess moisture or bleed water is present on the surface. The trowel finished surface shall be level so that the surface conforms to an F25 number as measured by the "Dipstick" or an optical device approved by the Architect.
- B. Scratched Finish: For slab surfaces intended to receive bonded applied "mud set" cementitious applications, ceramic tile or quarry tile, etc., after concrete has been placed, struck-off consolidated and leveled, the surface shall be roughened with stiff brushes or rakes before final set.

3.10 FINISHES OTHER THAN FLOORS

- A. Smooth Finish: All vertical concrete surfaces that will be exposed as finished work shall receive a smooth finish. This shall be achieved by the use of steel forms or new smooth plywood. Sheets shall be as large as possible with smooth even edges and installed with close joints. Joint marks and fins shall be ground off and surfaces left smooth, dense, and free from honeycombing, prominent grain marking, and bulges or depressions more than 1/8" in 4 feet. Surfaces shall then be patched, leaving the surface finish uniformly smooth and washed clean.
- B. Rough Finish: Rough concrete finish shall be used for all other concrete for which no other finish is indicated or specified. Obtain by using clean, straight lumber, plywood, or metal forms. Concrete having a rough finish shall have honeycombing and minor defects patched.

3.11 CONCRETE CURING AND PROTECTION

- A. General: Protect freshly placed concrete from premature drying and excessive cold or hot temperatures.
 - 1. Start initial curing as soon as free water has disappeared from concrete surface after placing and finishing. Immediately after placing and finishing, concrete surfaces not covered by forms, or when forms are removed within three days of placement, shall be protected from the loss of surface moisture for a period of not less than seven days by covering with the curing compound specified.
 - 2. Begin final curing procedures immediately following initial curing and before concrete has dried. Continue final curing for at least 7 days in accordance with ACI 301 procedures. Avoid rapid drying at end of final curing period.

3.12 REPAIR OF DEFECTIVE AREAS

- A. All Structural repairs shall be made with prior approval of the Structural Engineer, as to method and procedure.

3.13 REDESIGN

- A. Changes or departures from the construction details shown on the drawings shall be made only with the approval of the Structural Engineer.
- B. Changes will not be allowed to be made on shop drawings that have been previously submitted for approval except for items that have been noted for corrections or coordination.

3.14 BONDING

- A. Before new concrete is deposited on or against concrete that has hardened, the form shall be retightened, the surfaces of the hardened concrete shall be roughened as required, thoroughly cleansed of foreign matter and laitance, and slushed with cement grout.

PART 4 QUALITY CONTROL TESTING

4.1 TESTING AND INSPECTION

- A. General: The Owner shall pay for the services of a test laboratory for selected by the Owner for concrete quality control as enumerated in this specification. The test laboratory shall submit proof that any concrete inspectors used on the project shall have taken and passed the ACI course in Concrete Inspection within the past five years. The test laboratory services shall include the following:
 - 1. The testing laboratory shall provide continuous inspection and testing of ingredients used in concrete.

2. The test laboratory shall keep a man on the job site for the full length of all concrete placements and if requested, shall check the batching plant quantities and measurements at the beginning of each day's placement.
 3. The test laboratory shall make tests during the progress of the work and shall check for adequate mixing of all concrete placed.
- B. Codes: The testing laboratory, will test the concrete for compliance with contract documents and all applicable ACI and ASTM codes and standards.
- C. Understrength Concrete: If test cylinders fail to meet the strength requirements and/or if, in the opinion of the Structural Engineer, the cylinders are not truly representative of the in-place concrete the Architect has right to request that cores be cut from the work affected. Such cores shall be not less than 3 in number and shall comply as to size and shape and shall be secured and tested in conformance with the requirements of ASTM C42. The cores shall be taken at points mutually agreeable to the Contractor and the Architect, and shall be tested at points mutually agreeable to the Contractor and the Architect, and shall be tested in the presence of the Architect by a laboratory approved by the Architect. If test results are not satisfactory to the Architect, this Contractor shall remove from the work all affected concrete and replace such defective work in a satisfactory manner, all without further compensation or time extension including the costs of coring, testing and all related architectural and engineering work.
- D. Contractor's Responsibility: The sole responsibility for producing concrete in the field having the strength required without causing excessive shrinkage cracks shall rest on the Contractor, regardless of the laboratory determination. If, in his opinion, the field conditions are such that a lower water-cement ratio is necessary to produce the required strength, he shall submit the mix he proposes to use to the Architect in writing. In no case will the Contractor be permitted to use a higher water-cement or lower cement factor than those used in the approved mix.
- E. Re-dosage with the high range water reducing admixture (superplasticizer) may be permitted with the approval of the Engineer as to methods and procedures.

4.2 TESTING DURING PROGRESS OF WORK

- A. If requested, batch plant inspection by the testing laboratory will include:
1. Attendance at the batching plant during all batching.
 2. Determination that all weighing and measuring equipment is in proper working order and that calibration certificates of scales are current.
 3. Determination that the truck mixers are regularly cleaned and maintained and that the drums revolve at the proper speeds. Provide the Joint Venture with a list of trucks certified in accordance with ASTM C-94. No mixers with accumulations of hardened concrete on the blades or with worn or defective blades shall be permitted on this project.
 4. Ascertain that only correct weights of cement and aggregate are used.

5. Ascertain that only those admixtures as specified and in proper qualities are used in the mix.
 6. Ensure that only the correct amount of mixing water is loaded into the tank of the truck.
 7. Ensure that only approved materials are used.
 8. Ascertain that aggregates and water are of the proper temperature.
 9. Make necessary tests of the aggregates to determine the moisture content so that the total water in the batch may be properly adjusted.
 10. Test of aggregates received at the batching plant for gradation and cleanliness.
 11. Check and sign delivery tickets issued by supplier that will identify each load of concrete dispatched to the project as having been inspected.
- B. Field Inspection by the Testing Laboratory will include:
1. Attendance at the project site during all concrete placing operations.
 2. Ascertain that concrete delivered to the site has been inspected by the batch plant inspector.
 3. Control the addition of mixing water in order to maintain the required water/cement ratio.
 4. Ascertain that the concrete is mixed in accordance with the specification requirements.
 5. Ensure that the concrete is conveyed from the mixer to the point of pour in accordance with specifications and good practice.
 6. Ensure that the concrete is of the proper temperature when placed.
 7. Air Content Tests - At least two tests shall be made for each day's placing or from each batch of concrete from which cylinders are cast. Tests shall be representative of each type of concrete.
 8. Slump Tests - At frequent intervals to properly control the consistency and at least one at time of casting each group of cylinders and at least one test for every 25 cubic yards.
- C. Concrete Compression Cylinders: Unless otherwise specified, there shall be taken from the concrete of each strength placed on any one day at least one set of five representative 6" x 12" test cylinders. For large placements on any one day there shall be taken not less than one set of five representative type cylinders for each 100 cubic yard of concrete of each strength placed. Two cylinders to be tested at 7 days, two at the age of 28 days and the fifth cylinder in reserve for further testing. Ascertain that the test specimens are properly protected until shipped to the testing laboratory. Record and identify each cylinder with the location of the concrete from which the specimen was taken. Keep marking in sequence.

- D. Additional Test Lab Responsibilities: Report any material or work performed that fails to meet the job specifications immediately with the Contractor, and then to the Architect. Work will be checked as it progresses. Failure to detect any defective work or materials shall not in any way prevent later rejections or obligate the Owner for final acceptance.
- E. Reports on Inspection: Submit reports on testing and inspection. Reports shall include detailed data with respect to all requirements of the specifications referenced. Materials or workmanship not meeting the requirements of the Contract Documents, either at the plant or project site, will be rejected by the Testing Laboratory and immediately reported to the Contractor and then to the Architect. In no case shall the laboratory recommend any method of adjustment or correction without obtaining prior approval of the Architect. Include in all reports and project title and number, location, Contractor's name, and date work was performed.
- F. Report Copies and Timing: Immediately after tests or inspections have been made and in no case late than seven (7) days after tests of inspection have been made, the laboratory shall furnish copies of all test and inspection reports.
1. One (1) copy to Architect.
 2. One (1) copy to the Contractor.
 3. One (1) copy to Master Consulting Engineers, Inc.
 4. One (1) copy to Concrete Contractor.
 5. One (1) copy to the Owner.
- G. Batch Plant Inspection Daily Report: The batch plant inspectors shall submit a daily report which shall contain the following data:
1. Concrete supplier.
 2. Weather conditions and air temperature (ranges).
 3. Type of concrete.
 4. Required strength of concrete.
 5. Total number of batches, batch weight, and identifying number of each batch and truck load.
 6. Basic control data concrete mix, indicating mix number source, and type of cement, source of aggregates, type of admixtures, basic quantities of cement, aggregates (dry), water and admixtures of concrete per cubic yard, required slump, required air entrainment and water/cement ratio.
 7. Actual data and quantities of concrete batch, indicating time of batching, actual quantities of cement, aggregates (moist) and admixtures, gallons of water added to plant; percent of total moisture in aggregates; temperature of aggregates and water, gallons of water to be added in transit or at site; time truck dispatched from plant.

8. Name of inspector, with time of arrival and departure from batch plant and total hours for day.
- H. Site Inspection Daily Report: The site inspectors shall submit a daily report which shall contain the following data:
1. Concrete supplier.
 2. Weather conditions and air temperature (ranges).
 3. Class and type of concrete placed.
 4. Location of placed concrete and time of starting and stopping of placement.
 5. Identification of truck loads.
 6. Time of dispatching truck from batching plant and receipt of delivery tickets. Indicate delivery ticket number.
 7. Amount of water added in transit or at site.
 8. Time of discharging concrete from truck.
 9. Temperature of concrete during discharging from truck and during placing.
 10. Slump test results, identifying truck load and cylinders made.
 11. Air entrainment test results, identifying truck load.
 12. Test cylinders cast, identifying cylinder number, design strength, time taken, slump, truck numbers from which taken and location of pours with yardage of concrete placed at each location.
 13. Weight per cubic foot of plastic concrete.
 14. Other pertinent data which may have bearing on quality or strength of concrete, placing of concrete, and also report if any concrete was rejected.
 15. Name of inspector, with time of arrival and departure from site and total hours for day.
- 4.3 **CONTRACTOR'S RESPONSIBILITIES AND OBLIGATIONS RELATIVE TO CONCRETE MIX DESIGNS**
- A. This Contractor shall submit preliminary mix designs for the concrete proposed on this project for review.
 - B. The preliminary mix design shall be prepared by a concrete test lab and shall be based on the actual materials used as submitted by this Contractor.

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- C. Furnish an insulated weatherproof box for storing field test.
 - D. The test lab cost for the above shall be borne by this Contractor.
- 4.4 THE TESTING LABORATORY SHALL FURNISH ALL REQUIRED CYLINDER MOLDS AND TAGS TO BE USED FOR MIX DESIGNS AND FIELD TESTS.

END OF SECTION

SECTION 03 54 16
HYDRAULIC CEMENT UNDERLAYMENT

PART 1 GENERAL

1.1 WORK SCOPE

- A. Floor leveling cement based underlayment and leveling coat over existing concrete flooring to receive finished flooring.

1.2 RELATED SECTIONS

- A. Section 01 25 12 – Product Substitution Procedures.
- B. Section 01 31 00 – Project Management and Coordination.
- C. Section 01 33 00 – Submittal Procedures.
- D. Section 01 42 00 – References.
- E. Section 01 45 00 – Quality Control.
- F. Section 01 66 00 – Product Storage and Handling Requirements.
- G. Section 01 74 00 – Cleaning and Waste Management.
- H. Section 01 78 00 – Closeout Submittals.
- I. Section 03 30 00 – Cast In-Place Concrete
- J. Section 09 65 19 – Resilient Tile Flooring
- J. Section 09 68 16 – Sheet Carpeting.

1.3 REFERENCES

- A. See Section 01 42 00 – References for additional reference standards, abbreviations, definitions and acronyms.
- B. American Society of Testing Materials (ASTM):
 - 1. ASTM C78/C78M-15a: Test Method for Flexural Strength of Concrete (Using Simple Beam with Third-Point Loading)
 - 2. ASTM C109/C109M-13e1: Standard Test Method for Compressive Strength of Hydraulic Cement Mortars (Using 2” [50 mm] cube specimens)

1.4 SUBMITTALS

- A. Submit in accord with Section 01 33 00 – Submittal Procedures.
- B. Product Data: Manufacturer's data sheets, including product specifications, test data, preparation instructions and recommendations, storage and handling requirements and recommendations, and installation methods.
- C. Maintenance instructions, including protection requirements after application.

1.5 QUALITY ASSURANCE

- A. Installer Qualifications: Applicator shall be experienced with installation of product and certified by manufacturer as authorized product applicator.
- B. Provide adequate number of skilled workers trained and familiar with application requirements.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Comply with Section 01 66 00 – Product Storage and Handling Requirements.
- B. Deliver product in factory numbered and sealed containers, protected from extreme temperatures and moisture.
- C. Store products in dry area in manufacturer's unopened containers until ready for installation with temperature maintained between 50° F (10° C) and 85° F (29° C). Protect from direct sunlight.
- D. Handle products in accord with manufacturer's printed recommendations.

1.7 WARRANTY

- A. Provide manufacturer's 10 year warranty that hydraulic cement underlayment over structurally sound concrete will not spall, crack or delaminate from concrete surface.

PART 2 PRODUCTS

2.1 APPROVED MANUFACTURERS

- A. ARDEX K15 Rapid Drying Self Leveling Sub-Floor Smoothing Compound as manufactured by Ardex Engineered Cements, 400 Ardex Park Drive, Aliquippa, PA 15001; Tel: 724-203-5000; Tel: 888-512-7339; Fax: 724-203-5001; Website: www.ardexamericas.com
- B. Henry 345 Premixed Patch n' Level as manufactured by W W Henry Co., 400 Ardex Park Drive, Aliquippa, PA 15001; Tel: 1-800-255-3924, 724-203-8499; Website: www.wwhenry.com.
- C. Requests for substitutions from other manufacturers will be considered in accord with Section 01 25 13 – Product Substitution Procedures.

2.2 PERFORMANCE AND PHYSICAL PROPERTIES

- A. Conforming with following values for material cured at 73° F +/-3° F (23° C +/- 2 C°) and +/-5% relative humidity:
 - 1. Application: barrel mix or pump.
 - 2. Flow time: 10 minutes.
 - 3. Initial Set: approximately 30 minutes.
 - 4. Final Set: approximately 90 minutes.
 - 5. Compressive Strength: 4100 psi at 28 days per ASTM C109/C109M13e1.
 - 6. Flexural Strength: 1000 psi at 28 days per ASTM C78/C78M-15a.
 - 7. VOC: 0 grams/liter, calculated per SCAQMD 1168.

2.3 MATERIALS

- A. Water shall be clean, potable, not exceeding 75° F (24° C).

PART 3 EXECUTION

3.1 EXAMINATION

- A. Inspect substrate prior to start of work. Notify Contractor/CM immediately of unsatisfactory surface preparation before proceeding.
- B. Proceeding with installation shall be deemed acceptance of surface substrate conditions.

3.2 PREPARATION

- A. Clean surfaces thoroughly prior to installation. Do not begin installation until substrates have been cleaned, free of oil, grease, dirt, curing compounds, or substances that may act as bond breaker. Mechanically clean, if required to remove foreign matter on concrete surface.
- B. Prepare surfaces using the methods recommended by underlayment manufacturer for achieving best result for substrate under project conditions.
- C. Subfloors shall be tested for excessive moisture content. Do not begin installation until substrate is cleaned and dry.
- D. Provide manufacturer's recommended flexible sealing compound at expansion or isolation joints, or joint filler at saw cuts and control joints.

3.3 INSTALLATION

- A. Install materials in accord with manufacturer's printed installation instructions.
- B. Applicator shall be authorized trained applicator of product. Provide written authorization from manufacturer.
- C. Do not install materials below 50° F (10° C). Apply product using steel trowel using sufficient pressure to achieve desired thickness up to 0.50" (12.7 mm) over large areas and to any thickness for filling holes or gouges in concrete slabs. Provide uniform leveling of surface. Feather product to zero edge thickness, as required.
- D. Coordinate installation with adjacent work to ensure proper sequence of construction. Prevent damage to and soiling of adjacent work.

3.4 PROTECTION

- A. Protect installed underlayment until application of floor finishes in accord with manufacturer's printed instructions.

END OF SECTION

DIVISION

4

MASONRY

SECTION 04 20 00
UNIT MASONRY

PART 1 GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 1 Specification sections, apply to work of this section.

1.2 QUALITY ASSURANCE

- A. Codes and Standards: Comply with governing codes and applicable provisions of the following:
 - 1. National Concrete Masonry Association (NCMA), including "TEK Bulletins".
 - 2. American Concrete Institute (ACI), including ACI 531, ACI 531R and ACI 531.1.
 - 3. Portland Cement Association (PCA), "Concrete Masonry Handbook".
- B. Fire Performance Characteristics: Where fire-resistance ratings are indicated for unit masonry work, provide materials and construction which are identical to those of assemblies whose fire endurance has been determined by testing in compliance with ASTM E 119 by a recognized testing and inspecting organization or by another means, as acceptable to authority having jurisdiction.
- C. Field Construction Mock-Ups: Prior to installation of masonry work, erect sample wall representative of completed masonry work required for project with respect to qualities of appearance, materials and construction. Locate mock-ups during construction as standard for judging completed masonry work. Build mock-ups which are approximately 6' long by 4' high by full thickness. When directed, demolish mock-ups and remove from site.

1.3 SUBMITTALS

- A. Product Data: Submit manufacturer's product data for each type of masonry unit, accessory and other manufactured products, including certifications that each type complies with specified requirements.

1.4 JOB CONDITIONS

- A. Protection of Work: During erection, cover top of walls with waterproof sheeting at end of each day's work. Cover partially completed structures when work is not in progress.
- B. Extend cover a minimum of 24 inches down both sides and hold cover securely in place.
- C. Do not apply uniform floor or roof loading for at least 12 hours after building masonry walls or columns.

- D. Do not apply concentrated loads for at least 3 days after building masonry walls or columns.
- E. Staining: Prevent grout or mortar or soil from staining the face of masonry to be left exposed or painted. Remove immediately grout or mortar in contact with such masonry. Protect base of walls from rain-splashed mud and mortar splatter by means of coverings spread on ground and over all surface.
- F. Protect sills, ledges and projections from droppings of mortar.
- G. Cold Weather Protection
 - 1. Do not lay masonry units which are wet or frozen.
 - 2. Remove all masonry determined to be damaged by freezing conditions.
 - 3. No masonry work shall be performed when the air temperature is 38 deg. F. and falling.

PART 2 PRODUCTS

2.1 MASONRY UNITS - GENERAL

- A. Manufacturer: Obtain masonry units from one manufacturer, of uniform texture and color for each kind required, for each continuous area and visually related areas.
- B. Masonry Unit Characteristics: Provide units complying with standards referenced and requirements indicated.

2.2 CONCRETE MASONRY UNITS (CMU)

- A. Size: Manufacturer's standard units with nominal face dimensions of 16" long x 8" (15-5/8" x 7-5/8" actual), unless otherwise indicated.
- B. Special Shapes: Provide where required for lintels, corners, jambs, sash, control joints, headers, bonding and other special conditions.
- C. Hollow Load Bearing (HL) CMU: ASTM C 90 and as follows:
 - 1. Grade N.
- D. Weight Classification: Normal weight units unless otherwise indicated. (125 lbs. per cu. ft. or more, oven dry weight of concrete.)
- E. Cure units by atmospheric drying for not less than 30 days before installation, to comply with ASTM C 90, Type II.
- F. Exposed Faces: Provide manufacturer's standard color and texture, unless otherwise indicated.

1. Where special finishes are indicated, provide units with exposed faces of the following general description matching color and texture as selected by Architect from manufacturers standard color and texture.
 - a. Standard aggregate, ground finish.
 - b. Standard aggregate, split face finish.
- G. Prefaced Concrete Block: Provide lightweight concrete units indicated below with manufacturer's standard smooth resinous tile facing complying with ASTM C744:
 1. For units on which prefaced surfaces are molded, comply with the following requirements:
 - a. Hollow Loadbearing Block: ASTM C90, Grade N, Type I.
 2. Size: Manufacturer's standard with nominal face dimensions of 16" long x 8" high (15-5/8" x 7-5/8" actual) x thickness indicated for units on which prefaced surfaces are molded; with 1/16" thick returns of facing to create 1/4" wide mortar joints with modular coursing.
- H. Color and Pattern: Match Architect's sample.
- I. Products: Subject to compliance with requirements, provide one of the following:
 1. "Astra-Glaze"; Nabco Glazed Products.
 2. "Spectra-Glaze II"; manufacturer approved by the Burns & Russell Co.

2.3 MORTAR MATERIALS

- A. Portland Cement: ASTM C 150, Type I, except Type III may be used for cold weather construction. Provide natural color or white cement as required to produce required mortar color.
- B. Masonry Cement: ASTM C 91.
- C. Hydrated Lime: ASTM C 207, Type S.
- D. Aggregate for Mortar: ASTM C 144, except for joints less than 1/4" use aggregate graded with 100% passing the No. 16 sieve.
- E. Aggregate for Grout: ASTM C 404.
- F. Water: Clean and potable.

2.4 MASONRY ACCESSORIES

- A. Horizontal Joint Reinforcing and Ties for Masonry: Provide welded wire units prefabricated in straight lengths of not less than 10', with matching corner ("L") and intersecting ("T")

units. Fabricate from cold-drawn steel wire complying with ASTM A 82, with deformed continuous side rods and plain cross rods, into units with widths of approximately 2" less than nominal width of walls and partitions as required to position side rods for full embedment in mortar with mortar coverage of not less than 5/8" on joint faces exposed to exterior and not less than 1/2" elsewhere. Provide the following type of joint reinforcing unless otherwise indicated.

1. Truss type with diagonal cross rods spaced not more than 16" o.c.
- B. Number of Side Rods: Single pair for single wythe masonry.
- C. Wire Sizes: Fabricate with 9-gage side and cross rods, unless otherwise indicated.
- D. Wire Finish: Provide manufacturer's standard mill galvanized finish except as otherwise indicated.
- E. For exterior walls hot-dip galvanized joint reinforcing after fabrication to comply with ASTM A 153, Class B-2 coating (1.5 oz. per sq. ft.).
- F. Steel Strap Anchors: Provide straps, bars, bolts and rods fabricated from not less than 16 ga. sheet metal or 3/8" diameter rod stock, unless otherwise indicated.
- G. Miscellaneous Masonry Accessories
 1. Reinforcing Bars: Deformed steel, ASTM A 615, Grade 60 for bars No. 3 to No. 18.

2.5 MORTAR AND GROUT MIXES

- A. Do not lower the freezing point of mortar by use of admixtures or anti-freeze agents.
- B. Do not use calcium chloride in mortar or grout.
- C. Mortar for Unit Masonry: Comply with ASTM C 270, Proportion Specification, for types of mortar required, unless otherwise indicated.
- D. Limit cementitious materials in mortar to portland cement - lime.
- E. Use Type N mortar for all interior masonry work.
- F. Use Type S mortar for all exterior masonry work.
- G. Grout for Unit Masonry: Comply with ASTM C 476 for grout for use in construction of unit masonry. Use grout of consistency indicated or if not otherwise indicated, of consistency (fine or coarse) at time of placement which will completely fill all spaces intended to receive grout.

PART 3 EXECUTION

3.1 INSTALLATION - GENERAL

- A. Thickness: Build masonry construction to the full thickness shown, except, build singlewythe walls (if any) to the actual thickness of the masonry units, using units of nominal thickness shown or specified.
- B. Build chases and recesses as shown and as required for the work of other trades. Provide not less than 8" of masonry between chase or recess and jamb of openings, and between adjacent chases and recesses unless otherwise noted.
- C. Cut masonry units with motor-driven saw designed to cut masonry with clean, sharp, unchipped edges. Cut units as required to provide pattern shown and to fit adjoining work neatly. Use full units without cutting wherever possible. Use dry cutting saws to cut concrete masonry units.
- D. Do not wet concrete masonry units.
- E. Pattern Bond: Lay exposed masonry in running bond vertical joint in each course centered on units in courses above and below except as otherwise noted.
- F. Layout walls in advance for accurate spacing of surface bond patterns with uniform joint widths and to properly locate openings, movement-type joints, returns and offsets. Avoid the use of less-than-half size units at corners, jambs and wherever possible at other locations.
- G. Lay-up walls plumb and with courses level, accurately spaced and coordinated with other work.
- H. Stopping and Resuming Work: Rack back 1/2-masonry unit length in each course; do not tooth. Clean exposed surfaces of set masonry, wet units lightly (if required to be wetted), and remove loose masonry units and mortar prior to laying fresh masonry.
- I. Built-In Work: As the work progresses, build-in items specified under this and other sections of these specifications. Fill in solidly with masonry around built-in items.
- J. Fill space between hollow metal frames and masonry solidly with mortar.
- K. Where built-in items are to be embedded in cores of hollow masonry units, place a layer metal lath in the joint below and rod mortar or grout into core.
- L. Fill CMU cores with grout 3 courses (24") under bearing plates, beams, lintels, posts and similar conditions unless otherwise indicated.
- M. Non-Loadbearing Interior Partition Walls: Build full height of story to underside of solid structure above, unless otherwise indicated.

3.2 MORTAR BEDDING AND JOINTING

- A. Lay hollow concrete masonry units with full mortar coverage on horizontal and vertical face shells. Bed webs in mortar in starting course on footings and foundation walls and in all courses of piers, columns and pilasters, and where adjacent to cells or cavities to be reinforced or to be filled with concrete or grout. For starting courses on footings where cells are not grouted, spread out full mortar bed including areas under cells.

- B. Joints: Maintain joint widths shown, except for minor variations required to maintain bond alignment. If not otherwise indicated, lay walls with 3/8" joints. Cut joints flush for masonry walls which are to be concealed or to be covered by other materials. Tool all exposed joints in masonry walls slightly concave using a jointer larger than joint thickness. Rake out mortar in preparation for application of caulking or sealants where shown.
- C. Remove masonry units disturbed after laying; clean and relay in fresh mortar. Do not pound corners at jambs to fit stretcher units which have been set in position. If adjustments are required, remove units, clean off mortar, and reset in fresh mortar.

3.3 HORIZONTAL JOINT REINFORCING

- A. Provide continuous horizontal joint reinforcing as shown and specified. Full embed longitudinal side rods in mortar for their entire length with a minimum cover of 5/8" on exterior side of walls and 1/2" at other locations. Lap reinforcement a minimum of 6". Do not bridge control and expansion joints with reinforcing, unless otherwise indicated. Provide continuity at corners and wall intersections by use of prefabricated "L" and "T" sections. Cut and bend units as directed by manufacturer for continuity at returns, offsets, pipe enclosures and other special conditions.
- B. Space conditions horizontal reinforcing as follows:
 - 1. For single wythe walls, space reinforcing at 16" o.c. vertically, unless otherwise indicated.
 - 2. Reinforce masonry openings greater than 1'-0" wide, with horizontal joint reinforcing placed in 2 horizontal joints approximately 8" apart, both immediately above lintels and below sills.
 - 3. Extend reinforcing a minimum of 2'-0" beyond jambs of the opening, bridging control joints where provided.

3.4 ANCHORING MASONRY WORK

- A. See Drawings.

3.5 LINTELS

- A. Provide masonry lintels where shown and wherever openings of more than 1'-0" are shown without structural steel or other supporting lintels. Provide precast or formed in place lintels. Cure precast masonry before handling or installing. Temporarily support formed-in-place lintels.
- B. Provide minimum bearing of 8" at each jamb, unless otherwise indicated.

3.6 REPAIR, POINTING AND CLEANING

- A. Remove and replace masonry units which are loose, chipped, broken, stained or otherwise damaged, or if units do not match adjoining units as intended. Provide new units to match adjoining units and install in fresh mortar or grout, pointed to eliminate evidence of replacement.
- B. Pointing: During the tooling of joints, enlarge any voids or holes, except weep holes, and completely fill with mortar. Point-up all joints at corners, openings and adjacent work to provide a neat, uniform appearance, properly prepared for application of caulking or sealant compounds.
- C. Clean exposed CMU masonry by dry brushing at the end of each day's work and after final pointing to remove mortar spots and droppings. Comply with recommendations in NCMA TEK Bulletin No. 28.

END OF SECTION

SECTION 04 20 30
REINFORCED UNIT MASONRY

PART 1 GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract, including General and Special Conditions and Division 1 Specification sections, apply to work of this section.

1.2 DESCRIPTION OF WORK

- A. Provide each type of reinforced unit masonry work as indicated on drawings and in schedules and specified herein.
- B. Requirements of Section 04 20 00, "Unit Masonry" apply to work of this section.

1.3 SUBMITTALS

- A. Shop Drawings: Submit shop drawings for fabrication, bending, and placement of reinforcement bars. Comply with ACI 315 "Manual of Standard Practice for Detailing Reinforced Concrete Structures". Show bar schedules, diagrams of bent bars, stirrup spacing, lateral ties and other arrangements and assemblies as required for fabrication and placement of reinforcement for unit masonry work.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. General: Refer to Section 04 20 00 for masonry materials and accessories not included in this section.
- B. Reinforcement Bars: Provide deformed bars of Grade 60 complying with ASTM A 615.
- C. Shop-fabricate reinforcement bars which are shown to be bent or hooked.

PART 3 - EXECUTION

3.1 PLACING REINFORCEMENT

- A. General: Clean reinforcement of loose rust, mill scale, earth, ice or other materials which will reduce bond to mortar or grout. Do not use reinforcement bars with kinks or bends not shown on drawings or final shop drawings, or bars with reduced cross-section due to excessive rusting or other causes.
- B. Position reinforcement accurately at the spacing indicated. Support and secure vertical bars against displacement. Horizontal reinforcement may be placed as the masonry work progresses. Where vertical bars are shown in close proximity, provide a clear distance between bars of not less than the nominal bar diameter or 1" (whichever is greater).

- C. Splice reinforcement bars where shown; do not splice at other points unless acceptable to the Architect. Provide lapped splices, unless otherwise indicated. In splicing vertical bars or attaching to dowels, lap ends, place in contact and wire tie.
- D. Embed prefabricated horizontal joint reinforcement as the work progresses, with a minimum cover of 5/8" on exterior face of walls and 1/2" at other locations. Lap units not less than 6" at ends. Use prefabricated "L" and "T" units to provide continuity at corners and intersections. Cut and bend units as recommended by manufacturer for continuity at returns, offsets, column fireproofing, pipe enclosures and other special conditions.

3.2 INSTALLATION - GENERAL

- A. Refer to Section 04 20 00 for general installation requirements of unit masonry.

3.3 INSTALLATION OF REINFORCED CONCRETE UNIT MASONRY

A. General

1. Do not wet concrete masonry units (CMU).
2. Lay CMU units with full-face shell mortar beds. Fill vertical head joints (end joints between units) solidly with mortar from face of unit to a distance behind face equal to not less than the thickness of longitudinal face shells. Solidly bed cross-webs of starting courses in mortar. Maintain head and bed joint widths shown, or if not shown, provide 3/8" joints.

B. Walls

1. Pattern Bond: Lay CMU wall units in 1/2 running bond with vertical joints in each course centered on units in courses above and below, unless otherwise indicated. Bond and interlock each course at corners and intersections. Use special-shaped units where shown, and as required for corners, jambs, sash, control joints, lintels, bond beams and other special conditions.
2. Maintain vertical continuity of core or cell cavities, which are to be reinforced and grouted, to provide minimum clear dimensions indicated and to provide minimum clearance and grout coverage for vertical reinforcement bars. Keep cavities free of mortar. Solidly bed webs in mortar where adjacent to reinforced cores or cells.
3. Where horizontal reinforced beams (bond beams) are shown, use special units or modify regular units to allow for placement of continuous horizontal reinforcement bars. Place small mesh expanded metal lath or wire screening in mortar joints under bond beam courses over cores or cells on non-reinforced vertical cells, or provide units with solid bottoms.

C. Grouting

1. Use "Fine Grout" per ASTM C 476 for filling spaces less than 4" in one or both horizontal directions.

2. Use "Course Grout" per ASTM C476 for filling 4" spaces or larger in both horizontal directions.

D. Low-Lift Grouting

1. Provide minimum clear dimension of 2" and clear area of 8 sq. in. in vertical cores to be grouted.
2. Place vertical reinforcement prior to laying of CMU. Extend above elevation of maximum pour height as required for splicing. Support in position at vertical intervals not exceeding 192 bar diameters nor 10 ft.
3. Lay CMU to maximum pour height. Do not exceed 5' height, or if bond beam occurs below 5' height stop pour at course below bond beam.
4. Pour grout using chute or container with spout. Rod or vibrate grout during placing. Place grout continuously; do not interrupt pouring of grout for more than one hour. Terminate grout pours 1-1/2" below top course of pour.
5. Bond Beams - Stop grout in vertical cells 1-1/2" below bond beam course. Place horizontal reinforcement in bond beams; lap at corners and intersections as shown. Place grout in bond beam course before filling vertical cores above bond beam.

END OF SECTION

DIVISION

6

WOODS, PLASTICS AND COMPOSITES

SECTION 06 10 00
ROUGH CARPENTRY

PART 1 GENERAL

1.1 RELATED DOCUMENTS

- A. The provisions of the General Conditions, Supplementary Conditions, Drawings, Specifications and the Sections included under Division 1, General Requirements and References are included as a part of this Section as though bound herein.

1.2 SECTION INCLUDES

- A. Provide labor, materials, services, and equipment necessary to furnish and install work as indicated and as specified herein, which includes, but is not limited to:
 - 1. Roof curbs, cants, blocking, nailers, plywood sheathing and equipment mounting boards, furring, rough hardware required or indicated for complete and functional systems.

1.3 RELATED WORK:

- A. Section 01 25 13 – Product Substitution Procedures.
- B. Section 01 33 00 – Submittal Procedures.
- C. Section 01 42 00 – References.
- D. Section 01 45 00 – Quality Control.
- E. Section 01 66 00 – Project Storage and Handling Requirements.
- F. Section 01 78 00 – Closeout Submittals.
- G. Section 07 52 00 – Modified Bituminous Membrane Roofing.
- H. Section 09 91 00 – Painting.
- I. Section 09 29 00 – Gypsum Board.

1.4 REFERENCES

- A. Comply with Section 01 42 00 – References for additional reference standards, definitions, abbreviations and acronyms.
- B. American National Standards Institute (ANSI)/American Society of Mechanical Engineers (ASME):
 - 1. B18.2.1-2012 – Square, Hex, Heavy Hex, and Askew Head Bolts and Hex, Heavy Hex, Hex Flange, Lobed Head and Lag Screws (Inch Series).
 - 2. B18.2.2-2010 – Nuts for General Applications: Machine Screw Nuts, Hex, Square, Hex Flange and Coupling Nuts
 - 3. B18.6.1-1981 (R2008) - Wood Screws, (Inch Series).
 - 4. B18.6.4-98(R2005) Thread Forming and Thread Cutting Tapping Screws and Metallic Drive Screws (Inch Series).
- C. American Plywood Association (APA):
 - 1. E30-07 Engineered Wood Construction Guide
- D. American Society for Testing and Materials (ASTM):
 - 1. ASTM A47-99(2009): Standard Specification for Ferritic Malleable Iron Castings.
 - 2. ASTM A48-03(2012): Standard Specification for Gray Iron Castings.
 - 3. A653/A653M-13: Standard Specification for Steel Sheet Zinc-Coated (Galvanized) or Zinc-Iron Alloy Coated (Galvannealed) by the Hot Dip Process.

- 4 ASTM C954-11: Standard Specification for Steel Drill Screws for the Application of Gypsum Board or Metal Plaster Bases to Steel Studs from 0.033” (2.24 mm) to 0.112” (2.84 mm) in thickness.
 - 5 ASTM C1002-07(2013): Standard Specification for Steel Self-Piercing Tapping Screws for the Application of Gypsum Panel Products or Metal Plaster Bases to Wood Studs or Metal Studs.
 - 6 ASTM D143-09: Standard Specification for Small Clear Specimens of Timber, Method of Testing.
 - 7 ASTM D2559-12a: Standard Specification for Adhesives for Structural Laminated Wood Products for Use Under Exterior (Wet Use) Exposure Conditions.
 - 8 ASTM D3498-03(2011): Standard Specification for Adhesives for Field-Gluing Plywood to Lumber Framing for Floor Systems.
 - 9 ASTM F844-0 7a (2013): Standard Specification for Washers, Steel, Plain (Flat) Unhardened for General Use.
 10. ASTM F1667-13: Standard Specification for Nails, Spikes, and Staples.
- E. American Wood Protection Association (AWPA):
1. AWPA Standard U1, Commodity Specification A, requirements of Use Category 2 (UC-2).
- F. Southern Pine Inspection Bureau (SPIB) – Standard Grading Rules for Southern Pine Lumber.
- G. U.S. Department of Commerce Product Standard (PS).
1. PS 1-95 - Construction and Industrial Plywood.
 2. PS 20 -10 - American Softwood Lumber Standard.

1.5 SUBMITTALS:

- A. Submit in accord with Section 01 33 00 – Submittal Procedures.
- B. Shop Drawings showing wood trusses, framing, connection details, fasteners, connections and dimensions.
- C. Product Data:
 1. Wood/Plywood.
 2. Fasteners and anchors.
 3. Wood preservative treatment materials and application instructions.
 4. MSDS of treatment materials.
- D. Samples:
 1. Fastener types: Two (2) of each type.
 2. Material samples, if requested by Architect.

1.6 PRODUCT DELIVERY, STORAGE AND HANDLING:

- A. Comply with Section 01 66 00 – Storage and Handling.
- B. Protect lumber and other products from dampness both during and after delivery at site.
- C. Stack lumber to provide air circulation around surfaces of each piece.
- D. Stack plywood and other board products to prevent warping.
- E. Locate lumber and plywood in well drained areas, supported at least 6” (150 mm) above grade and cover with well ventilated sheds having firmly constructed over hanging roof with sufficient end wall to protect lumber from driving rain.

PART 2 PRODUCTS

2.1 LUMBER:

- A. Lumber shall be SPIB Stress Group D 1x and 2x No. 2 grade Southern Yellow Pine species, with specified preservative treatment.
 - 1. Identifying marks shall be in accord with rule or standard under which material is produced, including requirements for qualifications and authority of inspection organization, usage of authorized identification, and information included in identification.
- B. Lumber:
 - 1. Unless otherwise specified, species graded under grading rules of inspection agency shall be approved by Board of Review, American Lumber Standards Committee.
 - 2. Framing lumber: Minimum extreme fiber stress in bending of 1100 psi.
 - 3. Furring, blocking, nailers and similar items 100 mm (4") and narrower Standard Grade; and, members 150 mm (6") and wider, Number 2 Grade.
- C. Sizes:
 - 1. Conform to Prod. Std. PS20.
 - 2. Size references are nominal sizes, unless otherwise specified, actual sizes within manufacturing tolerances allowed by standard under which produced.
- D. Moisture Content (At time of delivery and maintained on site):
 - 1. Boards and lumber 50 mm (2") and less in thickness: 19 percent or less.
 - 2. Lumber over 50 mm (2") thick: 25 percent or less.

2.2 PRESERVATIVE TREATMENT:

- A. Wood Preservative (Pressure Treatment) for wood (exterior, above ground): AWWA U1, Use Category 3 (UC3) using waterborne preservative with 4.0 kg/m³ (0.25 pcf) of wood product.
- B. Treat wood members and plywood exposed to weather or in contact with plaster, masonry or concrete, including framing of open roofed structures; sills, sole plates, furring, and sleepers that are less than 600 mm (24") from ground; nailers, edge strips, blocking, crickets, curbs, cant, vent strips and other members used in connection with roofing and flashing materials.
- C. Wood preservative shall be borate based product. Use of Chromated Copper Arsenate (CCA) for pressure treating wood is not permitted.
- D. Approved Wood Preservative Applicator:
 - 1. Robbins Lumber Co., 13001 N. Nebraska Ave., Tampa, FL 33612-4456; Tel: 813-971-3030; Website: www.robbinlumber.com.
 - 2. Other preservative treatment companies shall comply with Section 01 25 13 – Product Substitution Procedures.

2.3 PLYWOOD

- A. Comply with Prod. Std. PS 1.
- B. Bear mark of recognized association or independent inspection agency that maintains continuing control over quality of plywood which identifies compliance by veneer grade, group number, span rating where applicable, and glue type.
- C. Sheathing:
 - 1. APA rated Exposure 1 or Exterior; panel grade CD or better.
 - 2. Wall sheathing:
 - a. Minimum 12 mm (15/32") thick with vertical supports not more than 600 mm (24") on center unless specified otherwise.
 - b. Minimum 1200 mm (48") wide at corners without corner bracing of framing.

3. Roof sheathing:
 - a. Minimum 15 mm (19/32") thick for supports not more than 600 mm (24") on center.
- D. Wall Mounted Plywood in Communications Rooms (MDF and IDF Rooms):
 1. 19.5 mm (3/4") AC Grade APA Exterior rated Exposure 1 Plywood, painted flat grey on both sides and panel edges per Section 09 91 00.
 2. Plywood shall have Class A fire rating per ASTM E84-01 – Standard Test Method for Surface Burning Characteristics of Building Materials.
 3. Fire Retardant Wood Treatment:
 - a. DRICON by Arch Wood Protection, Inc., 1955 Lake Park Dr., Suite 100, Smyrna, GA 30080; Tel: 770-801-6600; Fax: 770-801-1990); website: www.archchemicals.com
 - b. D-Blaze by Chemical Specialties, Inc., One Woodland Green, Suite 250, 200 East Woodlawn Rd., Charlotte, NC 28217. Tel: 800-421-8661; Fax: 704-527-8232; website: www.treatedwood.com.
 - c. FirePRO by Osmose, Inc., P.O. Drawer O, Griffin, GA 30224-0249; Tel: 800-241-0240; Fax: 770-229-5225; website: www.osmose.com.

2.4 ROUGH HARDWARE AND ADHESIVES:

- A. Anchor Bolts:
 1. ASME B18.2.1 and ANSI B18.2.2 galvanized, 13 mm (1/2") unless shown otherwise.
 2. Extend at least 200 mm (8") into masonry or concrete with ends bent 50 mm (2").
- B. Miscellaneous Bolts: Expansion Bolts: C1D, A-A-55615; lag bolt, long enough to extend at least 65 mm (2-1/2") into masonry or concrete. Use minimum 3/8" (9 mm) diameter bolts unless shown otherwise.
- C. Washers
 1. ASTM F844-07a (2013).
 2. Use zinc or cadmium coated steel for washers exposed to weather.
- D. Screws:
 1. Wood to Wood: ANSI B18.6.1 or ASTM C1002-07(2013), stainless steel.
 2. Wood to Steel: ASTM C954-11, or ASTM C1002-07(2013), stainless steel.
- E. Nails:
 1. Size and type best suited for purpose unless noted otherwise. Use aluminum-alloy nails, plated nails, or zinc-coated nails, for nailing wood work exposed to weather and on roof blocking.
 2. ASTM F1667-13:
 - a. Common: Type I, Style 10.
 - b. Concrete: Type I, Style 11.
 - c. Barbed: Type I, Style 26.
 - d. Underlayment: Type I, Style 25.
 - e. Masonry: Type I, Style 27.
 - f. Use special nails designed for use with ties, strap anchors, framing connectors, joists hangers, and similar items. Nails not less than 32 mm (1-1/4") long, 8d and deformed or annular ring shank.

PART 3 EXECUTION

3.1 INSTALLATION OF FRAMING AND MISCELLANEOUS WOOD MEMBERS:

- A. Conform to applicable requirements of the following:

1. APA for installation of plywood or structural use panels.
2. TPI for metal plate connected wood trusses.
- B. Fasteners:
 1. Nails:
 - a. Nail in accord with Recommended Nailing Schedule as specified in AFPA Manual for House Framing. Where detailed nailing requirements are not specified in nailing schedule, select nail size and nail spacing sufficient to develop adequate strength for connection without splitting members.
 - b. Use special nails with framing connectors.
 - c. For sheathing, select length of nails sufficient to extend 25 mm (1") into supports.
 - d. Use eight penny or larger nails for nailing through 25 mm (1") thick lumber and for toe nailing 50 mm (2") thick lumber.
 - e. Use 16d or larger nails for nailing through 50 mm (2") thick lumber.
 - f. Select the size and number of nails in accord with Nailing Schedule except for special nails with framing anchors.
 - g. Nailing Schedule; Using Common Nails:
 - 1) Sheathing:
 - a) 150 mm (6") wide or less to each joist face nail two-8d.
 - b) Plywood or structural use panel to each stud or joist face nail 8d, at supported edges 150 mm (6") on center and at intermediate supports 250 mm (10") on center. When gluing plywood to joint framing increase nail spacing to 300 mm (12") at supported edges and 500 mm (20") o.c. at intermediate supports.
 2. Bolts:
 - a. Fit bolt heads and nuts bearing on wood with washers.
 - b. Countersink bolt heads flush with the surface of nailers.
 - c. Embed in concrete and solid masonry or use expansion bolts. Special bolts or screws designed for anchor to solid masonry or concrete in drilled holes may be used.
 - d. Use toggle bolts to hollow masonry or sheet metal.
 - e. Use bolts to steel over 2.84 mm (0.112", 11 gage) in thickness. Secure wood nailers to vertical structural steel members with bolts, placed one at ends of nailer and 600 mm (24 inch) intervals between end bolts. Use clips to beam flanges.
 3. Drill Screws to steel less than 2.84 mm (0.112") thick.
 - a. ASTM C1002-07(2013) for steel less than 0.84 mm (0.033") thick.
 - b. ASTM C 954-11 for steel over 0.84 mm (0.033") thick.
 4. Power actuated drive pins may be used where practical to anchor to solid masonry, concrete, or steel.
 5. Do not anchor to wood plugs or nailing blocks in masonry or concrete. Use metal plugs, inserts or similar fastening.
 6. Screws to Join Wood:
 - a. Where shown or option to nails.
 - b. ASTM C1002-07(2013), sized to provide not less than 25 mm (1") penetration into anchorage member.
 - c. Spaced same as nails.
- C. Cut notch or bore in accord with NFPA Manual for House-Framing for passage of ducts wires, bolts, pipes, conduits and to accommodate other work. Repair or replace miscut, misfit or damaged work.
- D. Blocking Nailers, and Furring:
 1. Install furring, blocking, nailers, and grounds where shown.
 2. Use longest lengths practicable.

3. Use fire retardant treated wood blocking where shown at openings and where shown or specified.
4. Layers of Blocking or Plates:
 - a. Stagger end joints between upper and lower pieces.
 - b. Nail at ends and not over 24" (600 mm) between ends.
 - c. Stagger nails from side to side of wood member over 5" (125 mm) in width.
6. Unless otherwise shown, use wall furring 1" by 3" (25 mm by 75 mm) continuous wood strips installed plumb on walls, using wood shims where necessary so face of furring forms a true, even plane. Space furring not over 400 mm (16") on centers, butt joints over bearings and rigidly secure in place. Anchor furring on 16" (400 mm) centers.

END OF SECTION

SECTION 06 41 00
CUSTOM CASEWORK

PART 1 GENERAL

1.1 RELATED DOCUMENTS

- A. The provisions of the General Conditions, Supplementary Conditions, and the Sections included under Division 1, General Requirements, are included as a part of this Section as though bound herein.

1.2 SECTION INCLUDES

- A. Provide labor, materials, services, and equipment necessary to furnish and install work as indicated and as specified herein, which includes, but is not limited to:
 - 1. Millwork and custom casework including cabinetry, countertops, and shelving
 - 2. Millwork and casework hardware and accessories

1.3 REFERENCES

- A. ASTM E84 – Standard Test Method for Surface Burning Characteristics of Building Materials
- B. AWI – Quality Standards
- C. BHMA A156.9 – Cabinet Hardware
- D. FED MMM-A-130 – Adhesive, Contact
- E. NEMA (National Electric Manufacturer’s Association) LD3 – High Pressure Decorative Laminates
- F. PS 1 – Construction and Industrial Hardwood
- G. PS 20 – American Softwood Lumber Standard
- H. Voluntary Product Standards PS 20-70
- I. Grading rules of Southern Pine Inspection Bureau (SPIB)
- J. Forest Stewardship Council (FSC)
- K. Sustainable Forestry Initiative (SFI)
- L. Canadian Standards Association (CSA):
- M. FBC – Florida Building Code

1.4 SUBMITTALS

- A. Shop Drawings: Submit Shop Drawings in accordance with Specifications.
 - 1. Indicate quality grade, materials, species, construction, sizes, shapes, quantities, locations, and conditions of adjoining work.
 - 2. Indicate items in related or dimensional position with sections or details shown either full size or 3" = 1'-0" scale.
 - 3. Indicate required field measurements beyond control of mill.
 - 4. Indicate the allowable uniformly distributed loads for shelving.
- B. Samples: Submit manufacturer's full range of sample colors, textures, and patterns of plastic laminate for Architect's selection.
- C. Installation Instruction: Provide installation instructions and lists of replacement parts for all hardware and accessories.

- D. Product Data: Provide product data for all hardware and accessories. Product data. Unless otherwise indicated, submit the following for each type of product provided under work of this Section:
1. Recycled Content:
 - a. All interior wood lumber shall be formaldehyde free.
 - b. Salvaged Lumber: Provide documentation certifying products are from salvaged lumber sources.
 - c. Recovered Lumber: Provide documentation certifying products are from recovered lumber sources.
 2. Local/Regional Materials:
 - a. Sourcing Location(s): Indicate location of extraction, harvesting, and recovery; indicate distance between extraction, harvesting, and recovery and the project site.
 - b. Manufacturing Location(s): Indicate location of manufacturing facility; indicate distance between manufacturing facility and the project site.
 - c. Product Value: Indicate dollar value of product containing local/regional materials; include materials cost only.
 - d. Product Component(s) Value: Where product components are sourced or manufactured in separate locations, provide location information for each component. Indicate the percentage by weight of each component per unit of product.
 3. VOC Data:
 - a. Adhesives:
 - i) Submit manufacturer's product data for adhesives. Indicate VOC limits of the product. Submit MSDS highlighting VOC limits.
 - ii) Submit Green Seal Certification to GS-36 and description of the basis of certification.
 - iii) Submit manufacturer's certification that products comply with SCAQMD #1168.
 4. Submit environmental data in accordance with Table 1 of ASTM E2129 for products provided under work of this Section.
- E. Letter of Certification(s) for Sustainable Forestry:
1. Forest Stewardship Council (FSC): Provide letter of certification signed by lumber supplier. Indicate compliance with FSC "Principles for Natural Forest Management" and identify certifying organization.
 - a. Submit FSC certification numbers; identify each certified product on a line-item basis.
 - b. Submit copies of invoices bearing the FSC certification numbers.
 2. Sustainable Forestry Board: Provide letter of certification signed by lumber supplier. Indicate compliance with the Sustainable Forestry Board's "Sustainable Forestry Initiative" (SFI) and identify certifying organization.
 - a. Submit SFI certification numbers; identify each certified product on a line-item basis.
 - b. Submit copies of invoices bearing the SFI certification numbers.
 3. Canadian Standards Association (CSA): Provide letter of certification signed by lumber supplier. Indicate compliance with the CSA and identify certifying organization.
 - a. Submit CSA certification numbers; identify each certified product on a line-item basis.
 - b. Submit copies of invoices bearing the CSA certification numbers.
- F. Key Schedule:
1. Provide lock and key schedule for lockable cabinets.
 2. Coordinate key schedule with Specification Section - Door Hardware.
- G. Certification: Submit certifications by treating plant that pressure treatment materials comply with governing ordinances.

1.5 QUALITY ASSURANCE

- A. Millwork and casework fabricator shall have a minimum 5-years previous experience of successfully completed comparable work.
- B. Lumber Grading:
 - 1. Lumber Grading Rules and Wood Species in accordance with Voluntary Product Standards PS 20-70
 - 2. Grading rules of Southern Pine Inspection Bureau (SPIB) apply to materials furnished.
- C. Fire Hazard Classification: Comply with required NFPA, ANSI, and UL surface burning characteristics for plastic laminates, lumber, and plywood.
- D. Perform work in compliance with AWI standards.
- E. Sustainably Harvested Wood: Certification Organizations shall be accredited by the Forest Stewardship Council, Sustainable Forestry Board, or Canadian Standards Association.

1.6 MOCK-UP

- A. Prepare mock-up under provisions as specified.
- B. Provide full size base cabinet and upper cabinet of each type indicated, in specified finish with hardware installed. Contractor to coordinate with Architect for all required locations.
- C. Owner shall inspect units to ascertain quality and conformity to AWI Standards.
- D. Units will establish a minimum standard of quality for this work.
- E. Vendor may use undamaged approved units as part of the work.

1.7 FIELD MEASUREMENTS

- A. Design and fabricate units based upon field conditions and measurements.
- B. Verify field measurements are included in shop drawings.

1.8 PRE-INSTALLATION CONFERENCE

- A. Convene a pre-installation conference after site inspection and prior to commencement of work.
- B. Discuss any items that may alter fabrications or intended installation and determine acceptable conclusions.

1.9 COORDINATION

- A. Coordinate work with plumbing, mechanical, electrical, and other trades for rough-in work and installation of adjacent and associated components.

1.10 ENVIRONMENTAL REQUIREMENTS AND PROTECTION

- A. Specification Section - Material Equipment and Approved Equals: Environmental conditions affecting products on site.
- B. Immediately prior to, during and after installation of work of this section, maintain the same temperature and humidity conditions in building spaces as will occur after occupancy.
- C. Protect work from damage until final acceptance.

PART 2 PRODUCTS

2.1 QUALITY GRADE

- A. Materials and Fabrication: Provide premium grade construction and finishing in accordance with AWI "Quality Standards", conforming to Section 400B - Laminate Clad Cabinets.
- B. Design Type: Reveal overlay design in accordance with AWI Architectural Casework - General Details, except as otherwise specified and detailed.

2.2 CABINET MATERIALS

- A. Sub-base Material:
 - 1. Provide millwork or casework plywood cores of Hardwood Plywood "veneer core" with no-added-Urea Formaldehyde adhesives.
 - 2. Use ¾" thick, 9-ply closed-grain hardwood plywood typical unless noted otherwise.
 - 3. Use ¼" thick hardwood plywood at cabinet backs and drawer bottoms.
- B. Adhesive: Provide type II, CS 35 or as recommended by plastic laminate manufacturer.
 - 1. Adhesives shall be low VOC meeting USGB LEED for Schools requirements for low VOC.
- C. Plastic Laminate: High-pressure laminate, General Purpose Grade, NEMA LD3, GP-50 by Formica or Nevamar.
 - 1. Exposed horizontal surfaces: Use 0.050" thick, matte finish.
 - 2. Exposed vertical surfaces: Use 0.030" thick, matte finish.
 - 3. Provide GP 42 for post forming: Use 0.042" thick, matte finish.
 - 4. BK 20 for concealed backing: Use 0.020" thick, matte finish, vertical grade, white unless otherwise indicated.
 - 5. Architect and the District's Design Coordinator shall select the Color and pattern, which may determine the laminate manufacturer.
- D. Finish Hardware Items: Provide following items of finish hardware with millwork:
 - 1. Drawer Glides: No. 8400 Extension Slides by Knape & Vogt Mfg. Co.
 - a. Equal products to Knape & Vogt produced by Accuride and Blum are acceptable.
 - 2. Shelf Standards and Supports (recessed in cabinets): No. 255 Standard and No. 256 Supports by Knape & Vogt Mfg. Co., Natural aluminum finish.
 - a. Equal products to Knape & Vogt produced by Accuride and Blum are acceptable.
 - 3. Doors: 1 pair heavy-duty institutional hinges, Stanley HT1592, US28.
 - a. 1 catch, Stanley 41 Series.
 - b. 1 pull, Stanley 4483, US28.
 - c. Equal products to Stanley produced by Grant and Hettich America are acceptable.
 - 4. Drawer Pulls: Stanley 4483, US28. Equal products to Stanley produced by Grant and Hettich America are acceptable.
 - 5. Drawer Locks: Schlage CL 888R or Olympus 888IC cabinet drawer lock, US26D, complete with strike plate.
 - a. Provide locks with Interchangeable Core Schlage cylinders keyed to the existing Facility Master Key System as directed by Owner.
 - 6. Door Locks: Schlage CL 777R or Olympus 777IC cabinet door lock, US26D, complete with strike plate.
 - a. Provide locks with Interchangeable Core Schlage cylinders keyed to the existing Facility Master Key System as directed by Owner.
 - b. Provide one elbow catch per pair doors.

7. Cabinet locks keyed to the facility shall be coordinated with the Hardware Supplier of section 08 71 00 who shall provide the locks.
8. Master key:
 - a. Master key doors and drawers of cabinetry in each room with each other and the main entrance room door.
 - b. Use a Schlage Everest D245 or Schlage 1456 restricted keyway as directed by owner.
 - c. Equal products to Schlage produced by Olympus are acceptable.
9. Silencers: Use neoprene type with self-adhesive at all cabinet doors.
- E. Glazing: Provide clear, tempered glass for glazed doors and openings in cabinetwork, ¼" thick unless otherwise indicated, or approved.
 1. Alternate glazing: Varia – Organics Collection by 3Form to be provided as scheduled.
 - a. Provide gauge as recommended by manufacturer.
 - b. Finish and color to be selected by architect.
 - c. Provide all required hardware to secure panels per manufacturer's recommendations.
- F. Accessories: Provide adhesives, concealed fasteners, nuts, bolts, screws, pins, washers, and etc. of type and size to suit application and severity of use. Provide finish washers at all exposed screw locations.
 1. Provide finished grommets for holes and cut-outs and escutcheons at pipe penetration.
- G. Miscellaneous: Provide shims, blocking, etc. as required for complete installation.

2.3 FABRICATION

- A. General:
 1. All exposed cabinet edges shall be beveled or rounded to prevent sharp edges or corners.
 2. All counter tops exposed to room or student access have beveled or rounded edges, and exposed corners rounded with minimum ½" radius.
- B. Fabrication Workmanship:
 1. Construct millwork items in accordance with specified quality grade of reference standards, except as otherwise specified or detailed.
 2. Construct millwork items using materials specified for plastic laminate finish.
- C. Milling:
 1. Fabricate and assemble work at mill as complete as practicable.
 2. Deliver ready to assemble and set in place.
 3. Machine sand all work at mill and deliver free of machine or tool marks or defects that will show through finish.
- D. Plastic Laminate Tops, Panels, Cabinet Shelving, and All Exposed Surfaces:
 1. Use plywood substrate as specified.
 - a. Particleboard, hardboard, and flake-board are not acceptable.
 2. Glue tops and panels under pressure using Type II water-resistant adhesive.
 - a. Glue plastic, core, and backing sheet in one operation after applying edge bands.
 3. Plastic Laminate shall be applied to the top of all tall cabinets and scribed to wall.
- E. Fabricate finished tops and edges from one continuous sheet of plastic laminate.
 1. Make corners and joints hairline.
 2. Slightly bevel arises.
- F. Ease the edges of millwork as required to eliminate sharp edges.
- G. Backsplash and Aprons:
 1. Square edge, direct bond cover, and full returns.
 2. Make corners and joints hairline.
- H. Door and Drawer fronts shall be ¾" thick.

- I. Provide plastic laminate finish on all exposed surfaces of doors, drawers, countertops, splashes, etc. of cabinets.
 - 1. Shelves shall be finished on all sides and edges.
- J. Construction: Construct each unit or cabinet in one section where practical, or construct in largest practical sections to facilitate ease of handling and installation.
 - 1. Cabinet constructed in more than one section, ship trim and scribe strips loose at field joints.
 - 2. Locate counter butt joints minimum 2' from sink cutouts.
- K. Finish Hardware: Fit drawer guides and cabinet-mounted shelf standards at mill.
 - 1. Ship other finish hardware items loose for installation at job site.
- L. Glazing: Install glazing at mill to the greatest extent practical.
 - 1. Field glazing shall be with dry type glazing gaskets sized to eliminate gaps and prevent loose glazing installations.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Examine surfaces for conditions that would prevent quality installation of millwork.
- B. Verify that grounds and blocking are in place to support millwork.
- C. Do not install on defective conditions, doing so shall indicate acceptance of site conditions and require you to correct any defects.

3.2 INSTALLATION

- A. General:
 - 1. Install all millwork items, plumb, level and true (within 1/16" in 10'), in accordance with drawing details and shop drawings.
 - 2. Do not install trim until backs and unexposed edges have been back primed.
 - 3. Provide cutting, fitting, fabricating, erecting, wedging, bracing, blocking, nailing, and securing of items of rough woodwork throughout, including miscellaneous furring, grounds, blocking, and nailers.
 - a. Build-in items where indicated on Drawings or where required for attachment of finish and other work.
 - 4. Provide 4" high backsplash and end splashes at all locations where countertops abut walls.
 - 5. Fully bed backsplashes and end splashes to top and each other with Dow Corning #786 mildew resistant silicone sealant.
 - 6. Offsets: Offsets in plane on work surfaces and counters shall be negligible and no more than 1/32" at other abutting materials.
- B. Cabinets:
 - 1. Install cabinets plumb with countertops level to within 1/16" in 10'.
 - 2. Level the base cabinets to within allowable tolerances.
 - 3. Accurately scribe and fit scribe strips, trim strips, and filler panels to irregularities of adjacent surfaces, maximum gap opening 0.025". Plastic laminate overlay trim shall not be used to close caps.
 - 4. Secure cabinets permanently to floor using anchors spaced at maximum of 30" o.c., minimum of two for each unit while maintaining 3/4" clearance between the back of cabinet and the exterior wall.
 - 5. Bolt adjoining cases together, maximum width of joints 1/32".

6. Fasten tops to bases with screws driven through base cabinet top frame into bottom of countertop.
7. Scribe all backsplashes and aprons and caulk.
8. Blocking, Bucks, and Nailers: Install plumb, level and true with joints flush, fastened securely in place.
9. Furring and Stripping: Install plumb and level, shim to provide true finish surface.
10. Install color-matched sealant at unfinished joints with other materials.
11. Install wall-shelving standards on solid backing or with toggle bolts into steel studs or masonry or TEK screws into concrete.
 - a. Do not install wall-shelving standards into gypsum wallboard only.
 - b. Space standards as required to support indicated loading but not less than 5-plf based on shelf material provided.
12. Do not install cabinetry or millwork closer than 24" to ceilings in fully sprinklered buildings or such that installation obstructs any fire sprinkler head.

3.3 ADJUSTING AND CLEANING

- A. Adjust doors, drawers, hardware, fixtures, and other moving or operating parts to function smoothly and correctly.
- B. On completion of installation, touch up marred or abraded finished surfaces and wipe down surfaces to remove fingerprints and markings, and leave in clean condition.

3.4 WASTE MANAGEMENT

- A. Waste Management: Collect cutoffs and scrap and place in designated areas for recycling.

END OF SECTION

DIVISION

7

THERMAL AND MOISTURE PROTECTION

SECTION 07 62 00
FLASHING AND SHEET METAL

PART 1 GENERAL

1.1 SCOPE OF WORK

- A. Flashing, counter-flashing, roofing grounds and nailers, and fabricated sheet metal items for roofing intersections with vertical surfaces, copings, curbs, gutters, eaves, roof drains, scuppers, vents and other roof penetrations.

1.2 RELATED SECTIONS

- A. Section 01 25 13 – Product Substitution Procedures.
- B. Section 01 31 00 – Project Management and Coordination.
- C. Section 01 33 00 – Submittal Procedures.
- D. Section 01 42 00 – References.
- E. Section 01 45 00 – Quality Control.
- F. Section 01 66 00 – Product Storage and Handling.
- G. Section 01 78 00 – Closeout Submittals.
- H. Section 06 10 00 – Rough Carpentry.
- I. Section 07 92 13 – Elastomeric Joint Sealants.

1.3 REFERENCES

- A. See Section 01 42 00 – References for additional reference standards, abbreviations, definitions, and acronyms.
- B. ANSI-SPRI/ES-1.
- C. American Society for Testing and Materials (ASTM):
 - 1. ASTM A240/A240M-15a: Standard Specification for Heat-resisting Chromium and Chromium-nickel Stainless Steel Plate, Sheet, and Strip for Pressure Vessels
 - 2. ASTM A653/A653M-13: Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot Dip Process
 - 3. ASTM A755/A755M-15: Standard Specification for Steel Sheet, Metallic-Coated by the Hot Dipped Process (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot Dip Process.
 - 4. ASTM D4586/D4586M-07(2012)e1: Standard Specification for Asphalt Roof Cement, Asbestos Free.
 - 5. ASTM B32-08(2014): Standard Specification for Solder Metal (Lead Free).
- D. Florida Building Code (FBC), 6th Edition.
- E. National Roofing Contractors Association (NRCA) “Roofing and Waterproofing Manual” Detail for installation of units.
- F. Sheet Metal and Air-Conditioning Contractor’s National Association, Inc. (SMACNA): Architectural Sheet Metal Manual”, latest Edition. Details for fabrication of units, including flanges and installation to coordinate with type of roofing indicated.

1.4 SUBMITTALS

- A. Comply with Section 01 33 00 – Submittal Procedures.

- B. Submit Shop Drawings on flashing and sheet metal work.
- C. Samples:
 - 1. Submit 8" (203 mm) x 8" (203 mm) square samples of each specified sheet materials to be exposed as finished surfaces.
 - 2. Submit each samples of factory fabricated products exposed as finished work, complete with specified factory finish.

1.5 QUALITY ASSURANCE

- A. Comply with Section 01 45 00 – Quality Control.
- B. Regulatory Requirements: Ensure flashing and sheet metal complies with requirements of Florida Building Code, NRCA, SMACNA, and ANSI-SPRI/ES-1.
- C. Coordinate application of flashings with application of roofing, protruding material, and roof accessories to provide a complete weather tight installation under provisions of the specified warranty requirements.
- D. Perform work in accord with referenced standards and manufacturer's printed installation instructions.

1.6 PRE-INSTALLATION MEETING

- A. Comply with Section 01 31 00 – Project Coordination.
- B. Meeting Format:
 - 1. Pre-installation meeting shall occur after approval of Shop Drawings by Contractor/CM and accepted by AE.
 - 2. Meeting shall convene minimum of one week before starting work.
 - 3. Required Attendees:
 - a. Contractor/CM.
 - b. Roof flashings installer.
 - c. Roofing and roofing equipment manufacturers.
 - d. Installers of deck or substrate construction to receive roofing work.
 - e. Installers of roof-top mechanical, plumbing or electrical items or other work in and around roofing that must precede or follow roofing work
 - f. Other subcontractors associated with work.
 - g. Architect.
 - h. Owner's Project Manager.
 - 4. Contractor/CM shall make arrangements for meeting and notify parties required to attend.
 - 5. Agenda shall include:
 - a. Review preparation and installation procedures and coordinating and scheduling required with related work.
 - b. Review roof, roof equipment, doors, and window system requirements (drawings, specifications, and other contract documents).
 - c. Review Shop Drawings and associated submittals.
 - d. Review manufacturer's technical materials.
 - e. Review and finalize construction schedule related to work and verify availability of materials, personnel, equipment and facilities needed to make progress and avoid delays
 - f. Review required inspection, testing, certifying and material usage accounting procedures.

- g. Review weather and forecasted weather conditions, and procedures for coping with unfavorable conditions, including temporary roofing.
- h. Meeting may be combined with roofing pre-installation meeting.

1.7 WARRANTIES

- A. Comply with Section 01 78 00 – Closeout Submittals.
- B. Provide installer’s five (5) year written warranty for flashings indicated.
 - 1. Flashings shall resist design wind speeds required by Florida Building Code, Chapter 16, in which installer agrees to repair or replace flashing components of roofing system that fail in materials or workmanship within specified warranty period.
 - 2. Flashing failures shall include water leaks, fasteners, accessories, flashing and sheet metal, grounds/nailers, gutters and downspouts, scuttles and vents, curbs, and other flashing components of roofing system.
- C. See Roofing Specifications for additional warranties that shall also apply.
- D. Warranty shall be a term type, with no conditions, exclusions, including exclusions of remedies by Owner, deductibles or limitations on coverage amount. Conditions, exclusions, or dollar limits.

PART 2 PRODUCTS

2.1 MATERIALS

- A. Manufactured flashing and sheet metal products are to contain recycled content.
- B. Sheet Material:
 - 1. Type 302 or 304 stainless steel, 22 gage, complying with ASTM A167.
 - 2. Flashing for Pipes, Conduits, and Round Equipment Supports: Type 304 stainless steel, 26 gage, 2B, complying with ASTM A240.
 - 3. Solder: Per ASTM B32.
- C. Fastening Devices:
 - 1. Stainless steel fasteners compatible with metal and roofing system. Use of powder-activated fasteners is prohibited.
 - 2. Attach sheet metal to wood with exposed fastenings: No. 10 x 1-1/4” (31.8mm) pan head stainless steel sheet metal screws. Provide neoprene sealant washers and stainless steel washers under screw heads.
 - 3. Attachment of sheet metal to masonry or concrete: No. 10 x 1-1/4” (31.8mm) pan head stainless steel masonry screws. Provide neoprene sealant washers and stainless steel washers under screw heads.
 - 4. Roofing Cement: Plastic roofing cement complying with requirements of ASTM D2822 or as appropriate and as recommended by roofing manufacturer.

2.2 ACCESSORIES

- A. Roof Drain Flashing: Minimum 4 lb (1.82 Kg) per ft² lead sheet flashing, 36” (91.44 cm) x 36” (91.44 cm) installed in accord with NRCA specifications.
- B. Cants:
 - 1. Pre-fabricated 16-gage, galvanized, minimum 4” (101 mm) vertical height, formed at 45° angle to walls and parapets.
 - 2. Manufacturer: Concrecel USA; Product: ARBS (Alternative Roof Blocking System).
 - 3. Substitutions: Comply with Section 01 25 13 - Product Substitution Procedures.

- C. Copings:
 - 1. Fabricate in approximately 10' (3 m) sections using sheet 22-gage stainless steel to detail as indicated.
 - 2. Provide continuous 16-gage stainless steel outer hold-down cleat with punched holes at 6" (152 mm) on center and face fasten at inward facing parapet components with removable fasteners as required for sheet metal.
 - 3. Provide 8" (203 mm) wide joint covers.
 - 4. Manufacturer: SBC Industries, North Miami, Florida.
 - 5. Substitutions: Comply with Section 01 25 13 - Product Substitution Procedures.
- D. Curb to Duct Flashing and Counter Flashing:
 - 1. Fabricate from stainless steel to fit duct curbs and ducts projecting from curbs.
 - 2. Provide 4" (101 mm) vertical flange to cover top edge of bituminous base flashings. Form flange bottom towards curb, with ¼" (6.3 mm) bottom edge bent ¼" (6.3 mm) out and hemmed.
 - 3. At top of curbs bend metal 90° and extend horizontally over to duct, then bend upward and extend vertically not less than 3" (71.2 mm) from top edge of flashing out 3/8" (9.5 mm) to receive sealant.
 - 4. Provide for field soldered lap joints at corners and 1" (25.4 mm) lap joints at horizontal miter splices.
- E. Edge Drips:
 - 1. Fabricate using sheet 22-gage stainless steel drip edge to detail indicated, in not over 10' (3 m) sections.
 - 2. Provide continuous 16-gage stainless steel continuous cleat with punched holes spaced as necessary. If cleat extends 6" (152 mm) or more below top fastener, provide second row of punched holes spaced as necessary.
 - 3. Provide 4" (101 mm) roof flange, and extend bottom drip not less than 1" (25.4 mm) below bottom of roof sheathing, with bottom ¾" (19 mm) kick-out to drip water away from finish wall.
 - 4. Manufacturer: Concrecel USA; Product: ARBS (Alternative Roof Blocking System).
 - 5. Substitutions: Request for substitutions shall be in accord with Section 01 25 13 - Product Substitution Procedures.
- F. Pipes, Conduits, Wires, and Round Equipment Supports Penetrating Roofing or Resting on Roofing:
 - 1. Type 304 stainless steel, 26-gage, complying with ASTM A240.
 - 2. Form tubular stainless steel sleeves sized to shape of penetration, not less than 8" (202 mm) above finished roofing with 4" (101 mm) wide base flange welded to water-tight to sleeve.
 - 3. Shop punch flanges.
 - 4. Seal flashing and cover with protective umbrella.
 - 5. Pre-manufactured roof penetration seals.
 - a. Manufacturer: SBC Industries, North Miami, Florida.
 - 6. Substitutions: Request for substitutions shall be in accord with Section 01 25 13 - Product Substitution Procedures.
- G. Sanitary Vent Stack Flashings:
 - 1. 4 lb (1.82 Kg) per ft² lead flashing.
 - 2. Form tubular lead flashing sleeve not less than 8" (202 mm) high with diameter ½" (12.7mm) larger than vent stack.
 - 3. Provide 4" (101 mm) wide flange soldered water-tight.
 - 4. Provide vandal-proof vent covers.
- H. Scuppers:

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1. Fabricate using stainless steel to profiles and details shown.
 2. Lock seam corners, solder water-tight and hem outer exposed edges.
 3. Provide 4" (101 mm) wide minimum flanges formed to fit cants, decks and vertical wall surface.
 4. Shop punch flanges for fastenings at 6" (152 mm) on center.
- I. Gutters:
1. Gutters shall be minimum 6" (152 mm) wide x 6" (152 mm) deep, 24-gage stainless steel with mill finish.
 2. Gutter straps shall be 1" (25.4 mm) wide rolled stainless steel located at 24" o.c. (61 cm) and pop riveted to gutter.
 3. Gutter brackets shall be 1.25" wide by 0.125" thick stainless steel with mill finish located at 2'-6" o.c.
 4. Gutters shall be in minimum 10'-0" long sections formed to provide flush exterior seams between gutter sections. Joints between gutter sections shall be 1/2" wide with 6" wide cover plates and support brackets to allow for expansion and contraction. Joints shall be fully bedded in sealant on inside joints.
- J. Downspouts:
1. Downspouts:
 - a. Downspouts shall be 5" by 5" square 0.125" thick stainless steel with mill finish fabricated in one continuous piece down to kick-out diverter section at bottom of downspout.
 - b. Sections shall be welded and ground smooth.
 2. Downspout bracket/straps:
 - a. Straps shall be 1" wide by 0.125" thick located not more than 4'-0" apart with top and bottom brackets located not more than 12" from ends of downspouts.
 - b. Brackets shall be attached to structure with two .025" diameter Zamac drive pins per bracket.
 - c. Bracket shall be attached to gutter with two #10 sheet metal screws each side of bracket and calked with sealant.
- K. Stucco Stop with Counter-flashing (2-piece):
1. Fabricate in approximately 10 ft sections using sheet stainless steel to details indicated.
 2. Provide receiver with 1.5" wall flange, 0.75" sloping stucco stop, and 0.75" flange bend downward with 0.50" hem.
 3. Shop punch wall flange for fastening.
 4. Provide shop fabricated soldered corner splices extending 4" each way.
 5. Provide counterflashing with 1.5" 45° top flange with 0.35" kick back at top and 4" bottom flange formed inward 3/4" towards wall with hemmed 0.25" kick at bottom.
 6. Provide 1.5" x 4" storm cleats.
 7. Manufacturer: Subject to compliance with requirements, provide products by following manufacturer:
 - a. SBC Industries, North Miami, Florida.
 8. Substitutions: Request for substitutions shall be in accord with Section 01 25 13 - Product Substitution Procedures
- L. Stucco Top with Counter-flashing (1-piece for re-roofing):
1. Fabricate in approximately 10 ft. sections using sheet stainless steel to details as indicated.
 2. Provide counterflashing with 0.50" 45° leg for sealant with 1.5" wall flange with a 4" bottom flange formed inward 0.75" towards wall with hemmed 0.50" kick at bottom.
 3. Shop punch wall flange for fastening.
 4. Provide shop fabricated soldered corner splices extending 4 inches each way.

5. Manufacturer: Subject to compliance with the specified requirements, provide products by the following manufacturer:
 - a. SBC Industries, North Miami, Florida.
 6. Substitutions: Substitutions: Request for substitutions shall be in accord with Section 01 25 13 - Product Substitution Procedures
- M. Surface Mounted Flashing (1-piece):
1. Fabricate in approximately 10 ft. sections using sheet stainless steel to detail as indicated.
 2. Provide flashing with 1.50" wall flange with 0.25" kick at top to receive sealant, 0.50" 135° sloping top flange and 4" bottom flange formed inward 0.75" towards wall with hemmed 0.50" kick at bottom.
 3. Shop punch wall flange for fastening to meet wind loads per FBC
 4. Provide shop fabricated corner splices extending 4".
 5. Manufacturer: Subject to compliance with the specified requirements, provide products by following manufacturers:
 - a. SBC Industries, North Miami, Florida.
 6. Substitutions: Request for substitutions shall be in accord with Section 01 25 13 - Product Substitution Procedures

PART 3 EXECUTION

3.1 EXAMINATION

- A. Do not proceed with work until conditions detrimental to proper and timely completion of work have been corrected in acceptable manner.

3.2 INSTALLATION

- A. Lap, rivet, lock, or seal joints, as field conditions require.
- B. Provide necessary reinforcement, miscellaneous fittings, and accessories.
- C. Apply flashing and sheet metal work including miscellaneous fittings and accessories to even, smooth, sound, thoroughly clean and dry surfaces that are free from defects that might affect application. Prime metal flanges that receive bitumen under provisions of FBC and manufacturer's requirements.
- D. Perform soldering work slowly, with properly heated coppers to thoroughly heat seam material and sweat solder through full width of seam that shows no less than 1" of evenly flowed solder. Solder under provisions of ASTM B 32.
 1. Start soldering immediately after application of flux.
 2. Solder flat locked seam.
- E. Isolate dissimilar metals with accepted isolation paint or other accepted materials.
- F. Make flashing and sheet metal work water and weather tight, with lines, arises and angles sharp and true and plane surfaces free from waves and buckles.
- G. Provide sufficient fasteners and related hardware to ensure a complete and weather tight system.
- H. Base Flashings at Aluminum Walkway Covers Abutting Concrete and Masonry:
 1. Set flashing tight against wall and with roof flange set on aluminum deck in bed of sealant.
 2. Secure roof flanges to metal deck with No. 10 x 0.50" stainless steel sheet metal screws at 6" on center maximum. Provide sealant washers and stainless steel washers under screw heads.

- I. Cants Strips: Install at transitions of roof membrane with flat vertical surfaces.
- J. Copings:
 - 1. Secure outer hold-down cleat to woodblock at 6 inches on center with ring shank roofing nails.
 - 2. Install coping over cleat. Allow 0.125" space between each coping section.
 - 3. Secure inside face of coping with removable grommet type fasteners.
 - 4. Provide 1" to 12" slope at coping to inner parapet wall.
 - 5. Install joint covers in full bed of sealant.
- K. Curb to Duct Flashing and Counterflashing:
 - 1. Install flashings after ducts through curbs are in place and after bituminous base flashings are completed.
 - 2. Place flashings in place on curbs and solder corners and corner miter laps water-tight.
 - 3. Secure counterflashings to vertical edge of curb nailers with No. 10 stainless steel sheet metal screws through sealant washers at not over 12" on center.
 - 4. Secure vertical upturned duct flashing to duct with No. 10 stainless steel sheet metal screws through sealants washers at not over 6" on center.
 - 5. Seal joint between flashings and ducts with sealant per Section 07 92 13 – Elastomeric Joint Sealants.
- L. Edge Drips:
 - 1. Install continuous 20 gage stainless steel cleat.
 - 2. Set 22 gage stainless steel edge drip roof flanges in full bed of roofing cement over completed roofing.
 - 3. Lap splices 4" minimum and seal top horizontal surface laps with cold bitumen.
 - 4. Stagger nails at flange to roof deck at 4" on center.
 - 5. Cover roof flanges with 2-ply felt stripping set in full bed of roofing cement.
 - 6. Locate drip bottom not less than 0.75" away from finished vertical surfaces.
- M. Roof Drains:
 - 1. Prime roof drain flanges before applying roof felts.
 - 2. Set lead in full bed of cold bitumen over intermediate plies or cap sheet.
 - 3. Strip lead cover with 2 layers of roofing felts in solid coats of hot bitumen.
- N. Roof penetration materials at pipes, conduits and round equipment supports.
 - 1. After preliminary examination install conical sealant cover with sealant.
- O. Sanitary Vent Stack Flashings:
 - 1. Install in accord with NRCA specifications.
- P. Scuppers:
 - 1. Set scuppers in full bed of roofing cement over completed base flashing and roof membrane.
 - 2. Secure to masonry walls and concrete decks with stainless sheet metal screws in lead shields at 6" on center.
 - 3. Secure to wood nailers with stainless steel sheet metal screws at 6" on center.
- Q. Stucco Stop with Counterflashing (2-piece):
 - 1. Set receiver on masonry and concrete walls where indicated.
 - 2. Lap splices 4 inches minimum and seal laps with sealant.
 - 3. Secure to wall with No. 10 x 1.25" minimum Tap-Con screws 12" on center maximum.
 - 4. Check for membrane/bitumen seal on top of felt flashing before counterflashing installation.
 - 5. Attach storm cleats at 30" on center and with 1 cleat at each joint.
 - 6. Insert counterflashing into receiver, and secure tightly with storm cleats.
- R. Surface Mounted Flashing (1-piece):
 - 1. Set on masonry and concrete walls over base flashing where indicated.

2. Lap splices 4" minimum and seal laps with sealant.
3. Secure to wall with No. 10 x 1-1/4 inch Tap-Con pan head screws at 12 inches on center maximum. Provide neoprene sealant washers and stainless steel washers.
4. Where corrugated metal wall occurs, place premolded neoprene filler strip on wall immediately above top of metal base flashing.
 - a. Set filler strip in sealant and seal abutting edges of filler strip with sealant.
 - b. Place counterflashing over filler strip set in sealant and secure flashing to metal wall through filler strip with No. 10 x appropriate length stainless steel sheet metal screws at 6 inches on center maximum and centered on wall flutes.
 - c. Provide sealant washers and stainless steel washers under screw heads.
5. Check for membrane/bitumen seal on top of felt flashing before flashing installation.

END OF SECTION

SECTION 07 84 00
FIRESTOPPING

PART 1 GENERAL

1.1 RELATED DOCUMENTS

- A. The provisions of the General Conditions, Supplementary Conditions, Drawings, Specifications and the Sections included under Division 1, General Requirements and References are included as a part of this Section as though bound herein.

1.2 SECTION INCLUDES

- A. Provide labor, material, services and equipment necessary to furnish and install work as indicated and as specified herein, which includes, but is not limited to:
 - 1. Firestopping at penetrations in fire rated assemblies, fire-resistive joints and intersections with fire rated walls, floors and roofs, perimeter fire containment systems in fire rated spaces, fire and smoke seals for doors and corridors.

1.3 RELATED SECTIONS

- A. Section 01 25 13 – Product Substitution Procedures.
- B. Section 01 31 13 – Project Coordination.
- C. Section 01 33 00 – Submittal Procedures.
- D. Section 01 42 00 – References.
- E. Section 01 45 00 – Quality Control.
- F. Section 01 66 00 – Project Storage and Handling Requirements.
- G. Section 01 78 00 – Closeout Submittals.
- H. Section 03 30 00 – Cast-In-Place Concrete.
- I. Section 04 22 00 – Concrete Unit Masonry.
- J. Section 07 92 00 – Joint Sealants.
- K. Section 09 29 00 – Gypsum Board.
- L. Division 23 – Heating, Ventilating and Air Conditioning (work requiring firestopping).
- M. Division 26 – Electrical (work requiring firestopping).
- N. Division 27 – Communications (work requiring firestopping).

1.4 REFERENCES

- A. See Section 01 42 00 – References for additional reference standards, definitions, abbreviations, and acronyms.
- B. American Society of Testing Materials (ASTM):
 - 1. ASTM C920-11: Standard Specification for Elastomeric Joint Sealants.
 - 2. ASTM E1399-13e1: Standard Test Method for Cyclic Movement and Measuring the Minimum and Maximum Widths of Architectural Joint Systems.
 - 3. ASTM E 1996-00: Standard Test Method for Fire Resistive Joint Systems.
- C. American National Standards Institute/Underwriter’s Laboratory (ANSI/UL):
 - 1. ANSI/UL 1479: Fire Test of Through Penetration Firestops.
 - 2. ANSI/UL 2079: Test for Fire Resistance of Building Joint Systems.
- D. Florida Building Code, 6th Edition.
- E. Florida Fire Prevention Code, 6th Edition.

1.5 PERFORMANCE REQUIREMENTS

- A. Provide products that upon curing, do not re-emulsify, dissolve, leach, breakdown, or otherwise deteriorate over time from exposure to atmospheric moisture, sweating pipes, ponding water or other forms of moisture characteristic during and after construction.
- B. Provide firestop sealants sufficiently flexible to accommodate motion such as pipe vibration, water hammer, thermal expansion and other normal building movement without damage to seal.
- C. Pipe insulation shall not be removed, cut away or otherwise interrupted through wall or floor openings. Provide products appropriately tested for thickness and type of insulation utilized.
- D. Openings within walls and floors designed to accommodate voice, data and video cabling shall be provided with re-enterable products specifically designed for retrofit.
- E. Penetrants passing through fire-resistance rated floor-ceiling assemblies contained within chase wall assemblies shall be protected with products tested by being fully exposed to fire outside of chase wall. Systems within UL Fire Resistance Directory that meet criterion are identified with words "Chase Wall Optional".
- F. Provide fire-resistive joint sealants sufficiently flexible to accommodate movement such as thermal expansion and other normal building movement without damage to seal.
- G. Provide fire-resistive joint sealants designed to accommodate specific range of movement and tested for purpose in accord with cyclic movement test criteria as outlined in Standards, ASTM E-1399, ASTM E-1966 or ANSI/ UL 2079.
- H. Provide through penetration firestop systems and fire-resistive joint systems and conduct air leakage test in accord with Standards, ANSI/UL1479 and ANSI/UL2079, respectively, with published L-Ratings for ambient and elevated temperatures as evidence of ability of through penetration firestop system or fire-resistive joint system to restrict movement of smoke.

1.6 SUBMITTALS

- A. Submit in accord with Section 01 33 00 – Submittal Procedures.
- B. Product Data: Provide manufacturer's standard catalog data for specified products demonstrating compliance with referenced standards and listing numbers of systems in which each product is to be used.
- C. Shop Drawings: Submit schedule of opening locations and sizes, penetrating items, and required listed design numbers to seal openings to maintain fire resistance rating of adjacent assembly.
- D. Certificates:
 - 2. Product certificates signed by firestop system manufacturer certifying material compliance with applicable code and specified performance characteristics.
 - 3. Certification of Installer's Qualifications.
- E. Installation Instructions: Submit manufacturer's printed installation instructions.

1.7 QUALITY ASSURANCE

- A. Comply with Section 01 45 00 – Quality Control.
- B. Products/Systems: Provide firestopping systems that comply with following requirements and as specified in Paragraph 1.04 - Performance Criteria.
 - 1. Firestopping tests shall be performed by qualified, testing and inspection agency, UL approved, or another agency performing testing and follow-up inspection services for firestop systems acceptable to authorities having jurisdiction.

2. Firestopping products bear classification marking of qualified testing and inspection agency.
- B. Installer Qualifications: Installer shall have five continuous previous years of experience in performing work specified, and is certified or approved by firestopping manufacturer as having required training to install firestop products specified.
- C. Mock-Ups:
 1. Comply with Section 01 43 39 – Mockups.
 2. Install mockup using acceptable products and manufacturer approved installation methods.
 3. Apply one of each unit type of firestopping material, such as penetrations through fire rated partition, to representative application.
 4. Locate where directed.
 5. Maintain mockup during construction for workmanship comparison.
 6. Remove and legally dispose of mockup when no longer required.
- D. Preinstallation Meeting:
 1. Comply with Section 01 31 13 – Project Coordination.
 2. Contractor/CM shall coordinate and conduct meeting with applicable installers to verify project requirements, review substrate conditions, plan and schedule work progress, determine phasing and layout of work with other trades to minimize conflicts.
 3. Review manufacturer's printed installation instructions, and warranty requirements.

1.8 DELIVERY, STORAGE, AND HANDLING

- A. Comply with Section 01 66 00 – Product Storage and Handling Requirements.
- B. Deliver products in manufacturer's original, unopened, undamaged containers, identification labels intact identifying product and manufacturer, date of manufacture; lot number; shelf life, if applicable; qualified testing and inspection agency's classification marking; and mixing instructions for multicomponent materials.
- B. Handle and store products in accord with manufacturer's written recommendations published in technical materials. Leave products wrapped or otherwise protected and under clean and dry storage conditions until required for installation.
- C. Store materials protected from exposure to harmful weather conditions and at temperature and humidity conditions recommended by manufacturer.

1.9 PROJECT CONDITIONS

- A. Do not install firestopping products when ambient or substrate temperatures are outside limitations recommended by manufacturer.
- B. Do not install firestopping products when substrates are wet due to rain, frost, condensation, or other causes.
- C. Maintain minimum temperature before, during, and for minimum 3 days after installation of materials
- D. Do not use materials containing flammable solvents.
- E. Coordinate construction of openings and penetrating items to ensure that through-penetration firestop systems are installed according to specified requirements.
- F. Coordinate sizing of sleeves, openings, core-drilled holes or cut openings to accommodate through-penetration firestop systems.
- G. Schedule installation of firestopping after completion of penetrating item installation but prior to covering or concealing of openings.

- H. Schedule installation of safing materials in linear opening at curtain wall prior to construction that limits access to safing slot.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Approved Manufacturer: Specified Technologies Inc., 200 Evans Way; Somerville, NJ 08876; Tel: 800-992-1180; Tel: 908-526-8000; Fax: 908-526-9623; Website: www.stifirestop.com.
- B. Other manufacturers shall make requests for product substitutions in accord Section 01 25 13 – Product Substitution Procedures.
- C. Single Source: Obtain firestop systems for each type of penetration or joint opening and construction condition indicated from single manufacturer.

2.2 MATERIALS

- A. Use firestopping products that have been tested for specific fire-resistance-rated construction conditions conforming to construction assembly type, penetrating item type or joint opening width and movement capabilities, annular space requirements, and fire-rating involved for each separate instance.
- B. Latex Sealants: STI SpecSeal Series single component latex formulations that upon cure do not re-emulsify during exposure to moisture. Following products are acceptable:
 - 1. Specified Technologies, Inc. (STI) SpecSeal Series SSS Intumescent Sealant.
 - 2. Specified Technologies, Inc. (STI) SpecSeal Series LCI Intumescent Sealant.
 - 3. Specified Technologies, Inc. (STI) SpecSeal Series LC Endothermic Sealant.
 - 4. Specified Technologies, Inc. (STI) SpecSeal Series AS Elastomeric Spray.
 - 5. Specified Technologies, Inc. (STI) SpecSeal Series ES Elastomeric Sealant.
- C. Firestop Devices: STI SpecSeal Series factory-assembled steel collars lined with intumescent material sized to fit specific outside diameter of penetrating item. Following products are acceptable:
 - 1. Specified Technologies, Inc. (STI) SpecSeal Series SSC Firestop Collars.
 - 2. Specified Technologies, Inc. (STI) SpecSeal Series LCC Firestop Collars.
- D. Wall Opening Protective Materials: STI SpecSeal Series intumescent, non-curing pads or inserts for protection of electrical switch and receptacle boxes to reduce horizontal separation to less than 24 inches (610mm). Following products are acceptable:
 - 1. Specified Technologies, Inc. (STI) SpecSeal Series SSP Firestop Putty Pads.
 - 2. Specified Technologies, Inc. (STI) SpecSeal Series EP PowerShield Insert Pads.
- E. Firestop Putty: STI SpecSeal Series intumescent, non-hardening, water resistant putties containing no solvents, inorganic fibers or silicone compounds. Following products are acceptable:
 - 1. Specified Technologies, Inc. (STI) SpecSeal Series SSP Firestop Putty.
- F. Fire Rated Cable Pathways: STI EZ-PATH device modules comprised of steel raceway with intumescent foam pads allowing 0 to 100 percent cable fill. Following products are acceptable:
 - 1. Specified Technologies Inc. (STI) EZ-PATH Fire Rated Pathway.
- G. Wrap Strips: STI SpecSeal Series single component intumescent elastomeric strips faced on both sides with plastic film. Following products are acceptable:
 - 1. Specified Technologies, Inc. (STI) SpecSeal Series RED Wrap Strip.
 - 2. Specified Technologies, Inc. (STI) SpecSeal Series BLU Wrap Strip.

3. Specified Technologies, Inc. (STI) SpecSeal Series BLU2 Wrap Strip.
- H. Firestop Pillows: STI SpecSeal Series re-enterable, non-curing, mineral fiber core encapsulated with an intumescent coating contained in flame retardant poly bag. Following products are acceptable:
 1. Specified Technologies, Inc. (STI) SpecSeal Series SSB Firestop Pillows.
- I. Mortar: STI SpecSeal Series Portland cement based dry-mix product formulated for mixing with water at Project site to form a non-shrinking, water-resistant, homogenous mortar. Following products are acceptable:
 1. Specified Technologies, Inc. (STI) SpecSeal Series SSM Firestop Mortar.
- J. Silicone Sealants: STI SpecSeal Series moisture curing, single component, silicone elastomeric sealant for horizontal surfaces (pourable or nonsag) or vertical surface (nonsag). Following products are acceptable:
 1. Specified Technologies, Inc. (STI) Pensil 300 Silicone Sealant.
 2. Specified Technologies, Inc. (STI) Pensil 300 SL Self-Leveling Silicone Sealant.
- K. Silicone Foam: STI SpecSeal Series multicomponent, silicone-based liquid elastomers, that when mixed, expand and cure in place to produce a flexible, non-shrinking foam. Following products are acceptable:
 1. Specified Technologies, Inc. (STI) Pensil 200 Silicone Foam.
- L. Silicone/Urethane Sealants: STI SpecSeal Series moisture curing, single component, silicone/urethane hybrid elastomeric sealant for horizontal surfaces. Following products are acceptable:
 1. Specified Technologies, Inc. (STI) SpecSeal Fast Tack Firestop Spray.
- M. Installation Accessories: Provide clips, collars, fasteners, temporary stops or dams, and other devices required to position and retain materials in place.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Before beginning installation, verify that substrate conditions previously installed under other sections are acceptable for installation of firestopping in accord with manufacturer's printed installation instructions and technical bulletins.
- B. Surfaces shall be free of dirt, grease, oil, scale, laitance, rust, release agents, water repellents, and any other substances that may inhibit optimum adhesion.
- C. Provide masking and temporary covering to protect adjacent surfaces.
- D. Do not proceed until unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. General: Install through-penetration firestop systems and fire-resistive joint systems in accord with Performance Criteria and in accord with conditions of testing and classification as specified in published design.
- B. Manufacturer's Instructions:
 1. Comply with manufacturer's printed instructions for installation of firestopping products and following.
 2. Seal openings or voids made by penetrations to ensure air and water resistant seal.
 3. Consult with mechanical engineer, project manager, and damper manufacturer prior to installation of through-penetration firestop systems that might hamper the performance of fire dampers as it pertains to duct work.
 4. Protect materials from damage on surfaces subjected to traffic.

5. Apply suitable bond-breaker to prevent three-sided adhesion in applications where conditions might occur such as intersection of gypsum wallboard/steel stud wall to floor or roof assembly where joint is backed by steel ceiling runner or track.
6. Where joint application is exposed to elements, fire-resistive joint sealant shall be approved by manufacturer for use in exterior applications and shall comply with ASTM C-920-11: Standard Specification for Elastomeric Joint Sealants.
7. Select materials pertinent to conditions from the list above within the Specification and the UL, FM, or other approved assembly information.

3.3 FIELD QUALITY CONTROL

- A. Keep areas of work accessible until inspection by authorities having jurisdiction.
- B. Where deficiencies are found, repair or replace firestopping products to comply with requirements.

3.4 ADJUSTING AND CLEANING

- A. Remove equipment, materials and debris, leaving area in undamaged, clean condition.
- B. Clean surfaces adjacent to sealed openings to be free of excess firestopping materials and soiling as work progresses.

END OF SECTION

SECTION 07 91 23
BACKER RODS

PART 1 GENERAL

1.1 RELATED DOCUMENTS

- A. The provisions of the General Conditions, Supplementary Conditions, Drawings, Specifications, and the Sections included under Division 1, General Requirements and References are included as a part of this Section as though bound herein.

1.2 SECTION INCLUDES

- A. Provide labor, material, services, and equipment necessary to furnish and install work as indicated and as specified herein, which includes, but is not limited to:
 - 1. Application of closed-cell polyethylene foam backer rod in expansion joints where indicated.

1.3 RELATED SECTIONS

- A. Section 01 25 13 – Product Substitution Procedures
- B. Section 01 31 00 – Project Coordination
- C. Section 01 33 00 – Submittal Procedures
- D. Section 01 42 00 – References
- E. Section 01 45 00 – Quality Control
- F. Section 01 66 00 – Product Storage and Handling Requirements
- G. Section 01 78 00 – Closeout Submittals
- H. Section 07 62 00 – Sheet Metal Flashing and Trim

1.4 REFERENCES

- A. Comply with Section 01 42 00 – References for additional reference standards, definitions, abbreviations and acronyms.
- B. American Society of Testing Materials:
 - 1. ASTM C1016-14: Standard Test Method for Determination of Water Absorption of Sealant Backing (Joint Filler) Material
 - 2. ASTM C1330-02(2013): Standard Specification for Cylindrical Sealant Backing for Use with Cold Liquid Applied Sealants.
 - 3. ASTM D1623-09: Standard Test Method for Tensile and Tensile Adhesion Properties of Rigid Cellular Plastics
 - 4. ASTM D1662-08(2014): Standard Test Method for Acid Sulfur in Cutting Oils
 - 5. ASTM D5249-14: Standard Test Method for Isolation and Enumeration of Enterococci from Water by the Membrane Filter Procedure

1.5 SUBMITTALS

- A. Comply with Section 01 33 00 - Submittal Procedures.
- B. Submit manufacturer's product data and printed application instructions.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Comply with Section 01 66 00 – Product Storage and Handling Requirements.
- B. Deliver materials to site in manufacturer's original, unopened containers and packaging, with labels clearly identifying product name and manufacturer.
- C. Store materials in a clean, dry area in accord with manufacturer's instructions.
- D. Protect materials during handling and application to prevent damage.

PART 2 PRODUCTS

2.1 APPROVED MANUFACTURER

- A. W. R. Meadows, Inc., PO Box 338, Hampshire, Illinois 60140-0338; Tel: 800-342-5976, 847-214-2100; Fax: 847-683-4544. Website: www.wrmeadows.com.
 - 1. Product: KOOL-ROD closed cell, backer rod joint filler.
 - 2. Color: Gray.
- B. Sonneborn, Division of BASF Construction Chemicals, LLC-Building Systems, 889 Valley Park Dr., Shakopee, MN 55379; Tel: 800-433-9517; Website: www.buildingsystems.BASF.com.
 - 1. Product: Sonalastic Closed-Cell Backer-Rod, closed-cell polyethylene foam joint-filler and backing for sealants in sizes to fit openings indicated.
 - 2. Color: Gray.
- C. Other manufacturers shall comply with Section 01 25 13 – Product Substitution Procedures.

2.2 MATERIALS

- A. Closed Cell Backer Rod Test Data:
 - 1. Water Absorption, oz/in³ (g/cc³): <0.017 (<0.03), per ASTM C1016-14.
 - 2. Density, lbs/ft³ (kg/m³): 1.50-3.0 (24-48), per ASTM D1662-08(2014).
 - 3. Compression Recovery, %: >90, per ASTM D5249-14.
 - 4. Compression Deflection, psi (KPa): >2.97 (>20.5), per ASTM D5249-14.
 - 5. Tensile Strength, psi (KPa): 29.0 (>200), per ASTM D1623-09.
 - 6. Service Temperature, °F (°C): -45 to 160 (-43 to 71).
- B. Size of Backer Rods:
 - 1. For joint widths up to 0.75” (19mm) wide, backer rods shall be sized 0.125” (3mm) larger than width of joint.
 - 2. For 0.75” (19mm) joint widths, backer rods shall be 1” (25mm).

PART 3 EXECUTION

3.1 EXAMINATION

- A. Examine areas to receive backer rod. Notify Contractor/CM if areas are not acceptable.
- B. Do not begin application until unacceptable conditions have been corrected. Commencement of installation shall be deemed acceptance of substrate conditions.
- C. Expansion joints shall be clean, dry and free of obstructions.

3.2 APPLICATION

- A. Install backer rod in accord with manufacturer's printed instructions.

- B. Select proper backer rod diameter and cut to length or use directly from spool. Do not stretch backer rod.
- C. Uniformly install backer rod with blunt instrument or roller at depth or level recommended by sealant manufacturer.
- D. Use template or roller gage to control depth of backer rods in joints to allow correct installation of joint sealant.

3.3 PROTECTION

- A. Protect expansion joints, backer rods and joint sealant from damage until project's Substantial Completion.

END OF SECTION

SECTION 07 92 00
JOINT SEALANTS

PART 1 GENERAL

1.1 RELATED DOCUMENTS

- A. The provisions of the General Conditions, Supplementary Conditions, Drawings, Specifications, and the Sections included under Division 1, General Requirements, and References are included as a part of this Section as though bound herein.

1.2 SECTION INCLUDES

- A. Provide labor, materials, services, and equipment necessary to furnish and install work as indicated and as specified herein, which includes, but is not limited to:
 - 1. Joint sealers

1.3 JOB CONDITIONS

- A. This Contractor shall inspect the job conditions as he finds them, and his starting of the work constitutes approval of all conditions.

1.4 QUALITY ASSURANCE

- A. All manufacturer items must be factory labeled, on the material or its container.
- B. Manufacturer shall have a minimum of 10-years experience specializing in specified item.
- C. Applicator shall be Sealant Manufacturer approved with 5-years successful experience.
 - 1. Applicator shall also agree to employ only skilled tradesmen for the Work.
- D. Obtain elastomeric materials only from manufacturers that if requested, will send a qualified technical representative to the project site for advising the Installer of proper procedures and precautions for the use of the materials.
- E. Contractor shall hold a pre-caulking meeting at the project site with the Architect and all involved parties to review conditions, materials, colors, and other requirements.

1.5 REFERENCES

- A. ACI 504 R – Guide to Joint Sealants for Concrete Structures
- B. ASTM C834 – Standard Specification for Latex Sealants
- C. ASTM C919 – Standard Practice for Use of Sealants in Acoustical Applications
- D. ASTM C920 – Standard Specification for Elastomeric Joint Sealants
- E. ASTM C 1193 – Standard Guide for Use of Joint Sealants
- F. ASTM D1056 – Standard Specification for Flexible Cellular Materials - Sponge or Expanded Rubber
- G. SWRI (Sealant, Waterproofing and Restoration Institute) - Sealant and Caulking Guide Specification.
- H. California South Coast Air Quality Management District (SCAQMD) #1168

1.6 SUBMITTALS

- A. Submit manufacturer's detailed technical data for materials, fabrication, and installation, including catalog cuts of bond breakers, backer rods, and accessories.
 - 1. Submit full color samples for Architect selection.
- B. Certificates from the manufacturers of joint sealants attesting that their products comply with the specification and are suitable for the use indicated.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials to the project site in original unopened containers or bundles with labels indicating manufacturer, product name and designation, color, expiration period for use, pot life, curing time, and mixing instructions for multi-component materials.
- B. Store and handle materials in compliance with manufacturer's requirements to prevent their deterioration or damage due to moisture, temperature, contaminants, or other causes.

1.8 WARRANTY

- A. The Contractor shall furnish written guarantee that work executed under this section is free from defects of material and workmanship for a period of 5-years from date of substantial completion of the entire project.
 - 1. Include coverage that he will immediately and at his own expense, repair and replace all such defects as may develop during the term of this guarantee.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturer shall be one of the following however products of other manufacturers will be considered for acceptance provided they equal or exceed the material requirements and functional qualities of the specified product.
 - 1. DAP, Inc., Dayton, Ohio
 - 2. Dow Corning Corp., Midland, Michigan
 - 3. General Electric Co., GE Silicones, Waterford, New York
 - 4. Pecora Corp., Harleysville, Pennsylvania
 - 5. Sonneborn Building Products Div., Minneapolis, Minnesota
 - 6. Tremco, Inc., Beachwood, Ohio
 - 7. Hilti Construction Chemicals, Tulsa, Oklahoma
- B. Contractor may request other products or manufacturers for acceptance provided they equal or exceed the material requirements and functional qualities of the specified product.
 - 1. The "Substitution Request Form" and complete technical data for evaluation must accompany requests for Architect's approval.
 - 2. All materials for evaluation must be received at least 10-days prior to bid due date.
- C. Toxicity/IEQ:
 - 1. Comply with applicable regulations regarding toxic and hazardous materials, and as specified. Sealants must meet or exceed requirements of Bay Area Resources Board, reg. 8, rule 51.
 - 2. Sealants containing aromatic solvents, fibrous talc, formaldehyde, halogenated solvents, mercury, lead, cadmium, chromium and their compounds, are not permitted.
- D. Backer Rods: Provide composite backer rods.

2.2 MATERIALS

A. General

1. The term “Acceptable Standard” when used within this Section, refers to the manufacturer and product listed, specified as to type and quality required for this project.
2. Contractor shall supply a single resource responsibility for joint sealer materials.
 - a. Obtain joint sealer materials from a single manufacturer for each different product required.
3. Compatibility: Provide joint sealers, joint fillers, and other related materials that are compatible with one another and with joint substrates under conditions of service and application, as demonstrated by sealant manufacturer based on testing and final experience.

B. Caulking Compounds (Acrylic Latex Sealant)

1. Latex rubber modified, acrylic emulsion polymer sealant compound; manufacturer’s standard, one part, non-sag, mildew resistant, acrylic emulsion sealant complying with ASTM C 834, formulated for accepting paint. (Product recommended for exposed interior locations involving joint movement of less than 5%).
2. Acceptable Standard
 - a. “Sonolac”; Sonneborn Building Products, Inc
 - b. “Acrylic Latex Caulk 832”; Tremco, Inc
 - c. “Acrylic Latex Caulk with Silicone”; DAP

C. One-Part Elastomeric Sealant (Silicone)

1. One component elastomeric sealant complying with ASTM C 920, Class 25, Type NS (non-sag), unless manufacturer recommends Type S (self-leveling) for the application shown (general caulking , glazing applications).
 - a. Acceptable Standard
 - i) “Dow Corning 791; Dow Corning Corp.
 - ii) “Omniseal”; Sonneborn Building Products, Inc.
 - iii) “Spectrem 2; Tremco, Inc.
2. One component mildew resistant silicone sealant used around countertops, backsplashes, and other wet interior locations.
 - a. Acceptable Standard
 - i) “Dow Corning 786”, Dow Corning Corp.
 - ii) “Sanitary 1700”; General Electric
3. One-component high movement joints (+100/-50) use sealants in locations indicating high movement.
 - a. “Dow Corning 790”; Dow Corning Corp.
 - b. “Spectrem 1”; Tremco, Inc.

D. One-part self-leveling polyurethane sealant (for traffic areas)

1. One component polyurethane self-leveling sealant, complying with ASTM C 920, Type S, Grade P, Class 25.
 - a. Acceptable Standard
 - i) “Sonolastic SL 1”; Sonneborn Building Products, Inc.
 - ii) “NR-201 Urexpant”; Pecora Corp.
2. Two component polyurethane self-leveling sealant, complying with ASTM C920, Type M, Grade P, Class 25.
 - a. Acceptable Standard
 - i) “Sonolaastic SL 2”; Sonneborn Building Products, Inc.
 - ii) “NR-200 Urexpant”: Pecora Corp.
 - iii) “THC900/THC901”: Tremco, Inc.

- E. Flexible Polyurethane Security Sealant (for use on interior joints, perimeter of fixtures, penetrations, vents, doors, windows and similar openings)
 - 1. Two component polyurethane sealant, complying with ASTM C 920, Grade NS, Class 12.5, with a Shore A Hardness of 55, Type M.
 - a. Acceptable Standard
 - i) “Dynaflex”, Pecora Corp.
 - ii) “Ultra”, Sonneborn Building Products, Inc.
- F. Miscellaneous Materials
 - 1. Provide joint cleaner and joint primer sealer as recommended by the sealant or caulking compound manufacturer.
 - 2. Sealant backer rod shall be compressible rod stock, polyethylene foam; polyethylene jacketed polyurethane foam, butyl rubber foam, neoprene foam, or other materials as recommended by sealant manufacturer.
 - a. Where plans indicate a 2" building expansion joint, provide an expanding foam secondary sealant, “BackerSeal” as manufactured by Emseal Joint Systems, Ltd., or Apolytite Standard as manufactured by Polytite Manufacturing Corporation, behind sealant in lieu of standard backer rod.
 - 3. Primer: Provide type recommended by joint sealer manufacturer where required for adhesion of sealant to joint substrates indicated, as determined from preconstruction joint sealer substrate tests and field tests.
 - 4. Cleaners for Nonporous Surfaces: Provide non-staining, chemical cleaners of type acceptable to manufacturer of sealant and sealant backing materials, which are not harmful to substrates and adjacent nonporous materials, and which do not leave oily residues or otherwise have a detrimental effect on sealant adhesion or in service performance.
 - 5. Masking Tape: Provide non-staining, non-absorbent type compatible with joint sealants and to surfaces adjacent to joints.

PART 3 EXECUTIONS

3.1 INSPECTION

- A. This Contractor shall notify the General Contractor, when he has completed his work and is ready for A/E inspection.
- B. Verify that substrate surfaces and joint openings are ready to receive work.
- C. Verify that joint backing and release tapes are compatible with sealant.
- D. Clean and prime all joints in accordance with manufacturer’s instructions.
- E. Remove loose materials and foreign matter that might impair adhesion of sealant.

3.2 INSTALLATION

- A. Install all products in strict accordance to all manufacturers' recommendations.
- B. Measure joint dimensions and size materials to achieve required width/depth ratios.
- C. Install joint backing to achieve a neck dimension no greater than 1/3 the joint width.
- D. Install bond breaker where joint backing is not used.
- E. Install sealant free of air pockets, foreign embedded matter, ridges, and sags.
- F. Apply sealant within recommended application temperature ranges.
 - 1. Consult manufacturer when sealant cannot be applied within ranges.
- G. Tool joints concave.
- H. Tilt-up concrete wall panel joints; clean joints free of moisture, dust, sealers and form release agents using a wire brush and rag without solvents to clean concrete.

1. Exterior wall joints
 - a. Seal both sides (outside and inside) with an exterior joint system consisting of a foam-backer rod (set into the joint for the entire length of the joint cavity) and cover with a urethane or other acceptable joint sealant material (sealant depth should be one-half the joint width, max. ½” depth) tool joint material in place.
 - b. Protect sealant material during painting of walls.
2. Interior wall joints
 - a. In fire resistance rated walls
 - i) Seal both sides of joint with a fire-stopping sealant, encapsulating the ceramic blanket protection material, finish joint similar to that of the exterior wall joint described above.
 - b. In non-fire resistance rated walls
 - i) Seal exposed concrete panel joints
 - ii) Concealed (furred) concrete panel joints need not be sealed

3.3 ADJUSTMENT AND CLEANING

- A. After installation, thoroughly clean all exposed surfaces and restore all damaged material to its original condition, or replaced with new material.

3.4 SITE ENVIRONMENTAL PROCEDURES

- A. Indoor Air Quality:
 1. Temporary ventilation: Provide temporary ventilation during work of this Section.
 - a. Coordinate interior application of joint sealants with interior finishes schedules.

END OF SECTION

DIVISION

8

OPENINGS

SECTION 08 06 00
DOOR AND FRAME SCHEDULE NOTES AND LEGEND

1.1 General Notes and Legend

A. Legend

- | | | | |
|----|-----|---|----------------------|
| 1. | AL | - | Aluminum |
| 2. | GL | - | Glass |
| 3. | HM | - | Hollow Metal - Steel |
| 4. | SS | - | Stainless Steel |
| 5. | STL | - | Steel |
| 6. | WD | - | Wood |

B. Fire Rating in Minutes

- | | | | |
|----|-----|---|--|
| 1. | 20 | - | 20 Minute |
| 2. | 45 | - | C Label 3/4 Hour (interior); E label 3/4 hour (exterior) |
| 3. | 60 | - | B Label 1 Hour |
| 4. | 90 | - | B Label 1-1/2 Hour (interior); D label 1-1/2 hour (exterior) |
| 5. | 180 | - | A Label 3 Hour |

C. Door sizes are indicated thus: 21070 (2'-10"W. x 7'-0"H.) Door sizes as shown on Door and Frame Schedule are nominal. Approved shop drawings must be distributed between trades to coordinate and verify actual door and frame sizes.

D. Door thickness shall be 1-3/4 inch, unless noted otherwise.

E. (HM) hollow metal doors and frames shall be as specified in Section – Steel Doors and Frames.

F. Hardware sets indicated on schedule are specified under Section – Door Hardware.

G. Type and thickness of glazing for doors and frames shall be as specified in Section – Glazing.

H. UL frame anchors required for labeled openings.

I. For door and frame elevations see Drawing sheet A-104.

J. Closers shall be the last hardware item installed. Installing Contractor shall verify maximum degree of door swing that field conditions will allow and install closers accordingly regardless of swing shown on Drawings.

K. Except when restricted by individual published listings, it is permissible for a fire door assembly to consist of the labeled, listed, or classified components of different organizations that are acceptable to the authority having jurisdiction.

L. Steel astragals and wood door metal vision light frame shall be painted. Color to be as selected by the Architect.

- M. Provide knurled levers on all doors to hazardous areas. Tactile material is not acceptable.
- N. Contractor shall provide shims for wall mounted wall stop/holders where the trim (pull, lever, or knobs) extend beyond the engaged depth of wall holder.
- O. Door specified with kickplates and vertical rod exit devices – cut kickplate short of vertical rod bottom latch case.
- P. Door under cut $\frac{1}{2}$ maximum inches from finished floor.

The following information has been noted on the Door and Frame Schedule under the remarks column:

- A. Refer to the notes under the Remarks Column on the Door Schedule.

END OF SECTION

SECTION 08 11 13
METAL DOORS AND FRAMES

PART 1 GENERAL

1.1 RELATED DOCUMENTS

- A. The provisions of the General Conditions, Supplementary Conditions, Drawings, Specifications, and the Sections included under Division 1, General Requirements and References are included as a part of this Section as though bound herein.

1.2 SECTION INCLUDES

- A. Provide labor, material, services, and equipment necessary to furnish and install work as indicated and as specified herein, which includes, but is not limited to:
 - 1. Hollow steel doors and steel frames, frame components including sidelites, transom frames, borrowed lites, and louvers as indicated.
 - 2. Attachments including screws, bolts, expansion shields and related prep work.
 - 3. Door Hardware.

1.3 RELATED WORK

- A. Section 01 25 13 – Product Substitution Procedures
- B. Section 01 31 00 – Project Management and Coordination
- C. Section 01 33 00 – Submittal Procedures
- D. Section 01 42 00 – References
- E. Section 01 45 00 – Quality Control
- F. Section 01 66 00 – Product Storage and Handling
- G. Section 01 74 00 – Cleaning and Waste Management
- H. Section 01 78 00 – Closeout Submittals
- I. Section 08 14 29 – Prefinished Wood Doors
- J. Section 08 71 00 – Door Hardware
- K. Section 08 81 00 – Glazing
- L. Section 09 29 00 – Gypsum Board
- M. Section 09 91 00 – Painting

1.4 REFERENCES

- A. See Section 01 42 00 – References for additional reference standards, abbreviations, definitions and acronyms.
- B. ASCE 7-10 – Minimum Design Loads for Buildings and other Structures.
- C. American Society of Testing Materials (ASTM):
 - 1. ASTM A568A/568M-14: Standard Specification for Steel Sheet, Carbon, Structural, and High Strength, Low-Alloy, Hot-Rolled and Cold Rolled, General Requirements for
 - 2. ASTM A653/A653M-13: Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
 - 3. ASTM A1008/A1008M-15: Standard Specification for Steel, Sheet, Cold Rolled Carbon Structural High Strength Low-Alloy and High-Strength Low-Alloy with Improved Formability, Solution Hardened, and Bake Hardenable

4. ASTM E-90-09 – Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements.
- D. DHI (Door Hardware Institute) – The Installation of Commercial Steel Doors and Steel Frames, Insulated Steel Doors in Wood Frames and Builder's Hardware.
- E. National Fire Protection Association (NFPA):
 1. NFPA 80 – Fire Doors and Windows.
 2. NFPA 252 – Fire Tests for Door Assemblies.
- F. Florida Building Code, 6th Edition.
- G. Florida Fire Prevention Code, 6th Edition.
- H. American National Standards Institute (ANSI):
 1. ANSI A250.3 – Test Procedure and Acceptance Criteria for Factory Applied Finish Painted Steel Surfaces for Steel Doors and Frames.
 2. ANSI A250.8 – SDI-100 – Recommended Specifications for Standard Steel Doors and Frames.
 3. ANSI A250.10 – Test Procedure and Acceptance Criteria for Prime Painted Steel Surfaces for Steel Doors and Frames.
 4. ANSI A115.IG – Installation Guide for Doors and Hardware.
 5. ANSI A250.11 – Recommended Erection Instructions for Steel Frames.
- I. Underwriter's Laboratory (UL):
 1. UL 10B – Fire Tests for Door Assemblies.
 2. UL 10C – Positive Pressure Fire Test of Door Assemblies.

1.5 QUALITY ASSURANCE

- A. Comply with Section 01 45 00 – Quality Control.
- B. Conform to requirements of ANSI A250.8 SDI-100 – Recommended Specifications for Standard Steel Doors and Frames, or as amended herein if more restrictive.
- C. Manufacturer: Company specializing in manufacturing the products specified with minimum of three years continuous documented experience manufacturing products indicated.
- D. Product Approval: Door / Frame Assemblies shall meet current Florida Building Code Product Approval System or Miami-Dade Code Compliance Office requirements for High Velocity Hurricane Zone (HVHZ) or Notice of Approval (NOA) product approval.

1.6 SUBMITTALS

- A. Comply with Section 01 33 00 – Submittal Procedures.
- B. Submit Product Approvals for Door / Frame Assemblies certifying compliance with current Florida Building Code Product Approval System or Miami-Dade Code Compliance Office requirements for High Velocity Hurricane Zone (HVHZ) or Notice of Approval (NOA) product approval.
- C. Submit shop drawings, product data, manufacturer's literature and installation instructions. Include details of each frame type, elevations of door design types, conditions at openings details of construction, location and installation requirements of finish hardware and reinforcements and details of joints and connections.
- D. Indicate door and frame configuration, anchor spacing, anchor types, location of cutouts for hardware and glazing, and internal reinforcement.
- E. Performance Requirements: Provide hollow metal doors and frame assemblies that comply with performance requirements as demonstrated by testing manufacturer's assemblies in accordance with ASCE 7-10.
- F. Submit manufacturer's written installation instructions.

- G. Manufacturer shall certify and submit documentation that product complies with large and small missile impact criteria and have been tested and approved in compliance with Florida Product Approval or Miami Dade NOA and applicable requirements and submit documentation

1.7 DELIVERY, STORAGE, AND PROTECTION:

- A. Comply with Section 01 66 00 – Product Storage and Handling Requirements.
- B. Deliver doors and frames marked to identify each door, frame and opening in which they are located per numbers indicated.
- C. Store doors and frame in dry area on end with minimum ¼” spacers between units to allow ventilation.
- D. Frames shall be shipped and stored with temporary stiffeners and spacers in place to prevent distortion.
- E. Doors and frames shall be kept covered with water resistant, breathable fabric to prevent moisture intrusion on surfaces and allow ventilation.
- H. Replace doors and frames damaged during delivery, storage or construction.

1.8 WARRANTY:

- A. Comply with Section 01 33 00 – Submittal Procedures.
- B. Provide manufacturer's five-year warranty in which manufacturer agrees to repair or replace metal doors and frames that become corroded or rust within warranty period.
- C. Warranty shall include installation and finishing that is required due to repair or replacement of doors and frames.

PART 2 PRODUCTS

2.1 APPROVED MANUFACTURERS

- A. CECO DOOR, Division of Assa Abloy, 9159 Telecom Dr., Milan, TN 38353; Tel: 731-686-8345; Fax: 731-686-4211; Website: www.cecodoor.com.
- B. STEELCRAFT, 9017 Blue Ash Rd., Cincinnati, OH 45242; Tel: 800-243-9780; Fax: 513-745-6657; Website: www.steelcraft.com.
- C. Curries Manufacturing, Inc., 1502 12th St. NW, Mason City, IA 50401; Tel: 641-423-1334; Fax: 641-424-8305; Website: www.curries.com.
- D. Windsor Republic Doors, 155 Republic Dr., McKenzie, TN 38201; Tel: 800-733-3667; Website: www.republicdoor.com.
- E. Other manufacturers shall comply with Section 01 25 13 – Product Substitution Procedures.

2.2 DOORS AND FRAMES

- A. Material: Electro-Zinc coat bonderized conforming to ASTM A653/A653M-13.
 - 1. Exterior doors and frames: Factory applied G-90 (275 g/m²) electro plated zinc finish.
 - 2. Interior doors and frames: Factory applied G-60 (182 g/m²) electro plated zinc finish.
- B. Core: 20-gage cold rolled sheet steel vertical stiffeners in a "Z" configuration, spaced not more than 6" o.c. (16mm) and spot welded to face sheet. Vertical stiffeners extend full length of door cavity, except in areas of reinforcement. Fill core between stiffeners with rigid polyurethane chemically bonded to interior surfaces with minimum value of R10.
- C. Door Face: 16-gage.

D. Door Reinforcement:

1. Hinge reinforcement shall be minimum 10 ga. plate, 1.5" (318 mm) by full height of door.
2. Tops and bottom reinforcement shall be minimum 16 ga. full width of door welded to both face sheets.

E. Frame Gage: 16-gage for interior frames, 14-gage for exterior frames.

F. Fire Rated: Provide fire rated assembly where scheduled or required by Code. Installations shall be in accord with NFPA 80.

G. Insulated Doors: "U" value of 0.10 for polyurethane core for exterior metal doors.

H. Fire Rated Doors:

1. Test Doors in accord with UL 10B, UL 10C and NFPA 252.
2. Doors shall have UL labels, applied by authorized agent, in accord with independent testing agency.
3. Stairwell doors shall have 250°F (121°C) temperature rise rating with fire rating label on doors.

2.3 VISION LITES

A. Provide manufacturer's standard vision lites of minimum 16 gauge cold-rolled steel, factory primed of shapes and sizes where shown on drawings. Corners shall be mitered

B. Vision lites for fire rated applications shall be fire rated to comply with door rating.

1. At light opening cut outs, provide 18 gage bonderized zinc coated steel channel type stops tightly fitted to opening, with square and true butt joints.
 - a. Drill and dimple countersink stops for fastenings. Provide zinc plated No. 6 oval head screws into opening frames at not over 12 inches o.c.
 - b. Exterior stops shall be integral with opening frame, integral with door welded in place.
2. At exterior doors caulk perimeter seam between closure channel and door face sheet with grade exterior sealant prior to finish painting.
3. All light openings shall be cut, reinforced and stops applied in the shop. No field cutting of the doors.

C. Finish shall be zinc coat with baked enamel color selected by architect from manufacturer's standard colors.

D. Exterior frames shall be A60 galvanized or hot dipped galvanized.

2.5 ACCESSORIES

A. Door Silencers: Except on weather-stripped frames, drill stops to receive three silencers on strike jambs of single frames and two silencers on heads of double frames.

B. Jamb Anchors: Provide minimum four anchors on both hinge and latch jambs. Provide 14-gage galvanized sheet steel, angle anchors welded for each jamb which extend to floor, punched for minimum of two 0.25" (6.4 mm) diameter bolts.

C. Spreader: Provide frames with temporary steel spreader bars tack welded to jamb bottoms to maintain full rigidity and proper alignment during installation.

D. Astragals: Provide steel astragals (removable) as scheduled or indicated.

2.6 PROTECTIVE COATINGS

A. Frames: Provide with full immersion dip coat of rust-inhibitive metal primer for complete coverage including hidden surfaces.

- B. Doors: Provide full coverage electrostatic spray coat of rust-inhibitive metal primer.
- C. Dry frames and doors in baking oven process.
- D. AwlGrip Max Cor CF Primer manufactured by AkzoNobel Corp., 2270 Morris Ave., Union, NJ 07083; Tel: 908-686-1300; Fax: 908-964-2219; Website: www.akzonobel.com/us

2.7 GROUTING OF EXTERIOR FRAMES

- A. Paint inside (concealed) faces of door frames in exterior masonry or concrete walls, using fibered asphalt emulsion coating. Apply over shop primer approximately 1/8" thick and allow to dry before handling.
- B. Fill jambs and heads of hollow metal door and window frames solid with grout.

2.8 FABRICATION:

- A. Door Fabrication: Fully welded seamless construction. No metal tabs will be accepted.
- B. Frame Fabrication: Fully welded mitered corners ground smooth. Interior intersection of jambs shall be fully welded. Integral stops minimum 0.675" (16 mm) depth and minimum 2.5" (63.5 mm) width. Punch frames to receive silencers three on strike jamb of single leaf jambs. Provide 26-gage sheet metal grout guards at hinges, lock, bolts, door closer, foot, and silencer locations.
- D. Frame Reinforcement: Hinge reinforcing steel plate 0.1875" (4.8 mm) thick x 1.5"(43 mm) wide x 10" (254 mm) long and secured by a minimum of six spot-welds. Door closer foot shall be 10-gage steel reinforcing plate, 14" (356 mm) long x stop width anchored by minimum of 8 spot welds in hinge corner of head section of jamb.
- E. Hardware Location: Locate door hardware in accord with "Recommended Locations for Builder's Hardware" published by National Builder's Hardware Association.

PART 3 EXECUTION

3.1 INSTALLATION:

- A. Examine new and existing adjacent framing and rough opening preparation for conditions, which would prevent quality installation of doors and frames.
- B. Immediately notify Contractor/CM of conditions precluding successful installation. Proceeding with installation indicates installer's acceptance of conditions.
- C. Install frames in accord with NAAMM CHM-1-74 and ASCE 7-10.
- D. Install doors in accord with SDI-100, DHI and ASCE 7-10.
- E. Coordinate with masonry wall construction for anchor placement.
- F. Install roll-formed-steel reinforcement channels between two abutting frames. Anchor to structure and floor.
- G. Fully grout interior and exterior hollow metal frames with non-shrink grout.

3.2 PAINTING

- A. Comply with Section 09 91 00 – Painting for door and frame finishes.
- B. Exterior Door Frames: Air spray Max Cor DF AwlGrip, two component, anti-corrosive, chromate free epoxy primer on inside of door frame profiles of exterior doors prior to installation in accord with manufacturer's printed installation instructions.

3.3 TOLERANCES:

- A. Maximum Diagonal Distortion: 0.06375" (7.8 mm) measured with straight edge, corner to corner.
- B. Clearance between door and frame head and jambs shall be uniform 0.125" (15.6 mm).
- C. Clearance between meeting edges of pairs of doors shall be 0.1875" (23.4 mm) +/- 0.06375" (7.8 mm). For fire rated applications, clearance between meeting stiles shall be 0.125" (15.6 mm) +/- 0.06375" (7.8 mm).
- D. Bottom of door clearance shall be 0.50" (12.7 mm) minimum and 0.75" (19 mm) maximum floor clearance.
- E. Clearance between face of door and door stop shall be minimum 0.0625" (7.8 mm) to maximum 0.125" (15.6 mm).

3.4 ADJUSTING AND CLEANING:

- A. Adjust for smooth and balanced door movement.
- B. Check and readjust operating finish hardware items, leaving steel doors and frames undamaged and in complete and proper operating condition.

END OF SECTION

SECTION 08 14 16
FLUSH WOOD DOORS

PART 1 GENERAL

1.1 RELATED DOCUMENTS

- A. The provisions of the General Conditions, Supplementary Conditions, Drawings, Specifications, and the Sections included under Division 1, General Requirements and References are included as a part of this Section as though bound herein.

1.2 SECTION INCLUDES

- A. Provide labor, material, services, and equipment necessary to furnish and install work as indicated and as specified herein, which includes, but is not limited to:
 - 1. Flush wood doors with stain grade wood veneer, fire-rated and non-rated, solid core with and without glazing as indicated.

1.3 RELATED SECTIONS

- A. Section 01 25 13 – Product Substitution Procedures.
- B. Section 01 31 00 – Project Management and Coordination.
- C. Section 01 33 00 – Submittal Procedures
- D. Section 01 42 00 – References.
- E. Section 01 45 00 – Quality Control.
- F. Section 01 66 00 – Product Storage and Handling.
- G. Section 01 74 00 – Cleaning and Waste Management.
- H. Section 01 78 00 – Closeout Submittals.
- I. Section 08 11 00 – Metal Doors and Frames
- J. Section 08 70 00 – Finish Hardware
- K. Section 08 80 00 – Glazing

1.4 REFERENCES AND REGULATORY REQUIREMENTS

- A. See Section 01 42 00 – References for additional reference standards, abbreviations, acronyms and definitions.
- B. American Society of Testing Materials (ASTM):
 - 1. ASTM E90-09: Standard Test Method for Laboratory Measurement of Airborne Transmission Loss of Building Partitions
 - 2. ASTM E413-10: Classification for Rating Sound Insulation
- C. National Fire Protection Association (NFPA):
 - 1. NFPA 252 – Standard Methods for Fire Assemblies.
 - 2. NFPA 80 – Fire Doors and Windows.
- D. Florida Building Code, 6th Edition.
- E. Underwriters Laboratories, Inc.
 - 1. UL 10B – Fire Tests for Door Assemblies – Neutral Pressure.
 - 2. UL 10C – Fire Tests for Door Assemblies – Positive Pressure.
- F. American Woodwork Institute (AWI):
 - 1. Architectural Woodwork Standards, Section 9-Doors, 2nd Edition.
- G. Wood Door Manufacturers Association (WDMA):

1. WDMA I.S.1-13:
2. WDMA I.S.6-A.13: Interior Architectural Stiles and Rails Doors.

1.5 QUALITY ASSURANCE

- A. Comply with Section 01 45 00 – Quality Control.
- B. Door Standards:
 1. AWS Quality Standards 2nd Edition for Custom Grade.
 2. ANSI/WDMA I.S.6-A.13
- C. Labeling Agencies:
 1. Underwriters Laboratories, Inc. UL10B for neutral pressure and UL10C for positive pressure for rated doors.
 2. Intertek Testing Services-Warnock Hersey (ITS-WH) (Ratings for both Neutral pressure and Positive pressure rated doors).
- D. Sound Transmission Coefficient (STC) Minimum Performance Criteria:
 1. Classroom, Labs, Resource Room Doors and other spaces not noted: 31.
 2. Music (Band Choral and Orchestra Spaces): 50.
 3. Offices, Conference and Mechanical Room Doors: 45.

1.6 SUBMITTALS

- A. Submit in accord with Section 01 33 00 – Submittal Procedures.
- B. Shop drawings shall include:
 1. Door type.
 2. Door size.
 3. Fire rating.
 - a. Neutral pressure.
 - b. Positive pressure.
 4. Hardware types and locations.
 5. Lite opening size and location.
 6. Prefinished system type and approved color(s).
- C. Product Data: Indicate door core materials, thickness, construction, veneer may be ash, birch or maple species. See WDMA “A Specifier’s Guide to Door Face Veneers” for cut and matching requirements, factory machining and factory finishing criteria.
- D. Construction samples: Submit two or more manufacturer’s standard samples demonstrating door construction.
- E. Finish of submitted samples shall illustrate total range of color and grain of door face materials.
 1. Door color and grain finish failing to meet samples shall be rejected. Architect shall be sole judge of approved and rejected doors.
 2. Rejected doors shall be replaced at no additional cost to Owner.
- F. Provide manufacturer’s full lifetime door warranty.

1.7 DELIVERY STORAGE, HANDLING AND SITE CONDITIONS

- A. Comply with Section 01 66 00 – Product Delivery and Handling.
- B. Comply with WDMA’s Appendix Section “Care and Installation at Job Site”.
 1. Store doors flat and off floor on level surface in dry, well ventilated building.
 2. Protect doors from exposure to light, dirt, water and abuse.

3. Storage area in building shall have operational HVAC system maintaining temperature between 50° F (10°C) and 80° F (26.7°C) and 25%-55% relative humidity.
4. When handling doors, lift and carry. Do not drag across other doors or surfaces. Handle with clean hands or gloves.
5. Mark each door on top rail with opening number.
6. Accept doors on site in manufacturer's standard packaging. Inspect for damage.

1.8 COORDINATION

- A. Coordinate work in accord with Section 01 31 00 – Project Coordination.
- B. Coordinate work with door opening construction, door frame and door hardware installation with in pre-installation conference.

1.9 WARRANTY

- A. Provide manufacturer's warranty to include:
 1. Interior Solid Core Doors: "Full Life of Original Installation" including rehang and refinishing if door(s) do not comply with warranty tolerance standards.
 2. Include coverage for delamination, warping, bow, cup and telegraphing of core construction beyond warranty tolerances.

PART 2 PRODUCTS

2.1 APPROVED MANUFACTURERS

- A. Eggers Industries, Inc., 164 North Lake St., Neenah, WI 54956; Tel: 920-722-6444; Fax: 920-722-0357; website: www.eggersindustries.com.
- B. Algoma Hardwoods, Inc., 1001 Perry St., Algoma, WI 54201; Tel: 920-487-5221; Fax: 920-487-3636; website: www.algomahardwoods.com.
- C. Marshfield Door Systems, Inc., 1401 East Fourth St., Marshfield, WI 54449-3667; Tel: 800-869-3667; website: www.marshfielddoors.com.
- D. Graham Wood Doors, Div. of Assa Abloy; 525 9th St. SE, Mason City, IA; Tel: 641-423-2444; Website: www.grahamdoors.com.
- E. Other manufacturers shall make requests for substitutions in accord with Section 01 25 13 – Product Substitution Procedures.

2.2 DOOR CONSTRUCTION

- A. Stiles and Rails: Comply with WDMA I.S. 6A-13 – Interior Architectural Stiles and Rails Doors.
- B. Flush Doors: Comply with WDMA I.S. 1-13 - 6A-13 – Interior Architectural Wood Flush Doors.
- C. Fabricate doors to “Custom Grade” per AWI Quality Standards, 2nd Edition.

2.3 FABRICATION

- A. Non Fire Rated Doors:
 1. Structural Composite Lumber Core (SCLC) engineered hardwood composite complying with WDMA minimum performance levels for interior applications:
 - a. Screw holding strength: 540 lbs. (245Kg) minimum.

- b. Modulus of rupture: Average of 4,000 psi (27.58 MPa).
 - c. Modulus of elasticity: Average of 600,000 psi (4137 MPa).
 - d. Density: Minimum 38 lbs./cu. ft. (609 Kg/M³) for Staves engineered with single species hardwood composite core.
 2. Core Materials:
 - a. Stiles (Vertical Edges): Same species as face veneer.
 - b. Rails (Horizontal Edges): Structural composite lumber (SLC) as specified in core section per minimum requirements.
 - c. Stiles, rails, and mullions shall be joined with both 0.50" wooden dowels, and cope and stick joints and bonded with glue.
 3. Veneers:
 - a. Flush Wood Veneer Door Facing: White Birch (no heartwood), plain sliced veneers.
 - b. Veneer Matching: Book Match.
 - c. Assembly of Spliced Veneers: Running book match.
 - d. Doors in Pairs or Sets: Pair Match required. Door schedule shall reflect pairs and sets by door numbers, including doors separated by mullions.
- B. Fire Rated Doors:
 1. Structural Composite Lumber Core (SCLC) engineered hardwood composite complying with WDMA minimum performance levels for interior applications:
 - a. Screw holding strength: 540 lbs. (245Kg) minimum.
 - b. Modulus of rupture: Average of 4,000 psi (27.58 MPa).
 - c. Modulus of elasticity: Average of 600,000 psi 4137 MPa).
 - d. Density: Minimum 38 lbs./cu. ft. (608.7 K/M³) for staves engineered with single species hardwood composite core.
 2. Core and Edge Construction shall utilize non-combustible mineral composite materials and intumescent required for ¾, 1, and 1-1/2 hour ratings per Door Schedule.
 3. 20-minute fire-rating:
 - a. Positive Pressure: Category A (concealed intumescent).
 - 1) Structural Composite Lumber; SCL-20
 - 2) Staves with one species per core; SLC-20
 4. 45, 60, or 90-minute mineral core fire-rated as noted.
 - a. Category A (concealed intumescent).
 5. Acoustical:
 - a. Sound Transmission Class (STC) specified shall be certified by manufacturer based on tests conducted at independent testing agency in accord with ASTM E90-09 and E413-10 (earlier tests are not acceptable).
 - b. Acoustical doors with lites shall be factory glazed to maintain STC rating.
 - c. Provide STC ratings as indicated.
 6. Fire rated doors are indicated in Door Schedule.
- C. Lite and Astragal Details
 1. Lite openings shall be furnished with same species wood lite beads.
 2. Metal astragals and door edge may be used for pairs of fire doors.
- D. Vertical Edges (Stiles)
 1. Non-rated and 20-minute rated doors shall have edges to match face veneer.
 2. 20-minute rated pairs (No metal edges or astragal required).
 - a. Manufacturer's standard as required for fire approval. (May include veneer banding with structural composite lumber backers or inner plies).
 3. Fire Resistant Composite Core
 - a. Manufacturer's standard as required for fire approval. Veneered edge of matching/compatible veneer to face veneer.

- E. Horizontal Edges (Rails)
 - 1. Manufacturer's standard. (MDF top and bottom rails not permitted).
 - 2. Meet positive pressure ratings.
- F. Adhesives
 - 1. Face Adhesive: Type 1
- G. Inner Blocking For Fire Resistant Composite Core Fire Doors
 - 1. Supply hardware reinforcement for surface applied hardware where required by manufacturer to eliminate use of through bolts.
- H. Machining
 - 1. Factory fit and machine doors for frame and finish hardware in accord with hardware and NFPA 80 requirements and dimensions.
 - 2. Do not machine for surface hardware. Apply appropriate fire labels.
 - 3. Do not trim positive pressure rated doors for width.

2.4 ACCESSORIES

- A. Glazing Stops
 - 1. Non-Rated and 20 minute: Manufacturer's Standard Metal Vision Frames.
 - 2. Fire-Rated 45 minutes and above:
 - a. Manufacturer's Standard Metal Vision Frames.
 - b. Verify compatibility of glazing system with positive pressure requirements.
 - 4. Verify compatibility of glazing system with positive pressure requirements.
 - 5. Glazing per Section 08 80 00 – Glazing.
- B. Glass and Glazing in Wood Doors: Provided by manufacturer.
- C. Meeting Edges For Pairs Of Fire Rated Doors
 - 1. Metal edge and astragal or metal edges.
 - 2. Meet positive pressure requirements for Category A (concealed intumescent).
- D. Applied Moldings
 - 1. As selected from manufacturer's standard profiles and install as detailed.
 - 2. Applied moldings to be affixed to doors without use of nails or staples. No visible fasteners are permitted.

2.5 FACTORY FINISH

- A. Doors to be factory finished shall meet WDMA I.S. 1-A-04 specifications for TR-6 catalyzed polyurethane finish system or AWS section 5 specifications for UV curable polyester urethane finish system.
- B. Factory Finish (Basis of Design): Eggers' Gardall - water based stain and UV curable polyester urethane finish system complying with applicable Federal and State regulations for Volatile Organic Compounds (VOC) and Hazardous Air Pollutants (HAP) emission limitations per EPA Clean Air Act.
- C. Stain color shall be selected by Architect from manufacturer's standard colors that match existing wood door finish.
- D. Submit approved samples for factory finishing.
- E. Factory finished doors to be installed just prior to substantial completion.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify substrate opening sizes and tolerances are acceptable and ready to receive work. Notify Contractor/CM of any conditions preventing successful installation.
- B. Do not install doors in frame openings that are not plumb or are out of tolerance for size or alignment. Start of installation indicates installer's acceptance of conditions.
- C. Use three hinges for doors 7'-6" (2.286 m) in height or less and one additional hinge for each incremental 30" (76.2 cm) of height over 7'-6" (2.286 m).

3.2 INSTALLATION

- A. Install fire-rated and non-rated doors in accord with NFPA 80, Manufacturers' printed instructions and ITS-WH/UL requirements.
- B. Trim non-rated door width by cutting equally on both jamb edges.
- C. Trim door height by cutting bottom edges to a maximum 0.75" (19 mm).
- D. Trim fire door height at bottom edge only, in accord with fire rating requirements. Allow fitting clearance of 0.125" (3.33 mm) at each side and at top of door.
- F. Do not trim Positive Pressure rated doors for width.
- G. Pilot drill screw and bolt holes using templates provided by hardware manufacturer. Use threaded through bolts for half surface hinges.
- H. Exercise caution when drilling pilot holes and installing hinges to ensure pilot holes are not over-drilled and screws are not over-torqued. Follow Manufacturer's printed installation instructions for Positive Pressure doors. Do not use self-drilling or combination wood/metal screws on wood doors.
- I. Coordinate installation of doors with installation of frames and hardware.
- J. Coordinate installation of glass and glazing.
- K. Install door louvers and light kits plumb and level.
- L. Reseal or refinish any doors that require site alteration.

3.3 WARRANTY TOLERANCES

- A. Conform to WDMA standards and testing methods for warp, cup, bow and telegraphing.

3.4 ADJUSTING

- A. Adjust doors and hardware for proper function, smooth operation, proper latching and balanced door movement, without force or excessive clearances.

3.5 CLEANING

- A. Clean doors immediately after installation in accord with manufacturer's written Care and Handling Instructions.

3.6 PROTECTION

- A. Protect installed doors from damage.
- B. Replace or repair doors damaged during construction, as directed by Architect.

END OF SECTION

SECTION 08 41 13
ALUMINUM STOREFRONT SYSTEM

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

- A. The provisions of the General Conditions, Supplementary Conditions, Drawings, Specifications, and the Sections included under Division 1, General Requirements and References are included as a part of this Section as though bound herein.

1.2 SUMMARY

- A. Provide labor, materials, services, and equipment necessary to furnish and install work as indicated and as specified herein, which includes, but is not limited to:
 - 1. Aluminum storefront door and window systems.
 - 2. Hardware for aluminum doors will be furnished under Specification Section–Door Hardware, except continuous gear hinges, but installed under this Section.

1.3 REFERENCES

- A. AA (Aluminum Association) – Designation System for Aluminum Finishes
- B. AAMA Series number 11 – Design Wind Loads for Buildings and Boundary Layer Wind Tunnel Testing
- C. AAMA 101 – Standard Specification for Window, Doors, and Skylights
- D. AAMA 200 – Standard Practice for the Installation of Windows with Frontal Flanges for Surface Barrier Masonry Construction
- E. AAMA 502-08 – Voluntary Specification for field Testing of Newly Installed Fenestration Products
- F. AAMA 511 – Voluntary Guideline for Forensic Water Penetration Testing of Fenestration Products
- G. AAMA 606.1 – Voluntary Guide Specifications and Inspection Methods for Integral Color Anodic Finishes for Architectural Aluminum
- H. AAMA 607.1 – Voluntary Guide Specification and Inspection Methods for Clear Anodic Finishes for Architectural Aluminum
- I. AAMA 608.1 – Voluntary Guide Specification and Inspection Methods for Electrolytically Deposited Color Anodic Finishes for Architectural Aluminum
- J. AAMA 701/702 – Combined Voluntary Specifications for Pile Weather-stripping and Replaceable Fenestration Weatherseals
- K. AAMA 1503.1 – Voluntary Test Method for Thermal Transmittance and Condensation Resistance of Windows, Doors and Glazed Wall Sections
- L. ASCE 7 – Minimum Design Loads for Buildings and other Structures
- M. ASTM A123/A123M – Standard Specification for Zinc (Hot Dip Galvanized) Coatings on Iron and Steel Products
- N. ASTM B209 – Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate
- O. ASTM B221 – Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes
- P. ASTM C509 – Standard Specification for Elastomeric Cellular Preformed Gasket and Sealing Material

- Q. ASTM D2000 – Standard Classification System for Rubber Products in Automotive Applications
- R. ASTM D2287 – Standard Specification for Non-rigid Vinyl Chloride Polymer and Copolymer Molding and Extrusion Compounds
- S. ASTM E283 – Standard Test Method for Determining the Rate of Air Leakage Through Exterior Windows, Curtain Walls and Doors Under Specified Pressure Differences Across the Specimen
- T. ASTM E330 – Standard Test Method for Structural Performance of Exterior Windows, Doors, Skylights and Curtain Walls by Uniform Static Air Pressure Difference
- U. ASTM E331 – Standard Test Method for Water Penetration of Exterior Windows, Skylights, Doors, and Curtain Walls by Uniform Static Air Pressure Difference
- V. ASTM E1105 – Standard Test Method for Field Determination of Water Penetration of Installed Exterior Windows, Skylights, Doors, and Curtain Walls by Uniform or Cyclic Static Air Pressure Difference
- W. ASTM F588 – Standard Test Methods for Measuring the Forced Entry Resistance of Window Assemblies, Excluding Glazing Impact
- X. FED L-S-125B – Screening, Insect, Nonmetallic
- Y. FED RR-W-365A – Wire Fabric (Insect Screening)
- Z. FBC – Florida Building Code 6th Edition
- AA. Current Florida Building Code Product Approval

1.4 SUBMITTALS

- A. Product Data: For each product specified include details of construction relative to materials, dimensions of individual components, profiles, manufacturer's specifications and catalog cuts, and finishes. Provide structural test reports that meet all hurricane and impact resistant codes and requirements.
- B. Shop drawings shall show elevations of each door type, door construction details and methods of assembling sections, hardware locations and installation methods, dimensions, and shapes of materials, anchorage and fastening methods, weatherstripping, and finish requirements.
 - 1. Provide schedule of doors and frames using same reference numbers for details and openings as those on Contract Drawings and Schedules.

1.5 PERFORMANCE REQUIREMENTS FOR EXTERIOR STOREFRONT AND WINDOW SYSTEMS

- A. Performance Requirements: Provide aluminum curtain wall systems that comply with performance requirements indicated, as demonstrated by testing manufacturer's assemblies in accordance with South Florida Building Code Test Protocols TAS 201, TAS 202 and TAS 203.
 - 1. Air Infiltration: Completed storefront systems shall have 0.06 CFM/FT² (1.10 m³/h·m²) maximum allowable infiltration when tested in accordance with ASTM E 283 at differential static pressure of 6.24 psf (299 Pa).
- B. Water Infiltration: No uncontrolled water when tested in accordance with ASTM E 331 at test pressure differential of: 12 PSF (575 Pa) (or when required, field tested in accordance with AAMA 503). Fastener Heads must be seated and sealed against Sill Flashing on any fasteners that penetrate through the Sill Flashing.
- C. Wind Loads: Completed storefront system shall withstand wind pressure loads normal to wall plane indicated on structural drawings.

- D. Deflection: Maximum allowable deflection in any member when tested in accordance with ASTM E 330 with allowable stress in accordance with AAMA Specifications for Aluminum Structures.
 - 1. Without Horizontals: $L/175$ or $3/4"$ (19.1mm) maximum.
 - 2. With Horizontals: $L/175$ or $L/240 + 1/4"$ (6.4mm) for spans greater than 13'-6" (4.1m) but less than 40'-0" (12.2m).
- E. Thermal Movement: Provide for thermal movement caused by 180 degrees F. (82.2 degrees C.) surface temperature, without causing buckling stresses on glass, joint seal failure, undue stress on structural elements, damaging loads on fasteners, reduction of performance, or detrimental effects.

1.6 PERFORMANCE REQUIREMENTS FOR INTERIOR STOREFRONTS

- A. Deflection: Maximum allowable deflection in any member when tested in accordance with ASTM E 330 with allowable stress in accordance with AAMA Specifications for Aluminum Structures.
 - 1. Without Horizontals: $L/175$ or $3/4"$ (19.1 mm) maximum.
 - 2. With Horizontals: $L/175$ or $L/240 + 1/4"$ (6.4 mm) for spans greater than 13'-6" (4.1 m) but less than 40'-0" (12.2 m).
- B. Thermal Movement: Provide for thermal movement caused by 180 degrees F. (82.2 degrees C.) surface temperature, without causing buckling stresses on glass, joint seal failure, undue stress on structural elements, damaging loads on fasteners, reduction of performance, or detrimental effects.

1.7 QUALITY ASSURANCE

- A. Doors shall be provided to conform to the Florida Building Code. These requirements supersede Technical Specifications in this Section.
- B. Provide test reports from AAMA Accredited Laboratories.
- C. System shall conform to large and small impact requirements.

1.8 PROJECT CONDITIONS

- A. Field Measurements: Check openings by accurate field measurement before fabrication. Show recorded measurements on shop drawings. Coordinate fabrication schedule with construction progress to avoid delay of the work.

1.9 EHPA REQUIREMENTS (for use only if an EHPA designated area is indicated)

- A. Storefront systems that are indicated to be provided in an EHPA shelter area shall be designed and modified if necessary and installed to comply with structural design loads and all applicable codes. Documentation shall be provided indicating compliance with requirements.

PART 2 – PRODUCTS

2.1 MANUFACTURERS

- A. Basis of Design Product: Subject to compliance with requirements provide the following manufacturer.
 - 1. YKK North America

B. The following manufacturers are acceptable provided they equal or exceed the material requirements and functional qualities of the basis of design product.

1. Tubelite Division of Indal, Inc., Reed City, Michigan
2. Wausau Metals Corp., Wausau, Wisconsin
3. EFCO Corp., Monett, Missouri

2.2 STOREFRONT SYSTEM

A. Basis of Design

1. Storefront Door
 - a. Basis of Design: YHS 50H medium stile impact system with insulated impact resistant glazing.
 - b. FPA-FL #16554.4.
2. Storefront Wall and Window System
 - a. Basis of Design: YHS 50 TU, thermally broken impact system with insulated impact resistant glazing.
 - b. FPA – FL #14218.10.

2.3 MATERIALS AND CONSTRUCTION

- A. Sections shall be extruded from 6063-T5 aluminum alloy (A.S.T.M. B221 Alloy GS 10A T5).
- B. Major portions of the door stiles shall be .125 inch in thickness, and glazing molding shall be .050 inch thick.
 1. Mullions shall be as detailed on Drawings and as required for type of door being furnished.
- C. Screws, miscellaneous fastening devices, and internal components shall be of stainless steel, plated, or corrosion-resistant materials of sufficient strength to perform the functions for which they are used.
- D. Wide Stile: Vertical stiles shall be 5 inches, top rail 6-1/2 inches, and bottom rail 10 inches. Corner construction shall consist of both sigma deep penetration and sigma fillet welds and mechanical fastening. Inside joints between the top rail and vertical stiles shall have a continuous bead of sealant. Interior glazing stops shall be square snap-in type with neoprene bulb type glazing. Square stops on exterior side shall be lock-in tamperproof type. No exposed screws shall be required to secure stops.
- E. Door shall be weatherstripped on 3 sides with metal backed pile cloth installed in the door and/or frame. An adjustable weatherstrip astragal with stainless steel backing shall be provided at the meeting stiles of a pair of doors.
 1. Provide compression weatherstripping at fixed stops. At other locations, provide sliding weatherstripping retained in adjustable strip mortised into door edge.
- F. Doors shall have a portion of the top rail closed for mounting security door contacts.
- G. Where aluminum doors are scheduled to receive a concealed overhead stop, the jamb bracket shall be mortised into the frame and the channel mortised into the top of the door. The cut for the arm on the stop side of the door shall not be cut below the stop strip of the frame.
- H. All dissimilar metals must be properly insulated to prevent galvanic action.
- I. All exposed fasteners shall be aluminum or stainless steel.
- J. All aluminum extrusions shall have a minimum wall thickness of .080" and comply with ASTM B221 (ASTM B221M), 6063-T5 Aluminum Alloy.
- K. All units to be "dry-glazed" with EPDM gasket to accept impact rated glass.

2.4 SILL PAN AT EXTERIOR STOREFRONT

- A. Provide .125 inch aluminum sill pan with ¼" upturn at inside edge.
- B. Finish shall match storefront system.

2.5 ENTRANCE DOOR HARDWARE

- A. General:
 - 1. Provide hardware that is compliance with the Miami Dade NOA and/or Florida Product Approval.
 - 2. Opening-Force Requirements:
 - a. Egress Doors: Not more than 8.5 lbf to open the door to its minimum required width.
- B. Opening-Force Requirements:
 - 1. Latches and Exit Devices: Not more than 5 lbf required to release latch.
- C. Pivot Hinges: BHMA A156.4, Grade 1.
 - 1. Offset-Pivot Hinges: Provide top, bottom, and intermediate offset pivots at each door leaf.
- D. Manual Flush Bolts: BHMA A156.16, Grade 1.
- E. Mortise Auxiliary Locks: BHMA A156.5, Grade 1.
- F. Panic Exit Devices: BHMA A156.3, Grade 1, listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for panic protection, based on testing according to UL 305.
- G. Cylinders: To match cylinder manufacturer as specified in 08 71 00 "Door Hardware".
- H. Strikes: Provide strike with black-plastic dust box for each latch or lock bolt; fabricated for aluminum framing.
- I. Operating Trim: BHMA A156.6.
- J. Closers: BHMA A156.4, Grade 1, with accessories required for a complete installation, sized as required by door size, exposure to weather, and anticipated frequency of use; adjustable to meet field conditions and requirements for opening force.
- K. Door Stops: BHMA A156.16, Grade 1, floor or wall mounted, as appropriate for door location indicated, with integral rubber bumper.
- L. Weather Stripping: Manufacturer's standard replaceable components.
 - 1. Compression Type: Made of ASTM D 2000, molded neoprene, or ASTM D 2287, molded PVC.
 - 2. Sliding Type: AAMA 701, made of wool, polypropylene, or nylon woven pile with nylon-fabric or aluminum-strip backing.
- M. Weather Sweeps: Manufacturer's standard exterior-door bottom sweep with concealed fasteners on mounting strip.
- N. Silencers: BHMA A156.16, Grade 1.
- O. Thresholds: BHMA A156.21, raised thresholds beveled with a slope of not more than 1:2, with maximum height of 1/2 inch.

2.6 FABRICATION

- A. General: Fabricate components that, when assembled, will have accurately fitted joints with ends coped or mitered to produce hairline joints free of burrs and distortion. After fabrication, clearly mark components to identify their locations in Project according to shop drawings.
- B. Forming: Form shapes with sharp profiles, straight and free of defects or deformations, before finishing.

- C. Entrances: Fabricate door framing in profiles indicated. Reinforce as required to support imposed loads. Factory-assemble door units and factory install hardware to greatest extent possible. Reinforce door units as required for installing hardware indicated. Cut, drill, and tap for factory installed hardware before finishing components.
 - 1. Interior Doors: Provide ANSI/BHMA A156.16 silencers at stops to prevent metal to metal contact. Provide 3 silencers on strike jamb of single door frames and 2 silencers on head of double door frame.
- D. Storefront frames: Unless otherwise noted on drawings.
 - 1. Depth of frame as required for applicable wind loading.
 - 2. Frame components shall be shear block construction.

2.7 ALUMINUM FINISHES

- A. Clear Anodic Finish: AAMA 611, AA-M12C22A31, Class II, 0.010 mm or thicker.

PART 3 – EXECUTION

3.1 PREPARATION

- A. Openings for aluminum entrances and storefronts shall be prepared to the proper size, plumb, square, level, and in the proper location and alignment as shown on the Architect's Drawings and the final shop drawings.

3.2 INSTALLATION

- A. Aluminum doors shall be securely installed according to the manufacturer's recommendations, and operating hardware shall be checked for proper function and adjustment.
- B. Install entrances plumb and true in alignment with established lines and grades without warp or rack. Lubricate operating hardware and other moving parts according to hardware manufacturer's written instructions.
 - 1. Install surface mounted hardware according to manufacturer's written instructions using concealed fasteners to greatest extent possible.
- C. Install glazing to comply with requirements of Section – Glazing, unless otherwise indicated.
- D. Do not cut aluminum frame stop strip when mounting exit devices and closers.
- E. Provide conduits at frames and card reader locations to accommodate the future installation of card readers at doors indicated on the finish schedule. Conduits shall be run to 6" above the finished ceiling height and accessible to ceiling space.

3.3 ADJUSTING AND CLEANING

- A. Adjust doors and hardware to provide tight fit at contact points and weatherstripping, smooth operation, and weathertight closure.

3.4 PROTECTION

- A. Protect the aluminum doors and their finish against damage from construction activities and harmful substances. Clean the aluminum surfaces as recommended for the type of finish applied.

END OF SECTION

SECTION 08 71 00
DOOR HARDWARE

PART 1 GENERAL

1.1 RELATED DOCUMENTS

- A. The provisions of the General Conditions, Supplementary Conditions, Drawings, Specifications, and the Sections included under Division 1, General Requirements and References are included as a part of this Section as though bound herein.

1.2 SECTION INCLUDES

- A. Provide labor, material, services, and equipment necessary to furnish and install work as indicated and as specified herein, which includes, but is not limited to:
 - 1. Hardware for wood and hollow steel doors.
 - 2. Lock Cylinders for gates, folding partitions, wire cages, and doors.
 - 3. Thresholds.
 - 4. Gaskets.
 - 5. Screws, bolts, expansion shields and related prep work.
 - 6. Hardware layout templates.
 - 7. Keys key cabinet and Knox Box.

1.3 RELATED WORK

- A. Section 01 25 13 – Product Substitution Procedures.
- B. Section 01 31 00 – Project Coordination.
- C. Section 01 33 00 – Submittal Procedures.
- D. Section 01 42 00 – References.
- E. Section 01 45 00 – Quality Control.
- F. Section 01 74 00 – Cleaning and Waste Management.
- G. Section 01 78 00 – Closeout Submittals.
- H. Section 08 11 13 – Hollow Metal Doors and Frames.
- I. Section 08 14 29 – Prefinished Wood Doors.
- J. Section 08 41 00 – Entrances and Storefronts.

1.4 REFERENCES

- A. See Section 01 42 00 – References for additional reference standards, abbreviations, definitions, and acronyms.
- B. ANSI A117.1 - Specifications for Making Buildings and Facilities Accessible to and Usable by Physically Handicapped People.
- C. ANSI/NFPA 80 - Fire Doors and Windows.
- D. AWI - Architectural Woodwork Institute.
- E. BHMA - Builders' Hardware Manufacturers Association.
- F. DHI - Door and Hardware Institute.
- G. Florida Fire Prevention Code.
- H. NAAMM – National Association of Architectural Metal Manufacturers.
- I. NFPA 101 – Life Safety Code, Current Edition.
- J. SDI – Steel Door Institute.

K. Florida Building Code (FBC), 5th Edition.

1.5 COORDINATION

A. Coordinate hardware installation with other affected trades in accord with Section 01 31 00 – Project Coordination.

1.6 QUALITY ASSURANCE

- A. Manufacturers: Company shall specialize in manufacturing door hardware with five years continuous experience.
- B. Hardware Supplier: Company shall specialize in supplying institutional door hardware with five years continuous documented experience, approved by manufacturer.
- C. Hardware Supplier Personnel: Employ Architectural Hardware Consultant (AHC) on project.

1.7 REGULATORY REQUIREMENTS

- A. Conform to Florida Building Code for requirements applicable to fire rated doors, frames, and accessibility for physically disabled.
- B. Conform to Florida Fire Prevention Code and applicable sections of NFPA 101.

1.8 CERTIFICATIONS

- A. Architectural Hardware Consultant shall inspect complete installation and certify that hardware and installation has been furnished and installed in accord with manufacturer's printed instructions and as specified.
- B. Provide two copies of certifications to Architect.

1.9 SUBMITTALS

- A. Submit schedules, samples, parts lists, templates, installation instructions and product data per Section 01 33 00 – Submittals.
- B. Submittals shall identify each door and each set number following numbering system noted on Drawings.
- C. Manufacturing order shall not be placed until hardware schedule has been submitted and reviewed by Architect.
- D. Furnish templates to facilitate work schedule.
- E. Indicate locations and mounting heights of each type of hardware.
- F. Submit samples of hinge, latch set, exit device, door closer, thresholds, illustrating style, color, and finish.
- G. Project samples may be incorporated in Work.
- H. Submit manufacturer, supplier, fabricator, and installer's qualifications in accord with Section 01 33 00 – Submittal Procedures.

1.10 OPERATION AND MAINTENANCE DATA

- A. Submit operation and maintenance data in accord with Section 01 78 00 – Closeout Submittals.
- B. Include data on operating hardware, and inspection procedures related to preventative maintenance.

1.11 DELIVERY, STORAGE, AND HANDLING

- A. Deliver, store, and protect products in original packaging to site in accord with Section 01 66 00 – Project Storage and Handling Requirements.
- B. Hardware Packaging
 - 1. Items shall be individually labeled and identified with door opening code and hardware group to match hardware schedule.
 - 2. Each item shall identify door location by number identified on Door Schedule.
- C. Hardware manufacturers shall deliver via security shipping following items to District Maintenance Dept., 2485 SE Dixie Hwy., Stuart, FL 34996:
 - 1. Two copies of factory key biting schedule.
 - 2. Permanent building keys and construction key voiding devices.
- D. Protect hardware from theft by cataloging and storing in secured area.

1.12 WARRANTY

- A. Provide five-year warranty period in accord with Section 01 78 00 - Closeout Submittals for locksets, latch sets, exit devices hinges and items listed in the hardware schedule excluding overhead door closers.
- B. Provide ten-year warranty period in accord with Section 01 78 00 - Closeout Submittals for overhead door closers.

1.13 MAINTENANCE MATERIALS

- A. Provide special wrenches and tools applicable to different or special hardware component.
- B. Provide maintenance tools and accessories supplied by hardware component manufacturer.

PART 2 – PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

- A. Manufacturers not listed may submit requests for substitution except as noted in accord with Section 01 25 13 – Product Substitution Procedures.
- B. Obtain each kind of hardware from one manufacturer.
- C. Acceptable products and manufacturers are listed below:
 - 1. Hinges: Ives, Hager, Stanley, Bommer.
 - 2. Locks and Latches: Best Access (No Substitution Permitted).
 - 3. Cylinders, Keys, Keying: Corbin/Russwin (No Substitution Permitted).
 - 4. Exit Devices: Von Duprin (No Substitution Permitted).
 - 5. Removable Mullions: Von Duprin (No Substitution Permitted).
 - 6. Door Closers: LCN (No Substitution Permitted).
 - 7. Overhead Stops/holders: Glen Johnson, Rixon.
 - 8. Wall/Floor Stops/Flush Bolts: Ives, Rockwood, Glen Johnson.
 - 9. Kick Plates: Ives, Rockwood, Quality.
 - 10. Thresholds/Weatherstripping: National Guard, Zero, Pemko.
 - 11. Silencers: Ives, Rockwood, Quality, Glen Johnson.
 - 12. Push/Pulls: Quality, Rockwood.
 - 13. Key Cabinet: Lund, Key Control, Telkey.

2.2 HARDWARE FINISH

- A. Hardware shall have the following finishes:
 - 1. Exterior Hinges: Stainless Steel (32D).
 - 2. Interior Hinges/Locks/Exit Devices/Overhead Holders: Satin Chrome (26D).
 - 3. Door Closers: Aluminum.
 - 4. Flat Goods: Stainless Steel (32D) or Satin Chrome (26D).
 - 5. Thresholds: Mill Finish Aluminum.

2.3 HINGES AND PIVOTS

- A. Exterior butts shall be stainless steel (32D). Butts on all out-swinging doors shall be furnished with non-removable pins (NRP). Size: 4½" wide x 4½" high, for exterior doors up to 42" wide and heavy weight 4½" wide x 4½" high hinges for doors over 42" wide.
- B. Interior butts shall be steel, standard weight 4½" wide x 4½" high hinges doors up to 42" wide and heavy weight 4½" wide x 4½" high hinges for doors over 42" wide.
- C. Doors less than 5'-0" high shall have two (2) butts. Furnish one (1) additional butt for each 2'-6" of height or fraction thereof.

2.4 KEYING

- A. Pre-Order Meeting: Hardware supplier shall meet with District's Maintenance Lock Dept. Representative to establish keying order before lock order is placed.
- B. Locks shall be construction master keyed using split key method keyed to School District's restricted keyway.
- C. Hardware supplier shall meet with District's Maintenance Lock Dept. Representative will establish final count of locks and cylinders and transmit release order to Best Access Systems Lock Company for production in amounts established with Hardware Supplier.
- D. Construction keys in following quantities:
 - 1. 12 master keys
- E. Supply permanent keys in following quantities:
 - 1. Six keys for each lock with maximum of 12 keys of keyed alike sets.
 - 2. Five master keys for each building or area grouping. Key groups include:
 - a. Auditorium/Multipurpose/Stage (including adjacent support spaces).
 - b. Food Service (including Kitchen and adjacent support spaces).
 - c. Media Center (including adjacent support spaces).
 - d. Administrative Offices (including adjacent support spaces).
 - e. Classrooms, Resource Rooms and Labs (including adjacent storage area) subdivided into subgroups by floor level or building(s).
 - f. Mechanical/Electrical Rooms.
 - g. Custodial/Receiving Areas.
 - 3. Grand master keys shall be supplied based on size of facility as follows:
 - a. Five (5) Grandmaster keys for Elementary Schools and Ancillary Projects.
 - b. Ten (10) Grandmaster Keys for Middle Schools.
 - c. Twenty (20) Grandmaster keys for High Schools.
 - 4. Keys shall be stamped "DO NOT DUPLICATE".
- F. Key Function
 - 1. Supply locksets with following key functions:

Location	Function
a. Passage	N

- b. Privacy L
- c. Classroom/Office R
- d. Storage/Mechanical Rm D
- e. Electronic Lever Lockset DEL

2.5 KEY CABINETS

- A. Key Cabinet: Lund 1203 with pin tumbler lock.
- B. Cabinet Size: Size for project keys plus 10% spare capacity.
 - 1. Horizontal metal strips for key hook labeling with clear plastic strip cover over labels.
 - 2. Finish: Baked enamel finish, gray color.
- C. Attach key legend in key cabinet with 5-way cross-reference system indicating keyset number, FISH Room number, key code number, hook number and key description.

2.6 KEY VAULT

- A. Recessed Key Vault: Knox Company, Series 4400 Know-Vault, Model 4400-R.
- B. Key Vault shall be keyed to Owner's key system and will be Owner provided.
- C. Manufacturer: Knox Company. Key box shall meet criteria of fire department having jurisdiction at project location.

2.7 CLOSER/MAGNETIC HOLD OPEN SYSTEM

- A. LCN, Series No: 4041.
- B. Furnish closer/electromagnet compete with required accessories necessary for complete working system.
- C. Furnish two-year warranty.

2.8 LOCKSETS

- A. Lever Lock: Best Access Lock Company, heavy duty cylindrical type, Best 93K Series, Lever Design 15D.
- B. Electronic Lever Lock: Best Access Lock Company, heavy duty cylindrical type, Best 93KW7DEU, Lever Design 15D.

2.9 EXIT DEVICES

- A. Von Duprin 98 Series in types and functions listed.
- B. Devices shall be listed under "Panic Hardware" in accident equipment list of Underwriter Laboratories. Fire ratings shall be attached where indicated per UL requirements.
- C. Exit devices shall be tested per ANSI/BHMA A156.3 by BHMA certified testing laboratory. Provide written certification of 1,000,000 cycle testing per Section 01 33 00 – Submittals.
- D. Supply locksets with following key functions:

Location	Function
1. Non Fire Rated	19R NLP, 19R DT, or 19R BE with 560 strike as required.
2. Fire Rated	F19R SE or F19R BE with 570 strike as required.
3. Non Fire Rated (Pairs)	19R NLP, 19R DT, or 19R BE with 570 strike as required.

- 4. Fire Rated (Pairs) F19R SE or F19R BE with 570 strike and F4023 mullion as required.
- 5. Fire Rated (Electronic) ELX981-F X 992L X 06 X 26D.
- 6. Non-fire Rated (Electronic) SD ELL X 98NL X 990NL X 06 X 26D.
- 7. Power Supply PS873B X 4TD
- E. Electrical Power Transfer: EPT-10 X SP28.
- F. Surface strikes shall be roller type with plate underneath to prevent movement and dead-latching feature to prevent latchbolt tampering.

2.10 DOOR CLOSERS

- A. Door closers shall be LCN 4040/4041 Series with non-ferrous covers, forged steel arms, separate valves for adjusting backcheck closing and latching cycles and adjustable spring to provide up to 50% increase in spring power.
- B. Furnish closers with parallel arm mounted on door openings into egress spaces, mounted to permit 180 degree door swing where wall conditions permit, and have non-hold open arms unless otherwise noted.
- C. Door closer cylinders shall be high strength cast iron construction.
- D. Door closers shall be tested in accord with ANSI/BHMA A156.4 by BHMA certified testing laboratory and attest in writing that closers have successfully completed one million cycles.
- E. Door closers shall utilize temperature stable fluid capable of withstanding temperature ranges of 120° F (49°C) to -30°F (-34°C), without requiring seasonal adjustment of closer speed to properly close door.
- F. Closers for fire rated doors shall be provided with temperature stabilizing fluid complying with UCB 7-2 (1997) and UL 10C.
- G. Door closers shall incorporate tamper resistant non-critical screw valves of V-slot design to reduce clogging from particles within closer.
- H. Closers shall have separate and independent screw valve adjustments for latch speed, general speed, and hydraulic backcheck.
- I. Backcheck shall be located to effectively slow swing of door at minimum of 10 degrees in advance of dead stop location to protect door frame and hardware from damage.

2.11 DOOR TRIM

- A. Push/pull plates, armor plates, and kick plates shall be .050 gage stainless steel with US32D finish.
- B. Plates shall be two (2") less than door width with beveled edges, sized as follows:
 - 1. Push and pull plates shall be 4" wide x 16" high mounted 42" from door bottom.
 - 2. Armor plates shall be 36" high less than door width mounted 2" from door bottom.
 - 3. Kick plates 10" high x 2" less than door width mounted 2" from door bottom.

2.12 DOOR STOPS

- A. Door stops shall be furnished for doors to prevent door and hardware damage. Wall bumpers are preferred. Provide floor stops where wall bumpers are not practical. Where neither wall nor floor stops are practical, use surface mounted overhead stops as follows:
 - 1. Wall Stops: Ives WS407CVX Series.
 - 2. Floor Stops: Ives FS436 or FS438.
 - 3. Overhead Stops: Glynn Johnson 450 Series (Interior) and 900 Series (Exterior).

2.13 THRESHOLDS, WEATHERSTRIPPING, AND SEALS

- A. Thresholds and weatherstripping shall be as listed in Hardware Schedule.

2.14 DOOR SILENCERS

- A. Door Silencers: Ives SR64 Two (2) per door pair and three (3) per single door frame.

2.15 AUTOMATIC FLUSH BOLTS, SURFACE BOLTS AND COORDINATORS

A. Door Bolts:

1. Manufacturer; H. B. Ives.
 - a. Non Fire-rated: 454-f26D 8".
 - b. Fire-rated: 456-B26D.
2. Manufacturer: Glynn Johnson:
 - a. Non Fire-rated: 1631 or 1632.
 - b. Fire-rated: FB7 or FB8.
3. Manufacturer: DCI.
 - a. Non Fire-rated: 1008-US26D.
 - b. Fire-rated: 842-US26D.

B. Coordinators:

1. Manufacturer: Monarch, B-1277 with B-1278 opening bar.
2. Manufacturer: H. B. Ives, 469-B26D with 478 carry bar.
3. Manufacturer: DCI, 500 with carry bar.

2.16 OVERHEAD RAIN DRIP

- A. Rain Drip: Pemko 346PW at exterior HM Steel door locations or as scheduled herein.

PART 3 – EXECUTION

3.1 INSPECTION

- A. Verify that doors and frames are ready to receive work and dimensions are as indicated on shop drawings.
- B. Beginning of installation shall indicate installer's acceptance of existing conditions.

3.2 INSTALLATION

- A. Install hardware in accord with manufacturer's instructions and requirements of DHI.
- B. Use templates provided by hardware item manufacturer.
- C. Mounting heights for hardware from finished floor to center line of hardware item:
 1. Locksets: 38"
 2. Push/Pulls: 42"
 3. Dead Locks: 48"
 4. Exit Devices: 40"
- D. Conform to of Florida Bldg. Code: Accessibility, 5th Edition.
- E. Set door thresholds in full bed of butyl rubber.

3.3 ADJUST AND CLEAN

- A. Adjust and check operation of each item of hardware and door, to ensure proper function of every item.
- B. Replace items that cannot be adjusted to operate freely and smoothly.
- C. Final adjustment shall be made after ventilating systems are in operation.
- D. Clean hardware and adjacent surfaces after hardware installation.
- E. Instruct Owner's personnel in adjustment and maintenance of hardware and hardware finishes.

3.4 PROTECTION

- A. Protect installed hardware from damage.
- B. Replace damaged hardware.

3.5 HARDWARE SCHEDULE

- A. Attached Schedule is furnished for guidance in preparing Bidder's cost proposal and should not be considered as totally inclusive.
- B. Bidders shall use drawings to prepare hardware quantities. Variations between this schedule and drawings shall be communicated to Architect for resolution.
- C. Quantities listed are for each pair of doors or for each single door.
- D. Hardware Schedule was prepared by: Hardware Consultant's Name, Address, FAX and Phone Number and email address.
- E. Index of Manufacturers:
 - 1. Corbin/Russwin: NGP.
 - 2. Glynn-Johnson: BLY.
 - 3. Hager: HAG.
 - 4. Ives: IVE.
 - 5. LCN Closers: LCN.
 - 6. Best: BES.
 - 7. Von Durprin: VON.
 - 8. Pemko: PEM
 - 9. B/O: supplied by other trades.
- F. Hardware Group Schedules

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Hardware Group No. 06.1 – EXTERIOR-CARD ACCESS

For use on Door #(s):

Provide each SGL door(s) with the following:

QT		DESCRIPTION	CATALOG NUMBER		FINIS	MFR
Y					H	
1	EA	HINGE	5BB1 4.5 X 4.5 NRP		630	IVE
1	EA	POWER TRANSFER	EPT10		✂ 689	VON
1	EA	ELEC PANIC HARDWARE	RX-EL-HH-99-L-06		✂ 626	VON
1	EA	RIM CYLINDER	1E62		626	BES
1	EA	SURFACE CLOSER	4040XP SCUSH		689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS		630	IVE
1	EA	GASKETING	328AA		AA	ZER
1	EA	DOOR SWEEP	8197AA 36" (914MM)		AA	ZER
1	EA	THRESHOLD	566A-MSLA-10		A	ZER
1	EA	POWER SUPPLY	PS914 900-2RS		✂ LGR	VON

HURRICANE CODE COMPLIANT OPENING. SCHLAGE LOCK NOA #20-0310.07.

Hardware Group No. 15 – CARD ACCESS

For use on Door #(s):

Provide each SGL door(s) with the following:

QT		DESCRIPTION	CATALOG NUMBER		FINIS	MFR
Y					H	
3	EA	HINGE	5BB1 4.5 X 4.5 NRP		652	IVE
1	EA	STOREROOM LOCK	T581BDC DANE		626	FAL
1	EA	PERMANENT CORE	I.C.CORE		626	BES
1	EA	ELECTRIC STRIKE	6211 FSE		✂ 630	VON
1	EA	SURFACE CLOSER	4040XP REG OR PA AS REQ		689	LCN

BALANCE OF HARDWARE BY DOOR MANUFACTURER. CARD ACCESS SYSTEM AND CARD READER TO BE SUPPLIED BY DIV.28

Hardware Group No. 15.1 – CARD ACCESS

For use on Door #(s):

Provide each SGL door(s) with the following:

QT		DESCRIPTION	CATALOG NUMBER		FINIS	MFR
Y					H	
3	EA	HINGE	5BB1 4.5 X 4.5 NRP		652	IVE
1	EA	STOREROOM LOCK	T581BDC DANE		626	FAL
1	EA	PERMANENT CORE	I.C.CORE		626	BES
1	EA	ELECTRIC STRIKE	6211 FSE		✂ 630	VON
1	EA	SURFACE CLOSER	4040XP REG OR PA AS REQ		689	LCN
1	EA	GASKETING	328AA		AA	ZER

Martin County School District
 J.D. Parker Elementary School
 Enhanced Security Project A2

Hardware Group No. 17 – CARD ACCESS

For use on Door #(s):

Provide each SGL door(s) with the following:

QT		DESCRIPTION	CATALOG NUMBER		FINIS	MFR
Y					H	
3	EA	HINGE	5BB1 4.5 X 4.5 NRP		652	IVE
1	EA	POWER TRANSFER	EPT10		⚡ 689	VON
1	EA	ELEC PANIC HARDWARE	QEL-99-L-06 24 VDC		⚡ 626	VON
1	EA	RIM CYLINDER	1E62		626	BES
1	EA	SURFACE CLOSER	4040XP EDA		689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS		630	IVE
1	EA	WALL STOP	WS406/407CVX		630	IVE
3	EA	SILENCER	SR64		GRY	IVE
1	EA	POWER SUPPLY	PS902		⚡ LGR	VON

CARD ACCESS SYSTEM AND CARD READER TO BE SUPPLIED BY DIV.28

3.6 DOOR INDEX

Door#	HwSet#
1-101	06.1
1-102A	17
1-116	15.1
A	15
B	15

END OF SECTION

SECTION 08 80 00
GLAZING

PART 1 GENERAL

1.1 RELATED DOCUMENTS:

- A. The provisions of the General Conditions, Supplementary Conditions, Drawings, Specifications and the Sections included under Division 1, General Requirements and References are included as a part of this Section as though bound herein.

1.2 SECTION INCLUDES

- A. Provide labor, materials, services, and equipment necessary to furnish and install work as indicated and as specified herein, which includes, but is not limited to:
 - 1. Glass and glazing

1.3 REFERENCES

- A. ASCE-7 – Minimum Design Loads for Buildings and other Structures
- B. ANSI Z97.1 – Safety Glazing Materials Used in Buildings - Safety Performance Specifications and Methods of Test
- C. ASTM C-162 – Standard Terminology of Glass and Glass Products
- D. ASTM C864 – Standard Specification for Dense Elastomeric Compression Seal Gaskets, Setting Blocks, and Spacers
- E. ASTM C920 – Standard Specification for Elastomeric Joint Sealants
- F. ASTM C1036 – Standard Specification for Flat Glass
- G. ASTM C1048 – Standard Specification for Heat-Treated Flat Glass - Kind HS, Kind FT Coated and Uncoated Glass
- H. ASTM C1172 – Standard Specification for Laminated Architectural Safety Glass
- I. ASTM C1349 – Standard Specification for Architectural Flat Glass Clad Polycarbonate
- J. ASTM C 1503 – Standard Specification for Silvered Flat Glass Mirror.
- K. ASTM E84 – Standard Test Method for Surface Burning Characteristics of Building Materials
- L. ASTM E152 – Methods for Fire Test of Door Assemblies
- M. ASTM E283 – Standard Test Method For Determining Rate of Air leakage Through Exterior Windows, Curtain Walls and Doors Under Specified Pressure Differences Across the Specimen
- N. ASTM E330 – Standard Test Method for Structural Performance of Exterior Windows, Doors, Skylights and Curtain Walls by Uniform Static Air Pressure Difference
- O. ASTM E1996 – Standard Specification for Performance of Exterior Windows, Curtain Walls, Doors and Impact Protective Systems Impacted by Windborne Debris in Hurricanes
- P. ASTM E2025 – Standard Test Method for Evaluating Fenestration Components and Assemblies for Resistance to Impact Energies
- Q. CPSC 16 CFR 1201 Safety Standards for Architectural Glazing Materials
- R. FBC – Florida Building Code
- S. GANA – Glazing Manual
- T. GANA Laminated Glazing Reference Manual
- U. FGMA – Sealant Manual
- V. NFPA 80 – Standard for Fire Doors and Fire Windows
- W. NFPA 252 – Standard Methods of Fire Test of Doors Assemblies
- X. NFPA 257 – Standards on Fire Test of Window and Glass Block Assemblies

1.4 SUBMITTALS

- A. Manufacturer's Data:
 - 1. Submit two-copies of manufacturer's specifications, and installation instruction for each type of glass, glazing sealant and compound, gasket and associated miscellaneous material required.
 - 2. Include manufacturer's published data, or letter of certification, or certified test laboratory report indicating that each material complies with the requirements and is intended generally for the applications shown.
 - 3. Show by transmittal that the Glazer distributed one copy of each recommendation and instruction.
 - 4. If Safety glass, provide two copies of manufacturer certification of the glass meeting the requirements of CPSC 16 CFR 1201.
- B. Samples: Submit two-samples 12" x 12" in size illustrating glass coloration.
- C. Manufacturer shall certify that product complies with large and small missile impact criteria and have been tested and conform to SSTD and ASTM, Miami-Dade County, TAS 201, 202, and 203.

1.5 SYSTEM PERFORMANCE REQUIREMENTS

- A. General: Provide glazing systems that are produced, fabricated, and installed to withstand normal thermal movement, wind loading, and impact loading, without failure including loss or glass breakage attributable to the following: defective manufacturer, fabrication, and installation; failure of sealants or gaskets to remain watertight and airtight; deterioration of glazing materials; and other defects in construction.
- B. Hurricane rated impact loading on exterior glazing.
- C. Deterioration of Laminated Glass: Defects developed from normal use that are attributed to the manufacturing process and not to causes other than glass breakage and practices for maintaining and cleaning laminated glass contrary to manufacturer's written instructions. Defects include edge separation, delamination materially obstructing vision through glass, and blemishes exceeding those allowed by referenced laminated-glass standard.
- D. Glass Design: Glass thicknesses as indicated are for detailing only. Confirm glass thicknesses by analyzing Project loads and in service conditions. Provide glass lites for the various size openings in the thicknesses and strengths (annealed or heat-treated) to meet or exceed the following criteria:
 - 1. Glass Thicknesses: Minimum glass thickness, nominally, of lites in exterior walls is 6.0 mm.
 - 2. Glass Thicknesses (Hurricane): Select minimum glass thicknesses to comply with ASTM E-1300, according to the following requirements and performance standards:
 - a. Specified Design Wind Loads: 140 mph.
 - b. Safety
 - i) CPSC Cat. I and II
 - c. Security
 - i) UL972
 - ii) Blast Resistance
 - d. Natural Disasters
 - i) Hurricane Small Missile (River Gravel #6 for impact)
 - ii) Hurricane Large Missile (2" x 4" timber weighing 9 lbs.)

- E. Specific hazardous locations: The following shall be considered specific hazardous locations for purposes of glazing.
 - 1. Glazing in ingress and means of egress doors.
 - 2. Glazing adjacent to a door and within the same wall plane as the door whose nearest vertical edge is within 24 inches of the door in a closed position and whose bottom edge is less than 60 inches above the floor or walking surface, unless an intervening interior permanent wall is between the door and the glazing.
 - 3. Glazing in fixed panels having a glazed area in excess of 9 square feet with the lowest edge less than 18 inches above the finish floor level or walking surface within 36 inches of such glazing, unless a horizontal member not less than 1-1/2 inches in width is located between 24 inches and 36 inches above the walking surface.
- F. Normal thermal movement results from the following maximum change (range) in ambient and surface temperatures acting on glass framing members and glazing components. Base engineering calculation on materials' actual surface temperatures due to both solar heat gain and nighttime sky heat loss.
 - 1. Temperature Change (Range): 120 deg F, ambient; 180 deg F, material surfaces.

1.6 LABELS

- A. Glass shall bear labels indicating the manufacturer, type and thickness, and a note "Do Not Remove Label".
- B. All safety glass shall at least a permanent label indicating manufacturer, type, thickness, and compliance with CPSC 16 CFR 1201.
- C. If temporary label, label is to remain on glass until District Building Inspection is complete, then removed and turned into the District Building Department.

1.7 GLASS BREAKAGE

- A. The glazing subcontractor shall be responsible for all glass broken, scratched, damaged, or defective and shall replace same at his expense.

1.8 QUALITY ASSURANCE

- A. Perform Work in accordance with FGMA Glazing Manual, FGMA Sealant Manual, SIGMA and Laminators Safety Glass Association - Standards Manual for glazing installation methods.
- B. Installer Qualifications: Company specializing in performing the work of this section with minimum 5-years documented experience.

1.9 WARRANTY

- A. General: Warranties specified in this Article shall not deprive the Owner of other rights the Owner may have under other provisions of the Contract Documents and will be in addition to and run concurrent with other warranties made by the Contractor under requirements of the Contract Documents.
- B. Manufacturer's Special Warranty on Laminated Glass: Written warranty made out to Owner and signed by laminated-glass manufacturer agreeing to furnish replacements for laminated glass units that deteriorate as defined in "Definitions" Article f.o.b. the nearest shipping point to Project Site, within specified warranty period indicated below:
 - 1. Warranty Period: Five years from date of Substantial Completion.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Primary Glass; provide products from one of the following:
 - 1. PPG, Ford City, Pennsylvania
 - 2. Guardian, Carleton, Michigan
 - 3. Visteon, Detroit, Michigan
 - 4. LOF, Toledo, Ohio
 - 5. AFG, Kingsport, Tennessee
 - 6. Wire Glass
 - a. Pilkington, Don Mills, Ontario, Canada
 - b. Asahi, Miami Beach, Florida
 - c. Nippon, Los Angeles, California
- B. Architectural Glass Fabricators; provide products from one of the following:
 - 1. Primary glass manufacturers
 - 2. Globe-Amerada Glass, Elk Grove Village, Illinois (laminated glass products)
 - 3. Interpane/Spectrum Glass Products, Deerfield, Wisconsin (high performance glass)
 - 4. HGP and affiliates, Moorestown, New Jersey (full line glass fabricator)
 - 5. Viracon, Owatonna, Minnesota (high performance glass et. al)
 - 6. Laminated Glass Corporation, Plymouth Meeting, Pennsylvania
 - 7. Glasstemp, Bensenville, Illinois (glass door manufacturer also)
 - 8. Perilstein Distributing Corporation (PDC), Cheswick, Pennsylvania
- C. Plastic Interlayer Manufacturers, provide products from one of the following:
 - 1. DuPont, Wilmington, Delaware.
 - 2. Saflex, St. Louis, Missouri.
- D. Products of other manufacturers will be considered for acceptance provided they equal or exceed the material requirements and functional qualities of the specified product. Requests for Architect's approval and complete technical data for evaluation must be received at least 14 days prior to bid due date. Additional approved manufacturers will be issued by Addendum.

2.2 GLASS STANDARDS

- A. General
 - 1. Unless indicated otherwise, reference numbers used throughout this Specification Section are from ASTM C 1036 and C 1048. When the end product involves one or more categories, both, the primary glass specifications and the specifications of the additional features or construction shall be met.
- B. Clear Float Glass: Type I (transparent glass, flat), Class 1 (clear), Quality q3 (glazing select).
- C. Tinted Float Glass: Type I (transparent glass, flat), Class 2 (tinted heat absorbing and light reducing), Quality q3 (glazing select). Final shade shall be Architect selected from the manufacturer's standards within the following range:
 - 1. Grey: Visible light transmittance of 41-43 percent and shading coefficient of 0.67 – 0.69 percent for ¼ inch thick glass.
 - 2. Medium Green: Visible light transmittance of 75 percent and shading coefficient of 0.69 percent for ¼ inch thick glass.
- D. Tempered Glass (Safety Glass): Condition C (other than coated glass), kind FT (fully tempered), complying with ANSI Z97.1, ASTM C 1036 and ASTM C 1048 and "Federal CPSC Standard 16 CFR 1201 Category II."

- E. Heat-Treated Float Glass: ASTM C1048; Type I (transparent glass, flat); Quality q³ (glazing select); class, kind, and condition as indicated in examples under Article 4-GLASS USAGE.
- F. Fire Rated Glazing: Shall be listed and labeled by Underwriters Laboratories.
- G. Laminated glass shall meet minimum requirements as specified in ASTM C 1036-85 and laminate shall comply with ANSI Z97.1-1984 CPSC 16 CFR 1201 Category II where required.

2.3 MIRROR GLASS

- A. Safety Glass Mirrors
 - 1. Tapeback: Provide annealed float glass mirrors with manufacturer applied safety tape applied to the back surface and complying with FS DD-G-1403, ANSI Z97.1-1984 CPSC 16 CFR 1201 Category II.
- B. Mirror Glass Production and Fabrication
 - 1. Glass coating: Coat second surface of glass, unless otherwise indicated, with glass coating system complying with FS DD-M-00411 requirements and consisting of successive layers of chemically deposited silver, electrically or chemically deposited copper, and manufacturer's standard protective organic coating.
- C. Mirror Sizes: After application of glass coating, cut mirror glass to sizes as shown on Drawings and in 1/4 inch glass thickness.
- D. Edges: Seal edges after treatment to prevent chemical or atmospheric penetration of backing. Perform edge treatment and sealing in factory immediately after cutting to final sizes.
- E. Provide CRL mirror mount system in satin anodized finish. Continuous top channel shall be two pieces, D1638 channel and D1637 cleat. Bottom and ends shall have D638 channel. System shall be as manufactured by C.R. Lawrence Company, Inc. (800-421-6144) or an approved equal.

2.4 GLASS USAGE

- A. Exterior Insulated (Hurricane) – Large and Small Impact Rated
 - 1. Glass for all exterior door storefront, exterior door lites, and window openings: 1-3/16 inch insulated laminated glass complying with the following:
 - a. Insulated laminated Lite 1-3/16" Laminate – ¼" Clear – 0.090" Clear PVB – ¼" Clear, ½" air space, ¼" Tinted, Low-E on #5 surface
 - b. Performance Characteristics
 - Thermal
 - Winter U-factor/U-Value (Btu/hr-ft²-F°): 0.28
 - Solar Heat Gain Coefficient: between .25 and .27
 - Optical
 - Visible Light Transmittance: between 32% and 36%
 - Visible Light Reflectance (outside): less than 9%
 - Visible Light Reflectance (inside): less than 7%
 - c. Laminated glass products to be fabricated in autoclave with heat, plus pressure, free of foreign substances and air pockets.
 - d. Interlayer material: Polyvinyl Butyral sheets
 - e. Tint: Colored tint as selected by the Architect.
 - f. Impact rated as required by FBC Product Approval System.
- B. Fire Rated Glass
 - 1. Shall meet the safety glazing requirements of CPSC 16 CFR 1201, and
 - 2. Have the proper fire rating for the assembly (see plans for assembly fire ratings).

- a. SAFTI – Superlite 1-W acceptable for Cat II location per CPSC
 - b. Pilkington – Pyroshield Plus acceptable for Cat I location per CPSC
 - c. Cat I location is glass area less than or equal to 9 SF, and Cat II is glass area greater than 9 SF.
3. All glass shall have label indicating fire rating and safety glazing rating.
- C. Interior
1. Glass for Vestibule Doors, Sidelights, and Transoms: 1/4 inch thick clear tempered glass.
 2. Glass for Interior Fire Rated Doors and Windows: 1/4 inch fire rated glazing, polished both sides.
 3. Glass for Interior Non-Fire Rated Doors and Windows: 1/4 inch clear tempered safety glass.
 4. Large Mirrors: Where indicated.

2.5 GLAZING GASKETS

- A. Polyvinyl Chloride Glazing Gaskets: Shall be extruded, flexible PVC gaskets of the profile and hardness shown or as required for watertight construction, complying with ASTM D2287.

2.6 MISCELLANEOUS GLAZING MATERIALS

- A. Setting Blocks: Neoprene, 70-90 Durometer hardness, with proven compatibility of sealants used.
- B. Spacers: Provide neoprene, 40-50 Durometer hardness, with proven compatibility of sealants used.
- C. Compressible Filler Rod: Shall be closed-cell or waterproof jacketed rodstock of synthetic rubber or plastic foam with proven compatibility with sealants used. Rod shall be flexible and resilient with 5-10 PSI compression strength for 25 percent deflection.
- D. Cleaners, Primers and Sealers: Type recommended by sealant or gasket manufacturer.

2.7 ACCESSORIES

- A. Aluminum T-Trim:
1. Extruded aluminum TEE model # E-11177 EA as manufactured by Eagle Mouldings. Trim shall be used around decorative glass at per detail 5/A3.5

2.8 OTHER MATERIALS

- A. Provide other materials not specifically described but required for a complete and proper installation.

PART 3 EXECUTION

3.1 INSTALLATION OF GLASS

- A. General Requirements:
1. Follow recommendations of the glass manufacturer and the sealant, gaskets and glazing materials manufacturer, except if the codes or listed references are more restrictive.
 2. Where a combination of sealing materials is required for glazing in the same frame, the manufacturer must certify that all glazing materials furnished are compatible with each other.

3. Where setting blocks and spacer shims require setting into a glazing compound or sealant, contractor may butter them with the compound or sealant, then place them in position and allow to firmly setting prior to installation of glass.
- B. Sash and Frame Preparation and Acceptance
1. Inspect all window sash, frames, and surrounds glazed under this section and notify the Contractor of any defects, improper materials, or workmanship of other conditions that will affect the satisfactory installation of glass.
 - a. Do not proceed with glazing until such conditions are acceptable.
 - b. Absence of notification, or the beginning of glazing, will indicate acceptance of all previously placed related work executed by other trades.
 2. Other trades will execute the following work; but before starting glazing work, the glazier shall verify compliance with the requirements listed.
 - a. That the sash and frames are firmly anchored in proper position, plumb and square within 1/8" nominal dimensions on approved shop drawings.
 - b. That the rivet, screw, bolt or nail heads, welding fillets and other projections are removed from glazing rabbets to provide the specified clearances.
 - c. That all corners and fabrication intersections are sealed and sash and frames are weather-tight.
 - d. That rabbets at seals weep to outside and all rabbets are of sufficient depth and width to receive the glass and provide the required overlap of the glass.
 - e. That all sealing surfaces of steel sash and frames are primer painted.
- C. Preparation of Glass and Rabbets:
1. Clean the sealing surfaces of glass and the sealing surfaces of rabbets and stop beads before applying any glazing compound or gaskets.
 2. Use only the approved solvents and cleaning agents recommended by the compound manufacturer.
- D. Positioning Glass:
1. Center in glazing in the frame and rabbet to maintain specified clearances at perimeter on all four sides.
 2. Maintain centered position of glass in rabbet and provide the required sealer thickness (1/8" maximum) on both sides of glass.
 3. Whenever glass dimensions are larger than 50 united inches, provide setting blocks at the sill and spacer shims on all four sides; locate setting blocks one-quarter way in from each end of glass.
- E. Stop Bead Glazing; Use Putty or Elastic Glazing Compound for bedding glass in hollow metal frames, except if otherwise specified in this document.
1. Apply ample back putty or compound to rabbet so that it will ooze out when pressing glass into position and completely cover glass in rabbet.
 - a. Place setting blocks and spacer shims as required, and press glass into position.
 2. Secure glass in place by the application of stop beads.
 - a. Bed stop beads against glass and bottom of rabbet with compound and/or putty, leaving proper thickness between glass and stop beads.
 - b. Secure stop beads in place with suitable fastenings.
 - c. Strip surplus compound or putty from both sides of glass and tool to provide clean sight lines.

3.2 REPLACEMENT AND CLEANING:

- A. Upon completion of work, all glass shall be free from cracks and other defects.
- B. Any defective or broken glass that may appear before acceptance or within the 1-year warranty period shall be removed and replaced with new glass without additional cost to the Owner; excepting glass which is broken by a specific cause relating to building occupancy not relating to this contract.
- C. Thoroughly wash and clean all glass upon completion of the work and just prior to occupancy of the building.

END OF SECTION

DIVISION

9

FINISHES

SECTION 09 22 16
NON-STRUCTURAL METAL FRAMING

PART 1 GENERAL

1.1 RELATED DOCUMENTS

- A. The provisions of the General Conditions, Supplementary Conditions, Drawings, Specifications and the Sections included under Division 1, General Requirements and References are included as a part of this Section as though bound herein.

1.2 SECTION INCLUDES

- A. Provide labor, material, services and equipment necessary to furnish and install work as indicated and as specified herein, which includes, but is not limited to:
 - 1. Non-load bearing metal studs, support framing, bridging, bracing, strapping, attachments and accessories required for complete partition walls, soffits, bulkheads, and ceiling assemblies as indicated.
 - 2. Area separation and shaft wall framing products.

1.3 RELATED SECTIONS

- A. Section 01 25 13 – Product Substitution Procedures.
- B. Section 01 31 00 – Project Coordination.
- C. Section 01 33 00 – Submittal Procedures.
- D. Section 01 43 39 – Mockups
- E. Section 01 45 00 – Quality Control.
- F. Section 01 66 00 – Product Storage and Handling Requirements.
- G. Section 01 78 00 – Closeout Submittals.
- H. Section 09 29 00 – Gypsum Board.
- I. Section 09 91 00 – Painting.

1.4 REFERENCES

- A. See Section 01 42 00 – References for additional reference standards, abbreviations, acronyms and definitions.
- B. AISI - Standard for Cold-Formed Steel Framing General Provisions.
- C. AISI - North American Specification (NASPEC) for the Design of Cold-Formed Steel Structural Members - 2001.
- D. American Society of Testing Materials (ASTM):
 - 1. ASTM A653/A653M-13: Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy Coated (Galvannealed) by the Hot-Dip Process
 - 2. ASTM A780/A789M-09: Standard Practice for Repair of Damaged and Uncoated Areas of Hot-Dip Galvanized Coatings
 - 3. ASTM A1003/A1003M-15: Standard Specification for Steel Sheet, Carbon, Metallic- and Nonmetallic-Coated for Cold-Formed Framing Members
 - 4. ASTM C645-14: Standard Specification for Nonstructural Steel Framing Members
 - 5. ASTM C754-15: Standard Specification for Installation of Steel Framing Members to Receive Screw-Attached Gypsum Panel Products.
 - 6. ASTM C840-13: Specification for Application and Finishing of Gypsum Board.

7. ASTM C1513-13: Standard Specification for Steel Tapping Screws for Cold-Formed Steel Framing Connections.
8. ASTM E84-15a: Standard Test Method for Surface Burning Characteristics of Building Materials.
9. ASTM E90-09: Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements.
10. ASTM E119-14: Standard Test Methods for Fire Tests of Building Construction and Materials.
11. ASTM E413-10: Classification for Rating Sound Insulation.
- E. Gypsum Association (GA): GA-600 - Fire Resistance Design Manual.
- F. Steel Stud Manufacturers Association (SSMA): Product Technical Guide, Current Edition).

1.5 DESIGN REQUIREMENTS

- A. Design steel in accord with American Iron and Steel Institute Publication "Specification for the Design of Cold-Formed Steel Structural Members", except as otherwise shown or specified.
- B. Design loads: As indicated on the Architectural Drawings. 5 PSF minimum design lateral load is required for interior walls by building code. Shaftwall framing minimum design lateral load is 15 PSF.
- C. Framing systems for interior non-load bearing walls shall withstand design loads for lateral deflections less than $L/180$.
- D. Framing system to accommodate deflection of primary building structure and construction tolerances.
- E. Fire-Test-Response Characteristics:
 1. For fire-resistance-rated assemblies that incorporate non-load-bearing steel framing, provide materials and construction identical to those tested in assembly indicated according to ASTM E119-14 by independent testing laboratory.
 2. Products used in assembly shall carry classification label from testing laboratory.
- F. Sound Transmission Characteristics (STC):
 1. For gypsum assemblies wall and ceilings with STC rated requirements, provide materials and construction methods that are identical to requirements of ASTM E90-09.
 2. Testing or inspection agencies shall be certified and independent organizations.

1.6 SUBMITTALS

- A. Comply with Section 01 33 00 – Submittal Procedures.
- B. Submit manufacturer's product literature and data sheets for specified products.
- C. Manufacturer's certification of product compliance with codes and standards.

1.7 QUALITY ASSURANCE

- A. Comply with Section 01 45 00 – Quality Control.
- B. Product manufacturers shall be current members of Steel Stud Manufacturers Association (SSMA).
- C. Provide full time quality control over fabrication and erection complying with applicable codes and regulations of government agencies having jurisdiction.
- D. Conduct pre-installation meeting to verify project requirements, substrate conditions, and manufacturer's installation instructions.
- E. Submit manufacturer's storage and product installation instructions.

- F. Submit documentation verifying materials and components are from single manufacturer.
- G. Installer shall submit qualifications demonstrating five consecutive years of installing specified products of similar and equivalent work scope.

1.8 MOCKUPS

- A. Comply with Section 01 43 39 – Mockups.
- B. Prepare 8' (2.44 m) x 8' (2.44 m) wall section where directed by Architect to demonstrate, quality of substrate framing, material application and finished gypsum board surface on one side of partition mockup.
- C. Do not proceed with additional work until mockup is approved by Architect.
- D. Mockup may be incorporated into finished work product providing mockup remains available for inspection until end of framing and gypsum board work.

1.9 DELIVERY, STORAGE AND HANDLING

- A. Comply with Section 01 66 00 – Product Storage and Handling Requirements.
- B. Notify manufacturer of damaged materials received prior to installing.
- C. Deliver materials in manufacturer's original, unopened, undamaged containers with identification labels intact.
- D. Store materials inside building, protected from exposure to water, wind or other harmful weather conditions.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Approved Manufacturer's:
 - 1. Clark Dietrich Building Systems, 9100 Centre Point Dr., Suite 210 West Chester, OH 45069; Tel: 513-870-1100, 800-543-7140; Fax: 513-870-874-1300; Website: www.clarkdietrick.com.
- B. Manufacturers listed below are approved providing their products are equal to those specified as basis of design:
 - 1. Marino/Ware, Inc., 400 Metuchen Rd., South Plainfield, NJ 07080; Tel: 1-800-627-4661, 908-757-9000; Fax: 908-753-8786; Website: www.marinoware.com.
- C. Requests for substitutions by other manufacturers will be considered in accord with Section 01 25 13 – Product Substitution Procedures.

2.2 MATERIALS

- A. Steel: Galvanized Steel meeting requirements of ASTM A1003/A1003M-15.
 - 1. Coating: Galvanized G40 (Z120) coating minimum, complying with ASTM C645-14.

2.3 COMPONENTS

- A. Nonstructural Studs: Cold-Formed galvanized steel C-studs. Material: Galvanized steel meeting or exceeding the requirements of ASTM A754-15 for conditions indicated below:
 - 1. Flange Length: 1.25" (32 mm) 125 flange, web depth 1-5/8" and 3-5/8" and as indicated on Drawings.
 - 2. Minimum Material Thickness: Traditional 20ga or UltraSTEEL 20 EQ.

3. Punch Outs: 12" (305 mm) from base and every 48" (1219 mm) thereafter.
- B. Nonstructural Track: Cold-Formed galvanized steel runner tracks.
 1. Flange Length: 1.25" (32 mm) T125 flange.
 2. Web: Track web to match stud web size.
 3. Minimum Material Thickness: Traditional 20ga or UltraSTEEL 20 EQ.
 4. Minimum Material Thickness: Track thickness to match wall stud thickness.
- C. Deflection Track: Cold-Formed Deep Leg Runner Slip Track.
 1. Leg Length: As required by design.
 2. Minimum Material Thickness: To match stud thickness.
- D. Channel (CRC Cold Rolled Channel):
 1. Size: 150U50-54, 1.5" (38 mm) 54mils (16 ga.).
- E. Furring Channel: Furring walls and suspended ceiling applications.
 1. Size: 087F125-30 .875" (22 mm) Furring Channel 30 mils (20 ga Drywall).
 2. Size: 087F125-33 .875" (22 mm) Furring Channel 33 mils (20 ga Structural).
 3. Sizes and locations as indicated on Drawings.
- F. Resilient Channel: Cold-Formed Resilient Channel System to decrease sound transmissions.
 1. Size: Two Leg .50" x 1.25" Resilient Channel.
- G. Area Separation Wall System: Lightweight non-load-bearing gypsum panel assembly designed to provide fire resistive protection at common walls, complying with ASTM C754-15 for conditions indicated.
- H. Drywall Corner Beads: Cold-Formed galvanized steel beads.
 1. 103 USG Durabead Deluxe Metal Corner Bead 1.25" x 1.25" (32 mm x 32 mm).
- I. Drywall Trims: Cold-Formed galvanized steel trims.
 1. U-Trim (Mudable) Size: .625" (15.9 mm).
 2. J-Trim (Reveal) Size: .625" (15.9 mm).
- J. Framing Accessories: Accessories required in this project.
 1. Flat Strapping for Backing Strip.
 2. Flat Strapping and bridging for lateral bracing.
 3. Angles.
 4. SwiftClip Fixed Connection Angles.
- I. Fasteners: Self-drilling, self-tapping screws; complying with ASTM C1513-13 - Standard Specification for Steel Tapping Screws for Cold-Formed Steel Framing Connections.
- J. All Window & Door opening stud framing Studs: Cold-Formed galvanized steel C-studs.
Material: Galvanized steel meeting or exceeding the requirements of ASTM A754-15 for conditions indicated below:
 1. Flange Length: 1.25" (32 mm) 125 flange, web depth 1-5/8" and 3-5/8" and as indicated on Drawings.
 - a. Minimum Material Thickness: Traditional 18ga.
 - b. Punch Outs: 12" (305 mm) from base and every 48" (1219 mm) thereafter.
 - c. Double Studs at each jamb, sill & head of door & window openings.
- K. Touch-Up Paint:
 1. Comply with Section 09 91 00 – Painting.
 2. Comply with ASTM A780/A780M-09 (2015): Standard Practice for Repair of Damaged and Uncoated Areas of Hot-Dip Galvanized Coatings.

PART 3 EXECUTION

3.1 INSPECTION

- A. Inspect supporting substrates and structures for compliance of proper conditions for installation and performance of non-structural metal framing.

3.2 PREPARATION

- A. Prepare attachment surfaces for plumb, level, and proper alignment for accepting cold-formed structural framing.

3.3 FABRICATION

- A. Prior to fabrication of framing, submit product submittal sheets to Architect for approval.
- B. Framing components may be preassembled into panels prior to erecting. Prefabricate panels to be plumb and square, with components attached to prevent racking and minimizes distortion during lifting and transport.
- C. Cut framing components square for attachment to perpendicular members or as required for angular fit against abutting members.
- D. Plumb, align and securely attach studs to flanges of both upper and lower runners, except that for interior, non-load bearing walls where studs need not be attached to upper or lower runners.
- E. Splices in members other than top and bottom runner track are not permitted.
- F. Provide temporary bracing where required, until erection is complete.

3.4 INSTALLATION – NON-AXIAL LOAD-BEARING PARTITION WALLS

- A. Runners shall be securely anchored to supporting structure.
- B. Jack studs or cripples shall be installed below window sills, above window and door heads, and elsewhere to furnish supports.
- C. Lateral bracing shall be provided by use of gypsum board and gypsum sheathing, metal studs, or cold-rolled steel angles or channels.
- D. Provisions for structure vertical movement shall be provided where indicated.
- E. Partition walls shall extend to bottom of deck above floor, unless otherwise noted.
- F. Handling and lifting of prefabricated panels shall not cause distortion in members.

3.5 PROTECTION

- A. Protect installed products until completion of project.
- B. Touch-up, repair or replace damaged products before substantial completion of final installation.

END OF SECTION

SECTION 09 29 00
GYPSUM BOARD SYSTEM

PART 1 GENERAL

1.1 RELATED DOCUMENTS

- A. The provisions of the General Conditions, Supplementary Conditions, Drawings, Specifications and the Sections included under Division 1, General Requirements and References are included as a part of this Section as though bound herein.

1.2 SECTION INCLUDES

- A. Provide labor, materials, services, and equipment necessary to furnish and install work as indicated and as specified herein, which includes, but is not limited to:
 - 1. Gypsum Board Partition Systems
 - 2. Gypsum Board Accessories
 - 3. Joint Treatment
 - 4. Textured Finish

1.3 REFERENCES

- A. ASTM C36/C36M – Standard Specification for Gypsum Wallboard
- B. ASTM C79/C79M – Standard Specification for Treated Core and Non-treated Core Gypsum Sheathing Board
- C. ASTM C442/C442M – Standard Specification for Gypsum Backing Board and Coreboard, and Gypsum Shaftliner Board
- D. ASTM C475 – Standard Specification for Joint Compound and Joint Tape for Finishing Gypsum Board
- E. ASTM C630/C630M – Standard Specification for Water Resistant Gypsum Backing Board
- F. ASTM C645 – Standard Specification for Nonstructural Steel Framing Members
- G. ASTM C754 – Standard Specification for Installation of Steel Framing Members to Receive Screw Attached Gypsum Panel Products
- H. ASTM C931/C931M - Standard Specification for Exterior Gypsum Soffit Board
- I. ASTM E695 – Standard method for Measuring Relative Resistance of Wall, Floor, and Roof Construction to Impact loading
- J. ASTM D3273 – Standard Test Method for Resistance to Growth of Mold on the Surface of Interior Coatings in an Environmental Chamber
- K. ASTM D5420 – Standard Test Method for Impact Resistance of Flat Rigid Plastic Specimen By Means of a Striker Impacted by Falling Weight (Gardner Impact)
- L. ASTM E119 – Standard Test Methods for Fire Tests of Building Construction and Materials
- M. ASTM C840 – Standard Specification for the Application and Finishing of Gypsum Board
- N. GA 201 – Using Gypsum Board for Walls and Ceilings
- O. GA-216 – Recommended Specifications for the Application and Finishing of Gypsum Board
- P. GA-600 – Fire Resistance Design Manual
- Q. Florida Building Code (FBC)

1.4 SUBMITTALS

- A. Product Data: Submit manufacturer's product data sheets and printed installation instructions for each product or system proposed for use.

1.5 QUALITY ASSURANCE

- A. Perform gypsum board systems work in accordance with recommendations of ASTM C754, C840, and GA-216 except as otherwise specified in this Section.
- B. Regulatory Requirements:
 - 1. Fire-rated Assemblies: Listed and rated by Underwriter's Laboratories, Inc. or generic fire resistance ratings listed in GA-600.
 - 2. Fire-Hazard Classification: Listed and labeled by Underwriter's Laboratories, Inc.

1.6 COORDINATION

- A. Prior to and during installation, coordinate with work of other trades to facilities required openings and finishes.
- B. Conduct pre-construction meeting with drywall contractor, architect, owner, project coordinator, and others involved with process.

1.7 DELIVERY, STORAGE AND HANDLING

- A. Store the material off the floor in dry area to prevent damage from moisture or excessive handling.
- B. Follow manufacturer's requirements for on site storage and handling of materials.

1.8 PROJECT CONDITIONS

- A. Environmental Conditions, General: Establish and maintain environmental conditions for applying and finishing gypsum board to comply with ASTM C840 and with gypsum board manufacturer's recommendations.
- B. Room Temperatures: For non-adhesive attachment of gypsum board to framing, maintain not less than 40 degrees F. For adhesive attachment and finishing of gypsum board, maintain not less than 50 degrees F. for 48 hours prior to application and continuously after until dry. Do not exceed 95 degrees F. when using temporary heat sources.
- C. Ventilation: Ventilate building spaces, as required, for dry joint treatment materials. Avoid drafts during hot dry weather to prevent finishing materials from drying too rapidly.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturer shall be one of the following however products of other manufacturers will be considered for acceptance provided they equal or exceed the material requirements and functional qualities of the specified product.
 - 1. National Gypsum Corp.
 - 2. U.S. Gypsum Corp.
 - 3. Georgia-Pacific Corp.
- B. All gypsum board products shall have minimum mold growth ASTM D3273 rating of 10.

- C. Do not use drywall manufactured in China.

2.2 MATERIALS

- A. Furring Channels: USG metal stud channel, 1½" deep, roll-formed sections of 20-ga galvanized steel, ASTM C645.
- B. Gypsum Wallboard (General and above 8' AFF): 5⁄8" thick, ASTM C36/C36M, tapered edge, fire rated Type X. (Note: At radius walls the Contractor has the option to install ¼" and/or ⅜" thick gypsum wallboard in layers.)
- C. Gypsum Wallboard (Corridors, stairways, cafeteria, stage, and gymnasium up to at least 8' AFF minimum): Abuse resistant brand, 5⁄8" thick, ASTM C36/C36M, tapered edge, fire rated Type X. (Note: At radius walls the Contractor has the option to install ¼" and/or ⅜" thick gypsum wallboard in layers.)
 - 1. Acceptable abuse resistant drywall:
 - a. Fiber Rock VHI by USG
 - b. Or approved equal.
- D. Water Resistant Gypsum Wallboard: 5⁄8" thick, tapered edge.
 - 1. Provide at "wet" areas (areas subject to contact with water), as shown on plans.
- E. Cementitious backer board for tile and wet locations: Complying with ANSI A118.9 of thickness indicated and in maximum lengths available to minimize end-to-end butt joints. Ends and edges shall be square cut and finished smooth; formed in a continuous process of aggregated Portland cement slurry; and reinforced with vinyl coated, woven glass-fiber mesh embedded in both surfaces.
 - 1. Thickness: Manufacturer's standard thickness, but not less than 7/16 inch, unless otherwise indicated.
 - 2. Products: Subject to compliance with requirements, provide one of the following products:
 - a. Wonderboard Multi-Board; Custom Building Products.
 - b. DonCrete Cementitious Tile Backer Board; Domtar Gypsum.
 - c. Durock Cement Board; United States Gypsum Co.
- F. Gypsum Backing Board: Standard or Fire Rated type, square edges, ASTM C442/C442M.

2.3 MISCELLANEOUS MATERIALS

- A. Joint treatment materials and adhesives shall be as recommended by the gypsum board manufacturer. Joint tape shall be paper-reinforcing tape, unless otherwise recommended by gypsum board manufacturer for use with setting type compound.
 - 1. Setting Type Joint Compounds for Gypsum Board: Factory packaged, job mixed, and chemical hardening powder products formulated for use indicated.
 - a. Where setting type joint compounds are indicated as a taping compound only or for taping and filling only, use formulation that is compatible with other joint compounds applied over it.
 - b. For prefilling gypsum board joints, use formulation recommended by gypsum board manufacturer.
 - c. For filling joints and treating fasteners of water resistant gypsum backing board behind base for ceramic tile, use formulation recommended by gypsum board manufacturer.
 - d. Drying Type Joint Compounds for Gypsum Board: Factory packaged vinyl based products complying with the following requirements for formulation and intended use.
 - e. Ready Mixed Formulation: Factory mixed product.
 - 1) Topping compound formulated for finish (third) coats.
 - 2) All-purpose compound formulated for topping compound.

- f. Toxicity/IEQ: Sheetrock Joint Tape. Paper; fiberglass joint tape not permitted.
- B. Joint Compound for Cementitious Backer Board: Material recommended by cementitious backer unit manufacturer.
 - 1. Toxicity/IEQ: Lime compound. All purpose joint and texturing compound containing inert fillers and natural binders. Pre-mixed compounds shall be free of antifreeze, vinyl adhesives, preservatives, biocides, and other slow releasing compounds.
- C. Joint compound for gypsum sheathing board. G.P. setting type joint compound.
 - 1. Toxicity/IEQ: Lime compound. All purpose joint and texturing compound containing inert fillers and natural binders. Pre-mixed compounds shall be free of antifreeze, vinyl adhesives, preservatives, biocides, and other slow releasing compounds.
- D. Joint Tape for Cementitious Backer Board: Polymer-Coated, open glass-fiber mesh recommended by cementitious backer unit manufacturer.
 - 1. Toxicity/IEQ: Sheetrock Joint Tape, Paper: fiberglass joint tape not permitted.
- E. Screws for Gypsum Board (ASTM C1002): Phillips head galvanized steel Type "S" or "S-12" self-drilling screws, length and type as required and recommended by gypsum board manufacturer.
- F. Screws for Gypsum Sheathing Board.
 - 1. Type S-12, Bugle head, self-tapping, rust-resistant, fine tread for heavy gauge steel.
 - 2. Type S, bugle head, rust resistant, sharp point, and fine thread for light gauge steel or furring.
- G. Accessories for Interior Installation: Corner bead, edge trim, and control joints complying with ASTM C1047 and requirements indicated below:
 - 1. Material: Formed metal with metal complying with the following requirements:
 - a. Steel sheet zinc coated by hot-dip or electrolytic process, or steel sheet coated with aluminum or rolled zinc.
 - b. Do not use plastic accessories.
 - 2. Shapes indicated below by reference Figure 1 designations in ASTM C1047:
 - a. Corner bead on outside corners, unless otherwise indicated.
 - 1) Product shall be similar to "Dur-A-Bead Corner Bead (103)"; USG or as approved by board manufacturer and Architect.
 - b. L-bead with face flange only; face flanged formed to receive joint compound. Use L-beads for edge trim (perimeter relief).
 - 1) Product shall be similar to "No. 200-B Metal Trim"; USG or as approved by board manufacturer and Architect.
 - c. One-piece control joint formed with V-shaped slot and removable strip covering slot opening.
 - 1) Product shall be similar to "No. 093 Control Joint"; USG or as approved by board manufacturer and Architect.
- H. Sheathing Tape: 2-1/2 inch wide, 10 by 10 self-adhering fiberglass reinforced joint tape like No. 8086 Contractor Sheathing Tape as produced by the 3M Company of St. Paul, Minnesota.
- I. Spot Grout: ASTM C475, setting type joint compound recommended for spot grouting hollow metal doorframes.
- J. Texture Compound: Acrylic texture coating DS4000 as manufactured by TWI.
 - 1. Finish: Match Existing
- K. Asphalt Saturated Organic Felt: ASTM D 226, Type I (No. 15 asphalt felt), nonperforated.
- L. Foam Gaskets: Closed cell vinyl foam adhesive backed strips that allow fastener penetration without foam displacement, 1/8 inch thick, in width to suit metal stud size indicated.
- M. Gypsum board sheathing sealants, caulk, tape:
 - 1. Don Corning 795 or equivalent; Pecora 895 or equivalent
 - 2. Borden HPPG Elmer's siliconized acrylic latex caulk or equivalent.
 - 3. 2" wide 10 x 10 glass mesh quick tape or equivalent.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Examine adjacent construction for conditions that prevent proper installation of drywall systems.
- B. Do not proceed until defects are corrected.

3.2 METAL FRAMING INSTALLATION

- A. General:
 - 1. Install metal framing in accordance with ASTM C754 except as otherwise specified.
 - 2. Install the members true to line and level to provide surface flatness with maximum variation of 1/8" in 10' in any direction.
 - 3. Install metal studs at 16" o.c. unless noted otherwise.
- B. Metal Furring Channels
 - 1. Secure to masonry walls and around door and window openings, intersections, and corners with low velocity power driven anchors.
 - 2. Install metal furring at 16" o.c. vertically.
 - 3. Extend furring on exterior walls full height of wall.

3.3 GYPSUM BOARD SYSTEM INSTALLATION

- A. Gypsum Board Application and Finishing Standards: Install and finish gypsum panels to comply with ASTM C840 GA -201, GA-216 and GA-600.
- B. Work shall be provided in accordance with the manufacturer's printed instructions and as specified herein. Where fire rating requirements for systems are indicated on the Drawings or in the schedules, install components in accordance with manufacturer's instructions to comply with indicated fire rating requirements.
- C. Wallboard joints shall be butted tightly together. Maximum allowable gap at end joints shall be 1/8 inch. Support end joints on framing members.
 - 1. On partitions/walls apply gypsum panels vertically, unless parallel application is required for fire-resistive-rated assemblies. Use maximum length panels to minimize end joints.
 - 2. Install ceiling boards in direction, either parallel or perpendicular to framing members, which results in the least number of joints. Install in maximum practical lengths to span with minimum number of end (butt) joints. Stagger end joints of adjoining boards.
 - 3. Where ceiling or walls consist of 2 layers, face layer shall be installed perpendicular to base layer. Base layer to be screw attached and face layer to be strip laminated per manufacturer's instructions and screw attached to base layer in accordance with gypsum board application and finishing standards. Lay out joints so that tapered edges do not align with edges of openings.
 - 4. Fire Rated Walls: Construct required rated wall using thickness of Type "X" gypsum board required by code, installed to code requirements.
 - 5. Do not attach wallboard to head track.
 - 6. Provide a minimum of 1/4 inch perimeter relief where board abuts different materials. Trim edges with U-bead edge trim, where edges of gypsum panels are exposed. Seal joints between edges and abutting structural surfaces with acoustical sealant.
 - 7. Provide no less than 1/4", nor more than 3/8", space at bottom of board above floor.

- D. Wall Tile Substrates: For substrates indicated to receive thin-set ceramic tile and similar rigid applied wall finishes, comply with the following:
 - 1. Install cementitious backer units where tile is to be installed to comply with ANSI A108.11. Refer to Tile Specification.
- E. Soffits and Ceilings: Apply exterior gypsum soffit board panels perpendicular to supports, with end joints staggered over supports. Install with 1/4 inch open space where panels abut other construction or structural penetrations.
 - 1. Fasten with corrosion-resistant screws.
- F. Openings cut in gypsum board to fit electrical outlets, plumbing, and piping shall fit snugly and shall be small enough to be covered by plates and escutcheons. Both face and back paper shall be cut for cutouts that are not made by use of a saw.
- G. Fasteners: Install fasteners no closer than 3/8 inch to end or edge. Space fasteners approximately 7 inches o.c., opposite each other on adjacent ends or edges. Begin fastening from center of wallboard and proceed toward outer end or edges.
- H. Apply pressure on gypsum board, adjacent to fasteners being driven, to ensure that gypsum board will be secured tightly to framing member. Check for looseness at fasteners. Drive fastener with shank reasonably perpendicular to face of board.
- I. Drive screws with power screwdriver as recommended by gypsum board manufacturer. Surface of head shall be below surface of paper without cutting paper.
- J. Joint and corner treatment shall be in accordance with the manufacturer's printed instructions to provide a finished surface, ready for painting. Surface shall be free of dimples, excess finishing compound, ridges, or untrue corners.
 - 1. Install edge trim where edge of gypsum panels would otherwise be exposed or semi-exposed. Provide edge trim type with face flange formed to receive joint compound except where other types are indicated.
- K. Provide control joints in gypsum board partitions, bulkheads, ceilings, and soffits as follows:
 - 1. Partition, furring, or column fireproofing abuts a structural element (except floor) or dissimilar wall or ceiling.
 - 2. Ceiling or soffit abuts a structural element, dissimilar wall or partition or other vertical penetration.
 - 3. Construction changes within plane of partition or ceiling.
 - 4. Partition or furring run exceeds 40 feet, unless noted otherwise.
 - 5. Ceiling dimensions exceed 50 feet in either direction.
 - 6. Exterior soffits exceed 30 feet in either direction.
 - 7. Wings of "L", "U", and "T"-shaped ceiling areas are joined.
 - 8. Expansion or control joints occur in the exterior wall.
 - 9. Less than ceiling height frames should have control joints extending to the ceiling from both corners. Ceiling height door frames may be used as control joints. Treat window openings in same manner as doors.
 - 10. USG Control Joint No. 093: Apply over face of gypsum board where specified. Cut to length with a fine-toothed hacksaw (32 teeth per inch). Cut end joints square, butt together, and align to provide neat fit. Attach control joint to gypsum board with fasteners spaced 6 inches o.c. maximum along each flange. Remove plastic tape after finishing with joint compound or veneer finish.
 - a. Leave a 1/2 inch continuous opening between gypsum boards for insertion of surface-mounted joint.
 - b. Interrupt wood floor and ceiling plates with a 1/2 inch gap, wherever there is a control joint in the structure.
 - c. Do not attach gypsum board to steel studs on one side of control joint.
 - d. Provide separate supports for each control joint flange.

- e. Provide an adequate seal behind control joint where sound or fire ratings are prime considerations.
- L. Maximum variation in flatness required is $\frac{1}{8}$ " in 10'.
- M. Install sound-attenuation blankets, where indicated, prior to installing gypsum panels unless blankets are readily installed after panels have been installed on one side.
- N. Install ceiling board panels across framing to minimize the number of abutting end joints and to avoid abutting end joints in the central area of each ceiling.
 - 1. Stagger abutting end joints of adjacent panel not less than one framing member.
- O. Install gypsum panels with face side out.
 - 1. Do not install imperfect, damaged, or damp panels.
 - 2. Butt panels together for a light contact at edges and ends with not more than $\frac{1}{16}$ " of open space between panels.
 - 3. Do not force into place.
 - 4. Install all wall board with $\frac{1}{4}$ " to $\frac{1}{2}$ " separation from floor surface in accordance with manufacture's recommendation.
- P. Locate both edge or end joints over supports, except in ceiling applications where providing intermediate supports or gypsum board back blocking behind end joints.
 - 1. Do not place tapered edges against cut edges or ends.
 - 2. Stagger vertical joints on opposite sides of partitions.
 - 3. Avoid joints other than control joints at corners of framed openings where possible.
- Q. Attach gypsum panels to steel studs so leading edge or end of each panel is attached to open (unsupported) edges of stud flanges first.
- R. Attach gypsum panels to framing provided at openings and cutouts.
- S. Spot grout hollow metal doorframes for solid-core wood doors, and hollow metal doors.
 - 1. Apply spot grout at each jamb anchor clip and immediately insert gypsum panels into frames.
- T. Form control and expansion joints at locations indicated and as detailed, and as recommended by manufacturer with space between edges of adjoining gypsum panels, as well as supporting framing behind gypsum panels.
- U. Cover both faces of steel stud partition framing with gypsum panels in concealed spaces (above ceilings, etc.), except in chases braced internally.
 - 1. Except in concealed applications indicating or requiring sound, fire, air, or smoke ratings, may use scraps of not less than 8 s.f. in.
 - 2. Fit gypsum panels around ducts, pipes, and conduits.
 - 3. Where partitions intersect open concrete coffers, concrete joists, and other structural members projecting below underside of floor/roof slabs and decks, cut gypsum panels to fit profile formed by coffers, joists, and other structural members; allow $\frac{1}{4}$ " - $\frac{3}{8}$ " wide joints to install sealant.
- V. Isolate perimeter of non load-bearing gypsum board partitions at structural abutments, except floors, as detailed.
 - 1. Provide $\frac{1}{4}$ " - $\frac{1}{2}$ " wide spaces at these locations and trim edges with U-bead edge trim where edges of gypsum panels are exposed.
 - 2. Seal joints between edges and abutting structural surfaces with acoustical sealant.
- W. In STC-rated gypsum board assemblies, seal construction at perimeters, behind control and expansion joints, openings, and penetrations with a continuous bead of acoustical sealant at both faces of the partitions.
 - 1. Comply with ASTM C 919 and manufacturer's recommendations for location of edge trim and closing off sound-flanking paths around or through gypsum board assemblies, including sealing partitions above acoustical ceilings. Contractor to coordinate with all required fire/smoke rated separations.

- X. Space the fasteners in gypsum panels according to GA-216, finishing standard, and manufacturer's recommendations.

3.4 ACCESSORIES INSTALLATION

- A. Corner Beads: Install on external corners, with screws spaced 8" o.c. both sides.
- B. Trim: Install over face-layer gypsum board with fasteners spaced 8" o.c. Install where gypsum board surfaces meet dissimilar surfaces and at other detailed locations.
- C. Corner beads and trim may be either galvanized metal or plastic.

3.5 JOINT TREATMENT

- A. Treat joints, interior angles, fastener depressions, and finishing trim on face-layer gypsum board, including gypsum board in ceiling plenums.
- B. Pre-fill, tape, fill, and finish in accordance with manufacturer's directions.
- C. Apply a thin skim coat of joint compound over entire surface of gypsum board.
- D. Sand finish coat and leave surfaces smooth, uniform, and free of fins, depressions, cracks and other imperfections.
- E. Provide draft stopping in any concealed or furred space of the extruded insulation at the ceiling line and horizontally and vertically at 10'-0" o.c. maximum spacing. Provide at locations where interior wall(s) intersect or abut the exterior wall, at no more than 10' intervals in large rooms with walls over 20', and as required by FBC.
 - 1. Draft stopping may be ½" drywall, solid minimum 22-gauge metal strip, or ½" minimum mineral wool.
 - 2. Anchor draft stopping independent of the extruded insulation.
- F. Finish level shall be as indicated:
 - a. All spaces: level 4 with textured finish unless noted otherwise.

3.6 FINISHING GYPSUM BOARD ASSEMBLIES

- A. Levels of Finish: The following levels of finish are established as a guide for specific final finishes in accordance with GA-214.
 - 1. Level 0: No taping, finishing, or accessories required. This level of finish shall be used in temporary construction only.
 - 2. Level 1: Joints and interior angles shall have tape embedded in joint compound. Surface shall be free of excess joint compound. Tool marks and ridges are acceptable. This finish level shall be used in plenum areas above ceilings, in attics, in areas where the assembly is concealed.
 - 3. Level 2: Joints and interior angles shall have tape embedded in joint compound, and one separate coat of joint compound applied over joints, angles, fastener heads, and accessories. Surface shall be free of excess joint compound. Tool marks and ridges are acceptable. This finish level shall be used where water resistant gypsum backing board (ASTM C630) is used as a substrate for tile only.
 - 4. Level 3: Joints and interior angles shall have tape embedded in joint compound, and two separate coats of joint compound applied over joints, angles, fastener heads, and accessories. Joint compound shall be smooth and free of tool marks and ridges. Note: It is recommended that the prepared surface be coated with a primer/sealer prior to the application of final finishes. See painting/wall covering specification in this regard. This final level shall be used in areas that are to receive heavy textured, thick (1/8 inch or greater) wall coverings.

5. Level 4: Joints and interior angles shall have tape embedded in joint compound, and three separate coats of joint compound applied over joints, angles, fastener heads, and accessories. Joint compound shall be smooth and free of tool marks and ridges. Note: Prepare surface to be coated with a primer/sealer prior to the application of final finishes. This finish level shall be used where textured finishes, wall coverings, and painted (flat or eggshell) finishes are to be applied.
 6. Level 5: Joints and interior angles shall have tape embedded in joint compound and three separate coats of joint compound applied over joints, angles, fastener heads, and accessories. A thin skim coat of joint compound, or a material manufactured especially for this purpose, shall be applied to the entire surface. The surface shall be smooth and free of tool marks and ridges. Note: Prepare surface to be coated with a primer/sealer prior to the application of finish paint. This finish level shall be used with semi-gloss or gloss painted finishes and where indicated on the Room Finish Schedule.
- B. Use the following joint compound combination as applicable to the finish levels specified:
1. Embedding and First Coat: Setting type joint compound. Fill (Second) Coat: Setting type joint compound. Finish (Third) Coat: Ready mixed, drying type, all purpose or topping compound.

3.7 SITE ENVIRONMENTAL PROCEDURES

- A. Indoor Air Quality:
 1. Temporary ventilation: Provide temporary ventilation for work of this Section.
 2. Multi-layer gypsum board: Screw attachment. Adhesive attachment will not be permitted.
- B. Waste Management: As specified.
- C. Select panel sizes and layout panels to minimize waste; reuse cut offs to the greatest extent possible.

END OF SECTION

SECTION 09 51 23
ACOUSTICAL TILE CEILINGS

PART 1 GENERAL

1.1 RELATED DOCUMENTS

- A. The provisions of the General Conditions, Supplementary Conditions, Drawings, Specifications and the Sections included under Division 1, General Requirements and References are included as a part of this Section as though bound herein.

1.2 SECTION INCLUDES

- A. Provide labor, material, services and equipment necessary to furnish and install work as indicated and as specified herein, which includes, but is not limited to:
 - 1. Ceiling tiles, metal grid, ceiling suspension system and related accessories required for complete and functioning ceiling system.
 - 2. Removal and recycling of existing acoustical tile ceilings in renovation projects.

1.3 RELATED SECTIONS

- A. Section 01 25 13 – Product Substitution Procedures.
- B. Section 01 31 00 – Project Coordination.
- C. Section 01 33 00 – Submittal Procedures.
- D. Section 01 42 00 – References.
- E. Section 01 45 00 – Quality Control.
- F. Section 01 74 00 – Cleaning and Waste Management.
- G. Section 01 78 00 – Closeout Submittals.
- H. Section 23 37 00 – Air Outlets and Inlets.
- I. Section 26 09 23 – Lighting Control Devices.
- J. Section 26 51 00 – Interior Lighting.
- K. Section 27 60 00 – Sound reinforcement System.

1.4 REFERENCES

- A. Comply with Section 01 42 00 – References for additional reference standards, abbreviations, definitions and acronyms.
- B. American Society of Testing Materials (ASTM):
 - 1. ASTM C423-09: Sound Absorption and Sound Absorption Coefficients by the Reverberation Room Method
 - 2. ASTM C635-13: Standard Specification the Manufacture, Performance, and Testing of Metal Suspension Systems for Acoustical Tile and Lay-in Panel Ceilings.
 - 3. ASTM C636-13: Recommended Practice for Installation of Metal Ceiling Suspension Systems for Acoustical Tile and Lay-in Panels
 - 4. ASTM C641-09: Specification for Steel Sheet, Zinc-Coated (galvanized) Carbon Steel Wire
 - 5. ASTM A653-13: Specification for Steel Sheet, Zinc-Coated (galvanized) or Zinc-Iron Alloy-Coated (galvanized) by the Hot-Dip Process
 - 6. ASTM E84-14: Test Method for Surface Burning Characteristics of Building Materials

7. ASTM E119-12a: Standard Test Method for Fire Test of Building Construction and Materials
8. ASTM E795-05(12): Standard Practice for Mounting Test Specimens During Sound Absorption Tests
9. ASTM E1264-08e1: Standard Classification of Acoustical Ceiling Products
10. ASTM E1414-11a: Standard Test Method for Airborne Sound Attenuation Between Rooms Sharing a Common Ceiling Plenum
11. ASTM E1477-98a (2013): Standard Test Method for Luminous Reflectance Factor of Acoustical Materials by Use of Integrating Sphere Reflectometer
- C. Ceilings and Interior Systems Contractors Association (CISCA):
 1. Acoustical Ceilings: Use and Practice.
 - B. Ceiling Systems Handbook.
- D. International Organization of Standardization (ISO):
 1. ISO 11654:1997 – Sound Absorbers for use in Buildings – Rating of Sound Absorption
 2. ISO 14024:1999 – Environmental Labels and Declarations- Type I Environmental Labeling – Principles and Procedures
 3. ISO 14025:2006 – Environmental Labels and Declarations- Type III Environmental Labeling – Principles and Procedures
- E. Underwriter’s Laboratories (UL): Fire Resistance Directory and Building Material Directory

1.5 SUBMITTALS

- A. Comply with Section 01 33 00 – Submittal Procedures.
- B. Submit product data for each type of product specified.
- C. Submit samples for verification purposes of each type of exposed finish required, prepared on samples of size indicated below and of same thickness and material indicated for final unit of Work.
- D. Where finishes involve normal color and texture variations, include sample sets showing full range of variations expected.
- E. Submit 150 mm (6") square samples of each acoustical panel type, pattern, and color.
- F. Submit two (2) 300 mm (12") long samples of exposed suspension system members, including moldings, for each color and system type required.

1.6 QUALITY ASSURANCE

- A. Comply with Section 01 45 00 – Quality Control.
- B. Comply with CISCA “Ceiling Systems Handbook” and “Acoustical Ceilings: Use and Practice.
- C. Fire Performance Characteristics: Provide acoustical ceilings in accord with ASTM indicated:
 1. ASTM E 84-14: Flame Spread of 25 or less, and Smoke Developed of 50 or less.
 2. ASTM E 1264-08e1: Tile products rated Class A.
- D. Single Source Responsibility for Ceiling Units: Obtain each type of acoustical ceiling unit from a single source with resources to provide products of consistent quality in appearance and physical properties without delaying progress of Work.
- E. Single Source Responsibility for Suspension System: Obtain each type of suspension system from single source with resources to provide products of consistent quality in appearance and physical properties without delaying progress of Work.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Comply with Section 01 66 00 – Product Storage and Handling.
- B. Deliver acoustical ceiling units and suspension system components to Project site in original, unopened packages and store in fully enclosed space.
- C. Protect from damage due to moisture, direct sunlight, surface contamination, and other causes.
- D. Before installation, permit tiles to reach room temperature and attain stabilized moisture content.
- E. Handle acoustical ceiling units carefully to avoid chipping edges or damaging units. Replace damaged units.

1.8 PROJECT CONDITIONS

- A. Environmental Limitations: Do not install interior acoustical ceilings until interior spaces are enclosed and weatherproof, wet finish work is completed and nominally dry, work above ceilings is complete, and ambient temperature and humidity are continuously maintained per manufacturer's printed product installation instructions.

1.9 EXTRA MATERIALS

- A. Furnish extra materials described below that match products installed, are packaged with protective covering for storage, and are identified with labels describing contents.
- B. Acoustical Ceiling Units: Furnish two boxes of 2' (608 mm) x 2' (608 mm) replacement tiles on project site for Owner's use upon completion of work.

1.10 WARRANTY

- A. Comply with Section 01 78 00 – Submittal Documents.
- B. Submit printed warranty executed by manufacturer agreeing to repair or replace acoustic panels from sagging or warping, grid system from rusting or other manufacturing defects for ten years from date of project's substantial completion.
- C. Warranty shall not cover abuse or acts of God.

PART 2 PRODUCTS

2.1 APPROVED MANUFACTURERS

- A. Armstrong World Industries, Inc., P.O. Box 3001, Lancaster, PA 17604; Tel: 877-276-7876; Fax: 800-572-8324; Website: www.armstrong.com.
- B. USG Interiors, subsidiary of USG Corp., 550 West Adams St. Chicago, IL 60661-3637; Tel: 800-950-3839; Website: www.usg.com.
- C. Certainteed Corporation, subsidiary of Saint Goblain, P.O. Box 860, 750 East Swedesford Rd., Valley Forge, PA 19482; Tel: 800-233-8990, 610-341-7777; Website: www.certainteed.com.
- D. Other manufacturers may request approval in accord with Section 01 25 13 – Product Substitution Procedures.

2.2 PRODUCTS

- A. Tiles shall be 24" (608 mm) x 24" (608 mm) x 3/4" (19.5 mm) thick white, non-directional, with 15/16" (23.8 mm) wide white grid unless noted otherwise.
- B. Ceiling Tile Locations:
 - 1. ACT-1 (Non wet areas such as Classrooms, Offices, Media Center, Cafeteria & Stage):
 - a. Armstrong World Industries "Fine Fissured" Square Lay-in.
 - b. CertainTeed Corp. "Baroque"
 - c. USG Interiors Radar Climaplus

2.3 ACOUSTICAL CEILING UNITS

- A. Standard for Acoustical Ceiling Units: ASTM E 1264-08e1 classifications as designated by reference to types, patterns, acoustical ratings, and light reflectance, unless otherwise indicated.
- B. Mounting Method for Measuring NRC: Type E 400 (plenum mounting in which face of test specimen is 15-3/4" (400 mm) away from the test surface) per ASTM E 795-05(12).
- C. Colors and Patterns: Provide products to match appearance characteristics indicated under each product type.

2.4 SUSPENSION SYSTEM

- A. Standard for Metal Suspension Systems: Comply with applicable ASTM C 635-13 requirements.
- B. Finishes and Colors: Provide manufacturer's standard factory applied finish for type of system indicated.
- C. Attachment Devices: Size for 5 times design load indicated in ASTM C 635-13, Table 1, Direct Hung unless otherwise indicated.
- D. Wire Hangers, Braces, and Ties: ASTM C 641-09, Class 1 zinc coating, soft temper.
 - 2. Gage: Provide wire sized so that stress at 3 times hanger design load (ASTM C 635-13, Table 1, Direct-Hung), will be less than yield stress of wire, but provide not less than 2.69 mm (0.106") diameter wire.
- E. Edge Moldings and Trim: Metal or extruded aluminum of types and profiles indicated or, if not indicated, manufacturer's standard moldings for edges and penetrations that fit type of edge detail and suspension system indicated. Provide column surround trim at round columns.
- F. Retention Clips (For Fire Rated Ceiling Assemblies): Armstrong #414 or equal by other approved acoustical panel manufacturers.
- G. Ceiling Cloud Trim: Armstrong Axiom Classic Trim #AX4STR

2.5 NON-FIRE-RESISTANCE-RATED DIRECT-HUNG SUSPENSION SYSTEMS

- A. Wide-Face Capped Double-Web Steel Suspension System: Main and cross-runners roll-formed from pre-painted or electrolytic zinc-coated cold-rolled steel sheet, with pre-finished 23 mm (15/16") wide metal caps on flanges; other characteristics as follows:
 - 1. Structural Classification: Intermediate Duty System.
 - 2. End Condition of Cross-Runners: Override (stepped) or butt-edge type, as standard with manufacturer.
 - 3. Cap Material and Finish: Steel sheet painted white.

2.6 MISCELLANEOUS MATERIALS

- A. Tile Adhesive: Type recommended by tile manufacturer, bearing UL label for Class 0-25 flame spread.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Examine substrates and structural framing to which ceiling system attaches or abuts, with Installer, for compliance with requirements specified in this and other sections that affect installation and anchorage of ceiling system.
- B. Proceeding with installation shall be deemed installer's acceptance of surface conditions to which ceiling system is attached or abutting.

3.2 PREPARATION

- A. Coordination: Furnish layouts for preset inserts, clips, and other ceiling anchors whose installation is specified in other sections.
- B. Furnish concrete inserts and similar devices to other trades for installation well in advance of time needed for coordination of other work.
- C. Measure each ceiling area and establish layout of acoustical units to balance border widths at opposite edges of each ceiling. Avoid use of less than half width units at borders, and comply with reflected ceiling plans.

3.3 INSTALLATION

- A. General: Ceiling systems installation shall be in accord with manufacturer's written instructions and CISCA "Ceiling Systems Handbook", and Standard for Installation of Ceiling Suspension Systems: ASTM C 636-13.
- B. Arrange acoustical units as indicated.
 - 1. Where ACT units are installed, provide retention clips in accord with ceiling panel manufacturer's recommendations.
- C. Suspend ceiling hangers from building structural members and as follows:
 - 1. Install hangers plumb and free from contact with insulation or other objects within ceiling plenum that are not part of supporting structural or ceiling suspension system.
 - 2. Splay hangers only where required to miss obstructions and offset resulting horizontal forces by bracing, counter-splaying, or other equally effective means.
 - 3. Where width of ducts and other construction within ceiling plenum produces hanger spacing that interferes with location of hangers at spacing required to properly support standard suspension system members, install supplemental suspension members and hangers in form of trapezes or equivalent devices.
 - 4. Size supplemental suspension members and hangers to support ceiling loads within performance limits established by referenced standards.
 - 5. Secure wire hangers by looping and wire tying, either directly to structures or to inserts, eye-screws, or other devices that are secure and appropriate for substrate, and in manner that will not cause deterioration or otherwise fail due to age, corrosion, or elevated temperatures.

6. Secure flat, angle, channel, and rod hangers to structure, including intermediate framing members, by attaching to inserts, eye-screws, or other devices that are secure and appropriate for structure to which hangers are attached and for type of hanger involved, and in manner that will not cause deterioration or fail due to age, corrosion, or elevated temperatures.
 7. Space hangers not more than 48" (1216 mm) along each member supported directly from hangers, unless otherwise shown, and provide hangers not more than 8" (200 mm) from ends of each member.
 8. Lighting, speakers or other items inserted into ceiling tiles shall be supported by building structure and not by ceiling tile or grid.
- D. Install edge moldings of type indicated at perimeter of acoustical ceiling area and where necessary to conceal edges of acoustical units.
 - E. Install acoustical panels in coordination with suspension system, with edges concealed by support of suspension members. Scribe and cut panels to fit accurately at borders and at penetrations.

3.4 CLEANING

- A. Clean exposed surfaces of acoustical ceilings, including trim, edge moldings, and suspension members.
- B. Comply with manufacturer's printed instructions for cleaning and touch-up of minor finish damage.
- C. Remove and replace work that cannot be successfully cleaned and repaired to permanently eliminate evidence of damage.

END OF SECTION

SECTION 09 65 20
RESILIENT FLOORING

PART 1 GENERAL

1.1 RELATED SECTIONS

- A. The provisions of the General Conditions, Supplementary Conditions, Drawings, Specifications, and the Sections included under Division 1, General Requirements and References are included as a part of this Section as though bound herein.

1.2 SECTION INCLUDES

- A. Provide labor, material, services, and equipment necessary to furnish and install work as indicated and as specified herein, which includes, but is not limited to:
 - 1. Work consists of vinyl composition tile flooring, composite sheet flooring, vinyl base, accessories and surface preparation required for complete installation.

1.3 RELATED SECTIONS

- A. Section 01 25 13 – Product Substitution Procedures
- B. Section 01 33 00 – Submittal Procedures
- C. Section 01 42 00 – References
- D. Section 01 45 00 – Quality Control
- E. Section 01 66 00 – Project Storage and Handling Requirements
- F. Section 01 78 00 – Closeout Submittals
- G. Section 03 54 16 – Hydraulic Cement Underlayment

1.4 REFERENCES

- A. See Section 01 42 00 – References for abbreviations, acronyms, definitions and reference standards.
- B. American Society for Testing and Materials (ASTM):
 - 1. D570-98 (2010) e1: Standard Test Method for Water Absorption of Plastics.
 - 2. D2047-11: Standard Test Method for Static Coefficient of Friction of Polish-Coated Flooring Surfaces as Measured by the James Machine.
 - 3. E648-14c: Test Method for Critical Radiant Flux of Floor-Covering Systems Using a Radiant Heat Energy Source.
 - 4. E662-15: Test Method for Specific Optical Density of Smoke Generated by Solid Materials.
 - 5. F510/F510M-14: Standard Test Method for Resistance to Abrasion of Resilient Floor Covering Using an Abrader with a Grit Feed Method.
 - 6. F710-11: Standard Practice for Preparing Concrete Floors and Other Monolithic Floors to Receive Resilient Flooring.
 - 7. F970-07(2011): Standard Test Method for Static Load Limit.
 - 8. F1066-04(2014)e1: Standard Specification for Vinyl Composition Floor Tile
 - 9. E1428-15a: Standard Test Method for Evaluating the Performance of Antimicrobials in or on Polymeric Solids Against Staining by Streptomyces Species (A Pink Stain Organism).
 - 10. F925-13: Standard Test Method for Resistance to Chemicals of Resilient Flooring

11. F1515-03 (2008): Standard Test Method for Measuring Light Stability of Resilient Flooring by Color Changes.
12. F1869-11: Standard Test Method for Measuring Moisture Vapor Emission Rate of Concrete Subfloor using Anhydrous Calcium Chloride.
13. G21-15: Standard Practice for Determining Resistance of Synthetic Polymeric Materials to Fungi.

1.5 SUBMITTALS

- A. Comply with Section 01 33 00 – Submittal Procedures.
- C. Submit product data, including installation instructions before starting work.
- D. Submit manufacturer's standard size samples of each type, color, and finish of resilient flooring and required accessories including full range of flooring color and pattern variations available from proposed manufacturer.
- E. Manufacturer's Safety Data Sheet (MSDS) for adhesive.
- F. Submit manufacturer's printed documentation indicating compliance to slip-resistant coefficient requirements.
- G. Submit manufacturer's written instructions for recommended maintenance practices for installed resilient flooring to include:
 1. Schedule: Frequency and type of maintenance defined.
 2. Equipment: Equipment and tools specified by generic language or manufacturer's name.
 3. Materials: Chemicals required to maintain flooring by brand name, quantities, and proper solutions.

1.6 QUALITY ASSURANCE

- A. Comply with Section 01 45 00 – Quality Control.
- B. Regulatory Requirements:
 1. Resilient tile flooring systems shall have minimum slip-resistant coefficients:
 - a. 0.5 for leveled floors such as assembly areas including cafeterias, multipurpose spaces and music rooms.
 - b. 0.6 for accessible routes such as interior corridors.
 - c. 0.8 for inclined floors such as ramps.
 2. Non-compliance of slip-resistant coefficient factor will be grounds for removal and disposal of installed flooring system, properly preparing floor substrate and installation of required slip-resistant flooring system at no additional expense.
 3. Taber Abrasionmeter Testing:
 - a. Weight loss of each tile shall average no more than 0.60 grams when ten tiles are abraded with aluminum oxide grit and S-39 leather wheel for 2000 cycles according to ASTM F510-14.
- C. Installer shall provide documentation of five years successful experience completing similar resilient tile installations.
- D. Preinstallation Conference:
 1. Conduct meeting at site prior to commencing tile work related to installation with parties associated with work.
 2. Review site conditions, procedures, and coordination required with related work.
- E. Mockups:
 1. Comply with Section 01 43 39 – Mockups.
 2. Provide mockup of each type of installation using approved materials and installation procedures.

3. Obtain A/E's acceptance of mock-up prior to start of resilient tile installation.
4. Approved mockup may be incorporated into project.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Comply with Section 01 66 00 – Product Storage and Handling.
- B. Deliver products in manufacturer's unopened original dry packaging, with tags and labels intact.
- C. Provide equipment and personnel to handle materials to prevent damage from dropping, careless storage, and handling.
- D. Store material in weather protected space with temperature between 65°- 90° F (18° – 32° C).

1.8 SITE CONDITIONS

- A. Maintain room and material temperature between 65° F (18° C) and 90° F (32° C) for 48 hours before, during, and 48 hours after installation. Maintain minimum 65° F. (18° C) thereafter.
- B. Prior to installation, painting shall be completed, air-conditioning system is operational, and exterior thresholds are installed.

1.9 WARRANTY

- A. Comply with Section 01 78 00 – Closeout Documents.
- B. Furnish manufacturer's warranty covering manufacturing defects for a period of 2 years and 10 years for traffic wear resistance, excluding abusive treatment.
- C. Installer shall warrant in writing to correct conditions due to faulty installation or replace defective materials after project completion, including loss of adhesion to substrate.

PART 2 PRODUCTS

2.1 MATERIALS

- A. Products and manufacturers specified are approved for project. Other manufacturers may submit requests for product substitution in accord with Section 01 25 13 – Product Substitution Procedures.

2.2 SUPPLIER: AVA by Novalis Innovative Flooring; distributed by Capri cork email: sales@avaflor.com website: www.avaflor.com.

2.3 SUBSTITUTIONS: Refer to Division 1 Project Requirements for Product Substitution procedures.

2.4 PRODUCT OPTIONS

- A. AVA SMPL HPC Floating Plank
 1. Gauge: 2.5 mm (nominal)
 2. Wear layer: 0.5 mm (20.0)
 3. Core Specification: 4.0 mm high performance vinyl core, 1050 kg/m³ density
 4. Acoustical Backing: 1.0 mm cork underlayment
 5. Size: Planks: 7' x 48' planks

6. Carton: Planks: 22.836 sq. ft.
7. Edges: Straight Edge
8. Installation Method: Floating /Triple Lock Locking Mechanism
9. Color Planks:
Tangent Collection; Color: Charcoal; SKU; T20-600
10. Cobalt Tangent HPC construction is also available with any of the AVA DSGN, SNSE, STYL or SPRK colors/patterns for a minimum order of 4000 sf per color/patterns; lead times will apply.

2.5 PERFORMANCE: Physical properties of Cobalt Planks and Tiles shall conform to the published technical specifications for each individual product. Technical data can be found at www.cobaltsurfaces.com.

2.6 ACCESSORY PRODUCTS

- A. Provide matching trims, moldings and reducing strips specifically designed for luxury vinyl flooring. Architect / Designer shall specify the type and color of each molding. Follow industry or manufacturer's guidelines for proper use and installation of all moldings.
- B. Cleaning Products: Architect can specify per the latest edition of the maintenance instructions (available from www.avaflor.com).
- C. Resilient Tile Base:
 1. Manufacturers:
 - a. Armstrong World Industries, 2500 Columbia Ave., Lancaster, PA. 17603; Tel: 717-397-0611; Website: www.armstrong.com.
 - b. Flexco Corp., 1401 East 6th St., Tuscumbia, AL 35674; Tel: 800-633-3151; Fax: 800-346-9075; Website: www.flexcofloors.com.
 - c. Tarkett Collection by Johnsonite, Inc., 16910 Munn Rd., Chagrin Falls, OH 44023; Tel: 800-899-8916, 440-543-8916; Fax: 440-543-8920; Website: www.johnsonite.com.
 - d. Burke Mercer Industries, Inc., 2250 South Tenth St., San Jose, CA 95112; Tel: 800-447-8442; Website: www.burkemercerflooring.com.
 - e. Roppe Corp., 1602 N. Union St., P.O. Box 1158, Fostoria, OH 44830-1158.
 2. Base:
 - a. 0.125" (3.18 mm) thick, 4" (101 mm) high, Type TP rubber base with cove profile.
 - b. Colors shall be judged equivalent, as determined by A/E.
 - c. At corners, provide inside/outside corners as applicable to specific corner, to extend 4" (101 mm) (minimum) beyond corners.
- D. Accessories:
 1. Manufacturer (Basis of Design): Armstrong World Industries, 2500 Columbia Ave., 3001, Lancaster, PA. 17603; Tel: 717-397-0611; Website: www.armstrong.com.
 2. Transition Strips: Homogeneous vinyl, tapered edges in colors selected by A/E.
 - a. Carpet to tile reducer: VT0.
 - b. Carpet to concrete: VT2.
 - c. Tile to concrete: VT8.
 3. Tile Adhesive: Non-toxic with zero VOC content, waterproof, stabilized type as recommended by resilient tile flooring manufacturer.
- E. Subfloor Filler:
 1. Leveling concrete patching compound and leveling concrete underlayment shall be in accord with Section 03 30 00 – Concrete, Para. 2.5.

PART 3 EXECUTION

3.1 INSPECTION

- A. Notify Contractor/CM of work surface conditions detrimental to proper installation of work. Do not proceed until conditions have been corrected in manner acceptable to installer.
- B. Substrate surfaces shall be thoroughly cleaned of debris and have been reviewed for flatness and levelness per Section 03 30 00 – Concrete. Surface irregularities shall be filled or leveled as required.
- C. Verify condition of substrate by testing concrete in accord with ASTM F1869-11 and obtain results of 5lbs. (2.27 kg) or less of vapor transmission (MVER), surface alkali of 9 or less as measured by ph test paper, and be free of carbonization and dust.
- D. Proceeding with installation indicates installer's acceptance of substrate conditions.

3.2 PREPARATION

- A. Comply with ASTM F710-11, manufacturer's printed recommendations, and as specified for surface preparation.
- B. Concrete flatness and levelness shall comply with Section 03 30 0 – Concrete Para. 3.06. Grind down ridges and irregularities or fill to comply with requirements.
- C. Remove loose impediments from substrate with power vacuum.
- D. Fill cracks, holes, and depressions with cementitious based or underlayment as noted in Part 2 - Products.
- F. Remove paint, oils, bond breakers, waxes, and sealers from surface. Inorganic solvents shall not be used.
- G. See Section 03 54 16 – Hydraulic Cement Underlayment for preparation of uneven and damaged flooring.

3.3 INSTALLATION

- A. Lay resilient flooring, base and accessories with adhesive cement in accord with manufacturer's recommendations in patterns indicated.
- B. Layout:
 - 1. Butt tightly to vertical surfaces, thresholds, nosings, and edges.
 - 2. Scribe, as necessary, around obstructions to produce neat joints, laid tight, even, and straight.
 - 3. Extend flooring into toe spaces, door reveals, into closets, and similar openings.
 - 4. Install border tiles next to walls of not less than one half tile and of approximately equal size around the perimeter of room.
- C. Fill surface imperfections such as cracks, depressions, or rough areas with underlayment.
- D. Provide ventilation in areas where adhesive is being used. When natural ventilation is inadequate, use safety-spark-proof fans and prohibit smoking.
- E. Transition (Edge) Strips:
 - 1. Install vinyl transition (edge) strips wherever exposed edges of resilient flooring materials occur.
 - 2. Where resilient flooring stops at doorways, set transition thresholds directly under doors in closed position.

3.4 CLEANING, POLISHING AND PROTECTION

- A. Remove excess adhesive and other soilings from floors and adjacent surfaces, using neutral type cleaners as recommended by resilient flooring manufacturer.
- B. Do not use acids or other caustic solutions as cleaning agents.
- C. Clean and apply six (6) coats of liquid wax floor finish in accord with manufacturer's printed instructions.
- D. Prohibit traffic on floors for 48 hrs. Protect installed flooring from damage by covering with clean, heavy duty building paper from time of cleaning until work area is complete.
- E. Do not allow movement of heavy objects over flooring which could damage flooring or finish.
- F. Replace flooring damaged by subsequent construction operations.

END OF SECTION

SECTION 09 65 21
RESILIENT TILE FLOORING REFINISHING

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

- A. The provisions of the General Conditions, Supplementary Conditions, Drawings, Specifications, and the Sections included under Division 1, General Requirements and References are included as a part of this Section as though bound herein.

1.2 SUMMARY

- A. Provide labor, material, services, and equipment necessary to furnish and install work as indicated and as specified herein, which includes, but is not limited to:
 - 1. Vinyl Composition Tile Refinishing

1.3 ACTION SUBMITTALS

- A. Product Data: Submit technical data on each item specified including certification by manufacturer that products supplied for installation comply with local regulations controlling use of volatile organic compounds (VOC's).

1.4 INFORMATION SUBMITTALS

- A. Maintenance Data: Submit maintenance manuals for flooring materials provided to be included in Operation and Maintenance Manuals.

1.5 QUALITY ASSURANCE

- A. Manufacturer's Qualifications: Provide products from a firm that makes the indicated products as a regular production item and with not less than five (5) years experience.
- B. Refinisher Qualifications: An entity that employs refinishers who are trained for refinishing assemblies with not less than three (3) years experience.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Deliver refinishing products to Project site in original manufacturer's unopened cartons and containers each bearing names of product and manufacturer, Project identification, and shipping and handling instructions.

1.7 FIELD CONDITIONS

- A. Close spaces to traffic during refinishing.

PART 2 – PRODUCTS

2.1 MISCELLANEOUS MATERIALS

- A. VCT Floor Stripper: Flooring manufacturer’s standard floor stripper used to remove floor finishes, dirt, grime, oil, stains, tar, gum adhesives and scuffmarks.
- B. VCT Floor Finish: Low odor, ultra-high solids acrylic, white opaque liquid coating. Drying time shall be no more than 30 minutes in standard conditions. Non-Volatile Solids (%) 25.5 +/- 0.5. Coverage rate – approximately 2,500 sq. ft. per gallon Product shall: have a 3-year strip and re-coat cycle; be scuff, scratch and abrasion resistant; respond to ultra-high speed burnishing; and has a refractive index not less than 1.3861 and a maximum of 1.3898. UL classified for slip resistance.
 - 1. National Chemical Laboratories (NCL), Inc.: “24/7 Extended Performance Floor Finish”

PART 3 – EXECUTION

3.1 REFINISHING

- A. Vacuum the floor to pick up all dust and debris. Scrape off anything that is stuck on the floor so that the finish does not seal it onto the floor surface.
- B. Mix stripper and cold water in a bucket according to label instructions. Mop the floor with a generous amount of stripper and allow it to set without drying for seven to 10 minutes.
- C. Agitate the stripper using a floor machine with a stripping pad. Move the machine in a circular motion across the floor surface. Vacuum up the floor stripper with a wet-dry vacuum equipped with a mounted squeegee. Apply stripper, agitate and rinse again if there is a heavy buildup.
- D. Line one bucket with a trash bag so that you can dispose of the floor finish after you have completed the job. Fill the bucket a quarter full with floor finish, and fill another bucket half full with water. Soak the mop in the water and thoroughly wring the mop. Dip the mop in the floor finish and wring it again.
- E. Mop the finish onto the vinyl floor, moving the mop in a figure-eight pattern to ensure complete coverage. Begin at the corner that is farthest from the entrance. Apply the finish to the perimeter of the floor and then to one small segment of the open floor at a time, working toward the entrance. Allow the first coat to dry 30 minutes.
- F. Buff the floor so that the second coat of finish will adhere to the first coat. Apply a second coat of finish to the floor and apply additional coats until the floor looks wet when it is dry. Let the final coat dry at least 12 hours.

END OF SECTION 09 65 21

SECTION 09 91 00
PAINTING

PART 1 GENERAL

1.1 RELATED DOCUMENTS

- A. The provisions of the General Conditions, Supplementary Conditions, Drawings, Specifications, and the Sections included under Division 1, General Requirements and References are included as a part of this Section as though bound herein.

1.2 SECTION INCLUDES

- A. Provide labor, material, services, and equipment necessary to furnish and install work as indicated and as specified herein, which includes, but is not limited to:
- B. Surface preparation and field application of paints and coatings.
1. Exposed interior items and surfaces.
 2. Surface preparation, priming and finish coats specified are in addition to shop priming and surface treatment specified elsewhere.
- C. Paint exposed surfaces, except where paint schedule indicates surfaces or materials to remain unpainted.
- D. If paint schedule do not specifically mention items or surfaces, paint to match adjacent materials or surfaces.
- E. If paint schedule does not indicate color or finish, the Architect will select color or finish from manufacturer's standard colors or finishes.
- F. Painting includes field painting of exposed and covered pipes and ducts, color coding, hangars, exposed steel and iron work, and primed metal surfaces of mechanical and electrical equipment.
- G. Do not paint prefinished items, concealed building surfaces, finished metal surfaces, operating parts, and labels.
1. Prefinished items include the following factory finished components:
 - a. Architectural woodwork and casework.
 - b. Finished mechanical and electrical equipment.
 - c. Light fixtures.
 - d. Distribution cabinets.
 2. Concealed surfaces include walls or ceilings in the following normally concealed spaces:
 - a. Furred areas.
 - b. Ceiling plenums.
 - c. pipe chases.
 - d. Duct shafts.
 3. Finished metal surfaces include the following:
 - a. Anodized aluminum.
 - b. Stainless Steel.
 - c. Pre-finished aluminum or steel.
 4. Operating parts include moving parts of operating equipment and the following items:
 - a. Valve and damper operators.
 - b. Linkages.
 - c. Sensing devices.
 - d. Motor and fan shafts.

- G. Do not paint over Underwriter's Laboratories (UL), Factory Mutual (FM), or other code-required labels, equipment names, identification, performance rating, or other nomenclature plates.

1.3 RELATED SECTIONS

- A. Section 01 25 13 – Request for Substitution
- B. Section 01 31 00 – Project Management and Coordination
- C. Section 01 33 00 – Submittal Procedures
- D. Section 01 42 00 – References
- E. Section 01 45 00 – Quality Control
- F. Section 01 74 00 – Cleaning and Waste Management
- G. Section 01 78 00 – Closeout Submittals
- H. Section 10 14 00 – Signage
- I. Section 21 05 53 – Identification for fire Suppression Piping and Equipment
- J. Section 22 05 53 – Identification for Plumbing Piping and Equipment

1.4 REFERENCES

- A. See Section 01 42 00 – References for additional reference standards, acronyms, abbreviations and definitions.
- B. American Society of Testing Materials (ASTM):
 - 1. ASTM D1614: Standard Terminology for Paint, Related Coatings, Materials and Applications
 - 2. ASTM D4442-15: Standard Test Method for Direct Moisture Content Measurement of Wood and Wood Based Materials
- C. NACE (National Association of Corrosion Engineers) - Industrial Maintenance Painting.
- D. NPCA (National Paint and Coatings Association) - Guide to U.S. Government Paint Specifications.
- E. PDCA (Painting and Decorating Contractors of America) - Painting - Architectural Specifications Manual.
- F. SSPC (Steel Structures Painting Council) - Steel Structures Painting Manual.
 - 1. SP 1 - Solvent Cleaning.
 - 2. SP 2 - Hand Tool Cleaning.
 - 3. SP 3 - Power Cleaning.

1.5 SUBMITTALS

- A. Comply with Section 01 33 00 - Submittals.
- B. Product Data: Provide manufacturer's specifications and data sheets for each paint and coating product indicating the following:
 - 1 Product Characteristics.
 - 2 Surface preparation instructions.
 - 3 Primer requirements.
 - 4 Storage and handling requirements.
 - 5 Application methods.
 - 6 Precautionary requirements.
- C. Provide a list of required coatings indicating each material and cross referencing each specific coating, finish system and application by manufacturer's product number, color and classification.

1. Include manufacturer's technical information, label analysis and application instructions for each product.
 2. Provide certification that products comply with regulations controlling use of volatile organic compounds (VOC).
- D. Samples:
1. Submit manufacturer's color charts indicating full range of colors for each product indicated.
 2. Submit two 9" (22.9 cm) x 9" (22.9 cm) samples of each product illustrating selected colors, sheens and textures for each product.
- E. Manufacturer's Instructions: Indicate special surface preparation procedures, substrate conditions requiring special attention.
- F. Provide manufacturer's warranties for each product used.

1.6 QUALIFICATIONS

- A. Manufacturer: Company shall specialize in manufacture of the products specified with minimum ten years continuous documented manufacturing experience.
- B. Applicator: Company specializing in performing the work of this section with five years minimum continuous documented experience on similar project scope.

1.7 REGULATORY REQUIREMENTS

- A. Conform to applicable codes for flame and smoke rating requirements for finishes.

1.8 MOCK UP PANELS

- A. Comply with Section 01 45 00 – Quality Control.
- B. Provide a complete room field sample illustrating coating color, texture, and finish.
- C. Locate mockups where directed by Architect and Owner's Project Manager.
- D. Work samples that are accepted may remain as part of completed work.
- E. Work is not to proceed until mockups are approved.

1.9 DELIVERY, STORAGE, AND HANDLING

- A. Comply with Section 01 66 00 – Product Storage and Handling Requirements for delivery, storage, protection and handling of products.
- B. Deliver products to site in sealed and labeled containers; inspect to verify acceptability.
- C. Container label to include manufacturer's name, type of paint, brand name, lot number, batch date, color name and number, surface coverage, surface preparation, drying time, cleanup requirements, environmental issues, VOC content, and instructions for mixing.
- D. Store paint materials at minimum ambient temperature of 45° F (7° C) and maximum of 90° F (32° C) in ventilated area and as required by manufacturer's instructions.

1.10 ENVIRONMENTAL REQUIREMENTS

- A. Do not apply materials when surface and ambient temperatures are outside temperature ranges required by paint product manufacturer.
- B. Minimum Application Temperatures for Latex Paints: 45° F (7° C) for interiors.
- C. Minimum Application Temperature for Varnish and Stain Finishes: 65° F (18° C) for interior unless required otherwise by manufacturer's instructions.

- D. Provide lighting level of 80 foot-candles measured mid-height at substrate surface.
- E. Dispose of waste in accord with applicable regulations.

1.11 PRE-INSTALLATION MEETING

- A. Comply with Section 01 31 00 – Project Coordination for sequencing of trades to allow timely work start and completion.
- B. Pre-installation meeting shall be held minimum of one week prior to scheduled work start to verify acceptable condition of substrate surfaces to be painted, sequencing and protection of work until substantial completion.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Acceptable Manufacturer:
 - 1. The Sherwin-Williams Company, 101 Prospect Avenue NW, Cleveland, OH 44115; Tel: 1 800-321-8194; Fax: 216-566-1392; website: www.sherwin-williams.com.
- B. Other manufacturers may submit their products for approval per Section 01 25 13 – Substitutions Procedures. Manufacturers shall specify which Sherwin Williams products conform to products proposed for substitution.

2.2 MATERIALS

- A. Paintings and Coatings:
 - 1. Ready mixed, unless otherwise indicated.
 - 2. Process pigments to soft paste consistency, capable of being readily and uniformly dispersed to homogeneous coating; good flow and brushing properties.
 - 3. Capable of drying or curing free of streaks or sags.
- B. Accessory Materials: Coating application accessories shall be in accord with manufacturer's recommendations for patching materials, sealers, cleaning agents, cleaning cloths, primers, sanding paper, clean up materials, and other materials not specifically indicated but required to achieve specified finishes.

2.3 FINISHES

- A. Refer to schedule in Paragraphs 3.7 and 3.8 for interior surface finishes.
- B. Paint colors will be selected by Owner. Contractor/CM shall submit color samples to Architect who shall prepare color board for Owner's review and approval.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that surfaces are ready to receive work as instructed by the product manufacturer.
- B. Examine surfaces scheduled to be finished prior to commencement of work. Report any condition that may potentially affect proper paint application.
- C. Do not begin work until surfaces are ready to receive paint coatings. Start of work indicates acceptance of surfaces.
- D. Test shop applied primer for compatibility with subsequent cover materials.

- E. Measure moisture content of surfaces using an electronic moisture meter. Do not apply finishes unless moisture content of surfaces are below the following maximums:
 - 1. Plaster and Gypsum Wallboard: 12%.
 - 2. Masonry, Concrete, and Concrete Unit Masonry: 12%.
 - 3. Interior Wood: 15%, measured in accord with ASTM D4442-15.
 - 4. Concrete Floors: 8%.

3.2 PREPARATION

- A. Remove or mask electrical plates, hardware, light fixture trim, escutcheons and fittings prior to preparing surfaces or finishing.
- B. Correct defects and clean surfaces that affect work. Remove existing coatings that exhibit loose surface defects.
- C. Seal surface marks which may bleed through surface finishes.
- D. Remove mildew on surfaces per manufacturer's written recommendations.
- E. Aluminum Surfaces Scheduled for Paint Finish: Remove surface contamination by steam or high-pressure water. Remove oxidation with acid etch and solvent washing. Apply etching primer immediately following cleaning.
- F. Gypsum Board Surfaces: Fill minor defects with filler compound. Spot prime defects after repair.
- G. Galvanized Surfaces: Remove surface contamination and oils and wash with solvent. Apply coat of etching primer.
- H. Concrete and Unit Masonry Surfaces Scheduled to Receive Paint Finish: Remove dirt, loose mortar, scale, salt or alkali powder, and other foreign matter. Remove oil and grease with a solution of tri-sodium phosphate; rinse well and allow to dry. Remove stains caused by weathering of corroding metals with solution of sodium metasilicate after thoroughly wetting with water. Allow to dry.
- I. Plaster Surfaces: Fill hairline cracks, small holes, and imperfections with latex patching plaster. Make smooth and flush with adjacent surfaces. Wash and neutralize high alkali surfaces.
- J. Uncoated Steel and Iron Surfaces: Remove grease, mill scale, weld splatter, dirt and rust. Where heavy coatings of scale are evident, remove by power tool, wire brushing or sandblasting; clean by washing with solvent. Apply treatment of phosphoric acid solution, ensuring weld joints, bolts, and nuts are similarly cleaned. Spot prime paint after repairs.
- K. Shop Primed Steel Surfaces: Sand and scrape to remove loose primer and rust. Feather edges to make touch-up patches inconspicuous. Clean surfaces with solvent. Prime steel surfaces.
- L. Interior Wood Items Scheduled to Receive Finish: Wipe off dust and grit prior to priming. Seal knots, pitch streaks, and sappy sections with sealer. Fill nail holes and cracks after primer has dried; sand between coats.
- R. Interior Wood Items Scheduled to Receive Transparent Finish: Wipe off dust and grit prior to sealing, seal knots, pitch streaks, and sappy sections with sealer. Fill nail holes and cracks after primer has dried; sand lightly between coats.
- S. Wood and Metal Doors Scheduled for Painting: Seal top and bottom edges with primer and paint per Schedule.

3.3 APPLICATION

- A. Apply products in accord with manufacturer's written installation instructions.
- B. Do not apply paint coatings finishes to surfaces that are not dry, immediately before or after rain, during foggy conditions, or when temperature is less than 50° F (10° C).
- C. Apply each coat to uniform finish.

- D. Apply each coat of paint slightly darker than preceding coat unless otherwise approved.
- E. Sand wood and metal lightly between coats to achieve required finish.
- F. Vacuum clean surfaces free of loose particles. Use tack cloth just prior to applying next coat.
- G. Allow applied coat to dry before next coat is applied.
- H. Where clear finishes are required, tint fillers to match wood. Work fillers into the grain before set. Wipe excess from surface.
- I. Prime concealed surfaces of interior woodwork scheduled to receive stain or varnish finish with gloss varnish reduced 25% with mineral spirits.

3.4 FINISHING MECHANICAL AND ELECTRICAL EQUIPMENT

- A. Coordinate with Mechanical and Electrical Specifications and Drawings for schedules of color-coding and identification banding of equipment, ductwork, piping, and conduit.
- B. Paint shop primed equipment.
- C. Remove unfinished louvers, grilles, covers, and access panels on mechanical and electrical components and paint separately.
- D. Prime and paint insulated and exposed pipes, conduit, boxes, insulated and exposed ducts, hangers, brackets, collars and supports, in finished areas, except where items are pre-finished.
- E. Paint interior surfaces of air ducts, and convector and baseboard heating cabinets that are visible through grilles and louvers with one coat of flat black paint, to visible surfaces. Paint dampers exposed behind louvers, grilles and to match face panels.
- F. Paint exposed conduit and electrical equipment occurring in finished areas.
- G. Paint both sides and edges of plywood backboards for electrical and telephone equipment before installing equipment.
- H. Color code equipment, piping, conduit, and exposed ductwork in accord with requirements indicated. Color band and identify with flow arrows, names, and numbering.
- I. Reinstall electrical cover plates, hardware, light fixture trim, escutcheons and fittings removed prior to finishing.

3.5 FIELD QUALITY CONTROL

- A. Field inspection and testing will be performed in accord with Section 01 45 00 – Quality Control.

3.6 CLEANING

- A. Clean work under provisions of 01 74 00 – Cleaning and Waste Management.
- B. Collect cotton waste material that may constitute a fire hazard, place in closed metal containers and remove daily from site.

3.7 PAINT TYPE AND NUMBER OF COATS

- A. Painting schedules are intended to identify type of finishes which are required for various surfaces, and to identify surfaces to which each finish is to be applied. Refer to Room Finish Schedule.
- B. Requirements for quality, function, size, gauges, grades, textures, and color of materials are designated by manufacturer's brands, types, and number of coats required and other requirements that are to be furnished to conform to requirements of work.
- C. Where specific finishes are indicated by code designation, refer to identified types of coatings.

- D. Primers indicated under Material Identification is intended for particular substrate surface specified. Where same numbered finish are scheduled, but for another substrate, provide primer compatible with substrate and finish.
- E. Where substrate has compatible and satisfactory prime coat applied, prime coat specified for numbered finish may be omitted. Test prime coat for compatibility before applying additional coats.

3.9 INTERIOR PAINTING SCHEDULE

- A. Concrete Surfaces (Poured Concrete, Pre-Cast Concrete, Cast-In-Place Concrete, Tilt-Wall Concrete Panels, Concrete Beams, Ceilings, Stairs, Joists, and Columns).
 - 1. Egg Shell Finish (Low Odor/Low VOC):
 - a. 1st Coat: S-W Loxon Acrylic Masonry Primer, A24W8300 Series (8.0 mils wet/3.2 mils dry).
 - b. 2nd Coat: S-W ProGreen 200 Interior Latex Enamel, B20W3200 Series (4.0 mils wet/1.6 mils dry).
 - c. 3rd Coat: S-W ProGreen 200 Interior Latex Enamel, B20W3200 Series (4.0 mils wet/1.6 mils dry).
 - 2. Semi Gloss Finish (Low Odor/Low VOC):
 - a. 1st Coat: S-W Loxon Acrylic Masonry Primer, A24W8300 Series (8.0 mils wet/3.2 mils dry).
 - b. 2nd Coat: S-W ProGreen 200 Interior Latex Semi Gloss, B31W2200 Series (4.0 mils wet/1.3 mils dry).
 - c. 3rd Coat: S-W ProGreen 200 Interior Latex Semi Gloss, B31W2200 Series (4.0 mils wet/1.3 mils dry).
 - 3. Flat Finish (Low Odor/Low VOC):
 - a. 1st Coat: S-W Loxon Acrylic Masonry Primer, A24W8300 Series (8.0 mils wet/3.2 mils dry).
 - b. 2nd Coat: S-W ProGreen 200 Interior Latex Flat, B30W651 Series (4.0 mils wet/1.3 mils dry).
 - c. 3rd Coat: S-W ProGreen 200 Interior Latex Flat, B30W651 Series (4.0 mils wet/1.3 mils dry).
- B. Masonry (CMU- smooth, split, scored and fluted concrete units).
 - 1. Flat Finish:
 - a. 1st Coat: S-W PrepRite Block Filler, B25W25 Series (75-125 s.f./gal.).
 - b. 2nd Coat: S-W ProGreen 200 Interior Latex Flat, B30W651 (4.0 mils wet/1.8 mils dry).
 - c. 3rd Coat: S-W ProGreen 200 Interior Latex Flat, B30W651 (4.0 mils wet/1.8 mils dry).
 - 2. Egg Shell Finish:
 - a. 1st Coat: S-W PrepRite Block Filler, B25W25 Series (75-100 s.f./gal.3.6 mils).
 - b. 2nd Coat: S-W ProGreen 200 Interior Latex Eg-Shel, B20W2200 Series (4.0 mils wet/1.6 mils dry).
 - c. 3rd Coat: S-W ProGreen 200 Interior Latex Eg-Shel, B20W2200 Series (4.0 mils wet/1.6 mils dry).
 - 3. Semi Gloss Finish:
 - a. 1st Coat: S-W PrepRite Block Filler, B25W25 Series (75-125 s.f./gal.).
 - b. 2nd Coat: S-W ProGreen 200 Interior Latex Semi Gloss, B31W600 Series (4.0 mils wet/1.6 mils dry).

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- c. 3rd Coat: S-W ProGreen 200 Interior Latex Semi Gloss, B31W600 Series (4.0 mils wet/1.6 mils dry).
 - C. Metal Surfaces (Aluminum if not prefinished, Galvanized Steel metal doors, frames, railings, exposed ductwork, pipes and conduits and ferrous metal surfaces).
 - 1. Flat Finish:
 - a. 1st Coat: S-W Industrial ProCryl Universal Primer, B66-310 Series (5-10 mils wet/2-4 mils dry).
 - b. 2nd Coat: S-W ProGreen 200 Interior Latex Semi Gloss, B30W651 Series (4.0 mils wet/1.8 mils dry).
 - c. 3rd Coat: S-W ProGreen 200 Interior Latex Semi Gloss, B30W651 Series (4.0 mils wet/1.8 mils dry).
 - 2. Egg Shell Finish:
 - a. 1st Coat: S-W Industrial ProCryl Universal Primer, B66-310 Series (5-10 mils wet/2-4 mils dry).
 - b. 2nd Coat: S-W ProGreen 200 Interior Latex Eg-Shel, B20W651 Series (4.0 mils wet/1.6 mils dry).
 - c. 3rd Coat: S-W ProGreen 200 Interior Latex Eg-shel, B20W651 Series (4.0 mils wet/1.6 mils dry).
 - D. Metal (Exposed Structural Steel Columns, Trusses, Beams, Miscellaneous Ornamental Iron and Ferrous Metals).
 - 1. Flat Finish:
 - a. 1st Coat: S-W Industrial ProCryl Universal Primer, B66-310 Series (5-10 mils wet/2-4 mils dry).
 - b. 2nd Coat: S-W ProGreen 200 Interior Latex Flat, B30W651 Series (4.0 mils wet/1.8 mils dry).
 - c. 3rd Coat: S-W ProGreen 200 Interior Latex Flat, B30W651 Series (4.0 mils wet/1.8 mils dry).
 - 2. Egg Shell Finish:
 - a. 1st Coat: S-W Industrial ProCryl Universal Primer, B66-310 Series (5-10 mils wet/2-4 mils dry).
 - b. 2nd Coat: S-W ProGreen 200 Interior Latex Eg-Shel, B20W651 Series (4.0 mils wet/1.6 mils dry).
 - c. 3rd Coat: S-W ProGreen 200 Interior Latex Eg-Shel, B20W651 Series (4.0 mils wet/1.6 mils dry).
 - 3. Semi Gloss Finish:
 - a. 1st Coat: S-W Industrial ProCryl Universal Primer, B66-310 Series (5-10 mils wet/2-4 mils dry).
 - b. 2nd Coat: S-W ProGreen 200 Interior Latex Semi Gloss, B31W600 Series (4.0 mils wet/1.6 mils dry).
 - c. 3rd Coat: S-W ProGreen 200 Interior Latex Semi Gloss, B31W600 Series (4.0 mils wet/1.6 mils dry).
 - E. Wood Surfaces (Windows, Sills, Door Trim, Wall Paneling and other wood surfaces not factory finished or indicated otherwise).
 - 1. Flat Finish:
 - a. 1st Coat: S-W PrepRite ProBlock Latex, B51 Series, (4.0 mils wet/1.4 mils dry).
 - b. 2nd Coat: ProGreen 200 Interior Latex Flat, Series B30W651 (4.0 mils wet/1.8 mils dry).
 - c. 3rd Coat: ProGreen 200 Interior Latex Flat, Series B30W651 (4.0 mils wet/1.8 mils dry).

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2. Egg Shell Finish:
 - a. 1st Coat: S-W PrepRite ProBlock Latex, B51 Series, (4.0 mils wet/1.4 mils dry).
 - b. 2nd Coat: ProGreen 200 Interior Latex Eg-Shel, Series B20W651 Series (4.0 mils wet/1.6 mils dry)
 - c. 3rd Coat: ProGreen 200 Interior Latex Eg-Shel, Series B20W651 Series (4.0 mils wet/1.6 mils dry)
 3. Semi Gloss Finish:
 - a. 1st Coat: S-W PrepRite ProBlock Latex, B51 Series, (4.0 mils wet/1.4 mils dry).
 - b. 2nd Coat: ProGreen 200 Interior Latex Semi-Gloss, Series B31W600 Series (4.0 mils wet/1.6 mils dry)
 - c. 3rd Coat: ProGreen 200 Interior Latex Semi-Gloss, Series B31W600 Series (4.0 mils wet/1.6 mils dry)
 4. Stain and Varnish Satin Finish:
 - a. 1st Coat: S-W MinWax 250 VOC Oil Stain.
 - b. 2nd Coat: Wood Classics® Waterborne Polyurethane Varnish (4mils wet/1.0 mil dry).
 - c. 3rd Coat: Wood Classics® Waterborne Polyurethane Varnish (4mils wet/1.0 mil dry).
- F. Drywall and Plaster Surfaces (Walls, columns, ceilings, soffits, bulkheads, light shelves and soffits).
1. Flat Finish:
 - a. 1st Coat: ProGreen 200 Interior Latex Primer, Series B28W8200 Series (4.0 mils wet/1.5 mils dry).
 - b. 2nd Coat: ProGreen 200 Interior Latex Flat, Series B30W651 Series (4.0 mils wet/1.4 mils dry).
 - c. 3rd Coat: ProGreen 200 Interior Latex Flat, Series B30W651 Series (4.0 mils wet/1.4 mils dry).
 2. Egg Shell Finish:
 - a. 1st Coat: ProGreen 200 Interior Latex Primer, Series B28W8200 Series (4.0 mils wet/1.5 mils dry).
 - b. 2nd Coat: ProGreen 200 Interior Latex Eg-Shel, Series B30W651 Series (4.0 mils wet/1.6 mils dry).
 - c. 3rd Coat: ProGreen 200 Interior Latex Flat, Series B30W651 Series (4.0 mils wet/1.6 mils dry).
 3. Semi Gloss Finish:
 - a. 1st Coat: ProGreen 200 Interior Latex Primer, Series B28W8200 Series (4.0 mils wet/1.5 mils dry).
 - b. 2nd Coat: ProGreen 200 Interior Latex Semi-Gloss, Series B31W600 Series (4.0 mils wet/1.6 mils dry).
 - c. 3rd Coat: ProGreen 200 Interior Latex Semi-Gloss, Series B31W600 Series (4.0 mils wet/1.6 mils dry).
- G. Epoxy System (Water Base)
1. Gloss Finish
 - a. 1st Coat: S-W ProGreen 200 Interior Latex Primer, B28W600 (4-mil wet, 1.5-mil dry)
 - b. 2nd Coat: S-W Waterbased Catalyzed Epoxy, B70W211 / B60V15
 - c. 3rd Coat: S-W Waterbased Catalyzed Epoxy, B70W211 / B60V15 (2.5 - 3-mil dry per coat)

END OF SECTION

10

DIVISION

SPECIALTIES

SECTION 10 14 00
SIGNAGE

PART 1 GENERAL

1.1 RELATED DOCUMENTS

- A. The provisions of the General Conditions, Supplementary Conditions, Drawings, Specifications, and the Sections included under Division 1, General Requirements and References are included as a part of this Section as though bound herein.

1.2 SECTION INCLUDES

- A. Provide labor, materials, services, and equipment necessary to furnish and install work as indicated and as specified herein, which includes, but is not limited to:
 - 1. Tactile/raised letter plastic signs
 - 2. Individual plastic characters signs
 - 3. Signs of silk-screened characters on plastic
 - 4. Required sign type:
 - a. Interior room, space, and area ID signs
 - b. International symbols of accessibility for accessible spaces and exits
 - c. Accessible routes
 - d. Tactile "exit" signs
 - e. Hazard and safety signs
 - f. Evacuation plans

1.3 REFERENCES

- A. ANSI A117.1 – Specifications for Making Buildings and Facilities Accessible To and Usable By Physically Handicapped People
- B. FBC – Florida Building Code
- C. NFPA 101: 7.10.1.3

1.4 SUBMITTALS

- A. Submit shop drawings as specified.
- B. Indicate sign styles, lettering font, foreground and background colors, locations, overall dimensions of each sign and anchorage.
- C. Provide complete interior sign schedule showing sign type, location, and verbiage.
- D. Samples: Submit two sample signs in size illustrating type, style, letter font, and colors specified, and method of attachment.
- E. Provide manufacturer's installation instructions, templates, and attached devices.
- F. Colors shall be as selected by the Architect.

1.5 QUALIFICATIONS

- A. Manufacturer: Company specializing in manufacturing the products specified in this section with minimum three years documented experience.

1.6 REGULATORY REQUIREMENTS

- A. Conform to applicable codes for requirements for the physically handicapped, safety and egress.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Deliver, store, protect, and handle products to site.
- B. Package signs, labeled in name groups
- C. Store adhesive attachment tape at ambient room temperatures

1.8 ENVIRONMENTAL REQUIREMENTS

- A. Do not install signs when ambient temperature is lower than recommended by manufacturer.
- B. Maintain this minimum temperature during and after installation of signs.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturer shall be one of the following however products of other manufacturers will be considered for acceptance provided they equal or exceed the material requirements and functional qualities of the specified product and acceptance is provided by the architect in writing prior to bidding.
 - 1. ASI Sign Systems, Indianapolis, Indiana; Cincinnati, Ohio; Cleveland, Ohio
 - 2. Andco Industries Corp., Greensboro, North Carolina
 - 3. Baron Signs, Lake Park, Florida
 - 4. Multi-Graphics, Inc. Pelham, Georgia

2.2 FLORIDA AMERICANS WITH DISABILITIES ACT REQUIREMENTS

- A. Manufacturer shall conform to tactile, Braille, letter size, and other requirements as required by Florida Accessibility Code for Building Construction and ANSI A117.1.
- B. ADA requirements supersede technical specifications in this Section.

2.3 BUILDING SIGNAGE – GENERAL

- A. General; applies to all signs except as noted:
 - 1. Material shall be minimum 1/8" clear matte acrylic stock with 3/8" radius corners.
 - a. Interior signs – Shall be material of non-petroleum base phenolic resin using sand carving process to create the raised lettering, which is an integral part of the sign.
 - b. Paint shall be Matthews Acrylic Polyurethane system or equal.
 - i) Shall be low VOC
 - ii) Shall be UV Stable
 - iii) Shall be lead and chromate free
 - iv) Minimum life expectancy of 10-years
 - 2. Applied lettering not allowed.
 - 3. Letters and background colors selected by Architect from manufacturer's standard colors.
 - 4. Mounting:
 - a. Shall be with adhesives and non-removable oval head screws.
 - b. Mount at locations as directed by Architect.

- c. Mount at 60" above finished floor to the center of the sign.
 5. Graphic Process with Braille in one of the following, but no applied lettering method allowed:
 - a. Provide raised (photopolymer process)
 - b. Engraved letters
 - c. Sand craved process
 6. Letters:
 - a. Letters and numbers shall have width to height ratio between 3:5 and 1:1 and stroke width to height ratio between 1:5 and 1:10.
 - b. Letters and numbers to be raised $\frac{1}{32}$ " upper case sans serif font with Grade 2 Braille.
 - c. Raised characters shall be $\frac{5}{8}$ " high minimum and 2" high maximum.
 - d. Pictograms shall have the equivalent verbal description directly below the pictogram.
 7. Characters and backgrounds must be matte or other non-glaze surface and of contrasting colors.
 8. All signs shall comply with chapter 11 FBC.
- B. Room Name and Number Signs
 1. Provide a sign for each room or space to include name and room number.
 - a. Minimum size of 3" high by 6" wide for signs, longer where nomenclature demands
 2. Mount number as directed by Architect.
 3. All spaces listed in Finish Schedule plus if more than one door is to a space, additional signs will be required one by number of doors to space.
- C. Storage Signs
 1. Provide and install at mechanical and electrical rooms a sign mounted on the door to read as follows: " STORAGE NOT ALLOWED"
 2. Signs shall be matte acrylic plastic, red background with white letters 1 " high by width needed for copy and Braille, with $\frac{3}{8}$ " radius corners.
 3. Mount on doors with non-removable oval head screws verify number signs required.
- D. Toilet Room Handicapped Signs
 1. Furnish and install one sign depicting National Handicapped Symbol (wheelchair) at each toilet room, equipped with facilities for the handicapped.
 - a. Size shall be 6" by 10.5".
- E. Fire Extinguisher, No Exit and Pull Station Sign
 1. Copy to read: "No Exit", "Fire Pull Station Inside", And "Fire Extinguisher Inside"
 2. Red letters, same material, size and mounting as in A. General.
 3. NO EXIT sign shall have letter size as per NFPA 101 section 7.10.8.3.
 4. Braille sign not required for fire extinguisher.
 5. See plans for locations.
- F. Fire Rated/Smoke Partition Labeling
 1. Field label all fire rated walls above ceiling level, with fire rating shown on the construction plans.
 - a. Provide minimum $\frac{1}{2}$ " high block lettering stenciled on wall above finished ceiling, if in a storage, mechanical, electrical, or similar unfinished room, install at approximately 84 inches above floor.
 - b. (*Contractor to use rating from permit plans*) HOUR FIRE RATED WALL, PROTECT ALL OPENING AND THROUGH WALL PENETRATION PER CODE REQUIREMENTS.
 2. Field label all smoke partitions above ceiling level.
 - a. Provide minimum $\frac{1}{2}$ " high block lettering stenciled on wall above finished ceiling, if storage, mechanical, electrical, or unfinished room, install at 84" above floor.

- b. SMOKE PARTITION, PROTECT ALL OPENING AND THROUGH WALL PENETRATION PER CODE REQUIREMENTS.

G. Mechanical, Electrical, Data, and Similar Rooms

- 1. Provide a sign saying "NO STORAGE" meeting the General requirements.
- 2. If these rooms have pair of doors, provide sign saying "THIS DOOR TO REMAIN CLOSED AND LATCHED TOP AND BOTTOM, EXCEPT DURING THE TRANSFER OF EQUIPMENT".
 - a. Sign shall have 1" high block letters and be permanently attached (Attached in way as to maintain the rating of the door) to the inactive door near the latch side 60 inches from finished floor to center of sign.
 - b. Braille not required for this sign.

PART 3 EXECUTION

3.1 INSTALLATION

- A. Install all signs in strict accordance with manufacturer's instructions and FADA requirements.
- B. Room signs to be mounted 60" to center above finish floor on walls adjacent to the latch side of any door opening.

3.2 CLEANING

- A. After installation, thoroughly clean all exposed surfaces and restore all damaged material to its original condition or replaced with new material.

3.3 WARRANTY

- A. This Contractor shall fully guarantee all materials and labor under this section for a period of 5-years from date of final acceptance of the building against all defects in both workmanship and materials and he shall promptly correct and/or replace such faulty work if so notified.

END OF SECTION

SECTION 10 26 00
DOOR AND WALL PROTECTION

PART 1 GENERAL

1.1 RELATED DOCUMENTS

- A. The provisions of the General Conditions, Supplementary Conditions, Drawings, Specifications, and the Sections included under Division 1, General Requirements and References are included as a part of this Section as though bound herein.

1.2 SECTION INCLUDES

- A. Provide labor, materials, services, and equipment necessary to furnish and install work as indicated and as specified herein, which includes, but is not limited to:
 - 1. Corner Guards

1.3 REFERENCES

- A. FBC – Florida Building Code
- B. American Society for Testing and Materials (ASTM)
- C. Underwriters Laboratories (UL)

1.4 SUBMITTALS

- A. Product data and detailed specifications for each system component and installation accessory required, including installation methods for each type of substrate.
- B. Provide shop drawings showing locations, extent and installation details of corner guards.
 - 1. Show methods of attachment to adjoining construction.
- C. Submit the following samples, as proposed for this work, for verification of color, texture, pattern and end cap attachment/alignment:
 - 1. One, 12" long sample of each model specified including end cap and mounting hardware.
- D. Product test reports from a qualified independent testing laboratory showing compliance of each component with requirements indicated.
- E. Maintenance data for wall protection system components for inclusion in the operating and maintenance manuals specified in Division 1.

1.5 QUALITY ASSURANCE

- A. Installer qualifications: Engage an installer who has not less than 3-years experience in installation of systems similar in complexity to those required for this project.
- B. Manufacturer's qualifications: Shall be not less than 5-years experience in the production of specified products and a record of successful in-service performance.
- C. Code compliance: Assemblies shall conform to all applicable and referenced codes.
- D. Fire performance characteristics: Provide wall protection system components with a UL label indicating that they are identical to those tested in accordance with ASTM- E84-91A for Class 1 characteristics listed below:
 - 1. Flame spread 25 or less
 - 2. Smoke developed: 450 or less

- E. Impact Strength: Provide assembled wall protection units tested in accordance with the applicable provisions of ASTM F476 76 and FBC 1608.
- F. Color match, unless otherwise indicated, provide wall protection components that are color matched in accordance with the following:
 - 1. A delta-E difference of no greater than 1.0, using the Hunter (Lab) Scale.
- G. Single source responsibility: Provide all components of the wall protection system manufactured by the same company to ensure compatibility of color, texture, and physical properties.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials to the project site in unopened original factory packaging clearly labeled to show manufacturer.
- B. Store the materials in original, undamaged packaging in a cool, dry place out of direct sunlight and exposure to the elements.
 - 1. Maintain a minimum room temperature of 40° F and max of 100° F.

1.7 PROJECT CONDITIONS

- A. Environmental requirements: Installation areas must be enclosed and weatherproof before installation commences.
- B. Maintain ambient temperature above 65° F during, and for 24 hours after installation.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturer shall be the following however products of other manufacturers will be considered for acceptance provided they equal or exceed the material requirements and functional qualities of the specified product and acceptance is provided by the Architect in writing prior to bidding.
 - 1. Acrovyn

2.2 MATERIALS

- A. Vinyl/Acrylic:
 - 1. Extruded material shall be high impact with pebblette grain texture and thickness of .078" (1.98) thickness with 2" x 2" legs
 - 2. Height: Full height.
 - 3. Chemical and stain resistance shall be per ASTM D-1308 standards.
 - 4. Colors: Match existing or as selected by the Architect.
- B. Aluminum: Extruded aluminum retainers should be 6063-T6 alloy of thickness indicated, with a minimum strength and durability properties as specified in ASTM B221.
- C. Fasteners:
 - 1. Provide non-corrosive fasteners compatible with aluminum retainers.
 - 2. Manufacturer shall supply all necessary fasteners.

2.3 CORNER GUARDS

- A. Surface-mounted corner guards.
 - 1. Surface-mounted guards consisting of continuous aluminum retainer with snap-on cover.

2. Provide color matched end caps for both partial and full height applications.
3. Attachment hardware shall be appropriate for wall construction.

2.4 ACCESSORIES

- A. Fasteners: Size-mounting hardware for required load and substrate conditions.

2.5 FABRICATION

- A. General: Fabricate wall protection systems to comply with requirements indicated for design, dimensions, detail, finish, and member sizes.
- B. Preassemble components in the shop to the greatest extent possible to minimize field assembly.
- C. Fabricate components with tight seams and joints with exposed edges rolled.
 1. Provide surfaces free of chipping, dents, and other imperfections.

2.6 FINISHES

- A. General: Comply with NAAMM "Metal Finishes Manual" for recommendations relative to applications and designations of finishes.
- B. Aluminum mill finish: AA-MIO
- C. Wood Finish: AWI 60-degree gloss per ASTM D523.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verification of conditions:
 1. Examine areas and conditions of work area and identify conditions detrimental to proper or timely completion.
 2. Do not proceed with work until unsatisfactory conditions are corrected.

3.2 PREPARATION

- A. Surface preparation: Prior to installation, clean substrate to remove dirt, debris and loose particles. Perform additional preparation procedures as required by manufacturer's instructions.
- B. Protection: Take all necessary steps to prevent damage to material during installation as required in manufacturer's installation instructions.

3.3 INSTALLATION

- A. Install the work of this section in strict accordance with the manufacturer's recommendations, using only approved mounting hardware, and locating all components firmly into position, level, and plumb.
- B. Adjust installed end caps as necessary to ensure tight seams.
- C. Install at all outside wall corners and set bottom 6" A.F.F.

3.4 CLEANING

- A. General: Immediately upon completion of installation, clean vinyl covers and accessories in accordance with manufacturer's recommended cleaning method.

- B. Remove surplus materials, rubbish, and debris resulting from installation as work progresses and upon completion of work.

3.5 PROTECTION

- A. Protect installed materials to prevent damage by other trades.
- B. Use easily removable materials that do not leaving residue or permanent stains.

END OF SECTION

SECTION 10 73 26
WALKWAY COVERINGS

PART 1 GENERAL

1.1 RELATED DOCUMENTS

- A. The provisions of the General Conditions, Supplementary Conditions, Drawings, Specifications, and the Sections included under Division 1, General Requirements and References are included as a part of this Section as though bound herein.

1.2 SECTION INCLUDES

- A. Provide labor, material, services, and equipment necessary to furnish and install work as indicated and as specified herein, which includes, but is not limited to:
 - 1. Extent of aluminum walkway canopy, fascia and trim covers, columns, and accessories required for complete and functioning walkway canopy system.
 - 2. Design, fabricate and install welded, extruded aluminum walkway covers with protective finish and illumination of covered areas.
 - 3. Canopy system shall include integral water drainage system.
 - 4. Canopy system shall include footing design.

1.3 RELATED DOCUMENTS

- A. Section 01 25 13 – Substitution Procedures
- B. Section 01 31 13 – Project Coordination
- C. Section 01 33 00 – Submittal Procedures
- D. Section 01 42 00 – References
- E. Section 01 45 00 – Quality Control
- F. Section 01 66 00 – Product Storage and Handling Requirements
- G. Section 01 78 00 – Closeout Submittals
- H. Section 31 00 00 – Earthwork
- I. Section 03 30 00 – Cast-in-Place Concrete
- J. Section 04 21 13 – Brick Masonry
- K. Section 04 22 00 – Concrete Unit Masonry
- L. Section 07 62 00 – Sheet Metal Flashing and Trim
- M. Section 07 92 00 – Joint Sealants
- N. Section 26 05 33 – Raceways and Boxes for Electrical Systems
- O. Section 26 56 00 – Exterior Lighting

1.4 REFERENCES

- A. Comply with Section 01 42 00 – References for additional applicable references and codes, abbreviations, definitions and acronyms.
- B. Florida Building Code, 5th Edition.
- C. American Architectural Manufacturers Association (AAMA):
 - 1. AAMA Specification AA-M-10C-22A-21
- D. ANSI/ASCE 7-10 - Wind Loads.
- E. American Society of Testing Materials (ASTM):

1. ASTM B221-14: Standard Specification for Aluminum and Aluminum-Alloy Extruded Bar, Rod, Wire, Profiles, and Tube.
2. ASTM B211-12e1: Standard Specification for Aluminum and Aluminum Alloy Rolled or Cold Finished Bar, Rod and Wire

1.5 SUBMITTALS

- A. Comply with Section 01 33 00 – Submittal Procedures.
 1. Submit shop drawings including plans, elevations and details, with dimensions and grades, for approval by Architect.
 2. Submit manufacturer's product information, specifications and installation instructions for review by Architect.
 3. Submit design calculations for canopy system and footings signed by a Professional Engineer, registered in the State of Florida, verifying the walkway cover system design meets wind loading per Fig. 1609 of FBC and requirements of ASCE 7-10, live and dead loads, footings and other load requirements.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Comply with Section 01 66 00 – Product Storage and Handling.
- B. Deliver, store and protect products as instructed by manufacturer.
 1. Promptly inspect shipment to assure the products comply with requirements, quantities are correct, and products are undamaged.
 2. Stack materials to prevent twisting, bending, or abrasion, and to provide ventilation. Slope metal sheets to ensure drainage.
 3. Prevent contact with materials during storage, which may cause discoloration or staining.

1.7 QUALITY ASSURANCE

- A. Comply with Section 01 45 00 – Quality Control.
- B. Aluminum walkway system shall be from one manufacturer.
- C. Manufacturer shall specialize in aluminum walkway systems with minimum five years documented experience in manufacturing walkway system products.
 1. Installer shall be company with minimum five continuous years documented experience in erecting walkway system products, and be approved as certified installer by manufacturer.

1.8 WARRANTY

- A. Provide five-year warranty to include coverage for structural integrity, water tightness and finish beginning from date of Substantial Completion.

1.9 PERFORMANCE

- A. Delegated-Design: For the canopy system including footings to comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified Florida registered professional engineer responsible for their preparation.

PART 2 PRODUCTS

2.1 APPROVED MANUFACTURERS

- A. Dittmar Architectural Aluminum, 1006 Shepard Rd., Winter Springs, FL 32708-2018, Tel: 1-800-822-1755; Fax: (407) 695-4430, Website: www.dittdeck.com.
- B. Perfection Architectural Aluminum, 2310 Mercator Dr., Orlando, FL 32807, Tel: (407) 671-6225, Fax: (407) 671-8252, Website: www.perfectionarch.com.
- C. Peachtree Protective Covers, Inc., 1477 Rosedale Dr., Hiram, GA 30141, Tel: (770)439-2120, Fax: (770) 439-2122, Website: www.peachtreecovers.com.
- D. Other manufacturers shall comply with Section 01 25 13 – Product Substitution Procedures.

2.2 COMPONENTS

- A. Aluminum members: Extruded aluminum alloy 6063, heat treated to T-6 temper.
- B. Finish: Satin anodized 204-R1 complying with Aluminum Association Specification AA-M-10C-22A-21.
- C. Columns: Radius-cornered tubular extrusions with cutout and internal diverter for drainage.
- D. Beams: Open-top tubular extrusions; thickened top edges designed to receive deck members in self-flashing manner.
- E. Extruded structural ties: Installed in top of beams.
- F. Deck: Extruded self-flashing sections interlocking into composite unit with camber to offset dead load deflection providing positive drainage.
- G. Welded plates: Closures at deck ends.
- H. Fascia: Manufacturer's standard shape, 0.04" (1.016mm) aluminum.
- I. Fasteners: Aluminum, 18-8 non-magnetic stainless steel, 300 series stainless steel, or 410 stainless steel sealed with neoprene "O" ring seals beneath 0.625" (15.875mm) outside diameter conical washers.
- J. Fascia rivets: 0.1875" (4.7265mm) x 0.50" (12.7mm) grip range aluminum rivets with aluminum mandrel.
- K. Aluminum columns embedded in concrete shall be protected with clear acrylic.
- L. Grout shall be 2,000-psi (13,789.5kPa) compressive strength; concrete 3,000-psi (20,684.3kPa), and reinforcing per Specification Section 03 21 00 – Reinforcement Bars.
- M. Gaskets shall be dry seal pressure type of manufacturer's standard material.

2.3 FABRICATION

- A. Beams and columns:
 - 1. Factory welded with mitered corners into one-piece rigid bents.
 - 2. Welds shall be smooth and uniform using inert gas shielded arc, with 100% penetration.
 - 3. Grind welds where interfering with adjoining structure to ensure flush connection.
 - 4. Field welding is not permitted.
- B. Rigid mechanical joints shall be used when shipping size limitations occur.
- C. Deck shall be extruded modules that interlock to provide self-flashing.
- D. Interlocking joints shall be positively fastened at eight inches on center to form monolithic structural unit to develop full strength of sections.
- E. Fastenings shall have minimum shear strength of 350 pounds each.
- F. Deck shall be assembled with sufficient camber to offset dead load deflection and provide positive drainage.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Examine areas and conditions where walkway covers are to be installed. Notify Contractor/CM of unsatisfactory conditions prior to starting work.
- B. Start of work indicates acceptance of existing site conditions.
- C. Confirm bent locations, dimensions and elevations indicated on shop drawings prior to fabrication.

3.2 ERECTION

- A. Comply with manufacturer's written installation instructions.
- B. Walkway covers shall be erected true to line, level and plumb. Aluminum columns in concrete shall be protected with clear acrylic coating to prevent electrolytic reaction.
- C. Sleeves shall be furnished by walkway cover manufacturer and installed by Contractor/CM.
- D. Downspout columns shall have welded water diverters or shall be filled with grout to level of discharge to prevent standing water.
- E. Non-draining columns shall have weep-holes at concrete grade level to remove condensation.
- F. Water discharge shall not be allowed to drain across walkways.
- G. Concrete splash blocks shall be provided in size and location to prevent washout of lawn or landscape.
- H. Grade adjacent area for water to drain away from walkways.
- I. Light fixtures shall be located on columns. Coordinate with electrical contractor. Provide aluminum cover panels to match column dimensions and finishes.
- J. Wiring to lighting fixtures shall be run underground in conduits into covered wiring panel chases. Devices, screws, bolts, crimps conduits, connections and fasteners shall be concealed.

3.3 CLEANING

- A. Walkway components shall be cleaned and debris removed upon completion.

3.4 PROTECTION

- A. Protect materials during and after installation. Remove and replace damaged and defective members.
- B. Provide warning tape or other method of barriers that identifies that access to area is unauthorized until work is complete.

END OF SECTION

12

DIVISION

FURNISHINGS

SECTION 12 21 16
VERTICAL LOUVER BLINDS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. The provisions of the General Conditions, Supplementary Conditions, Drawings, Specifications, and the Sections included under Division 1, General Requirements and References are included as a part of this Section as though bound herein.

1.2 SUMMARY

- A. Section Includes:
 - 1. Provide labor, material, services, and equipment necessary to furnish and install work as indicated and as specified herein, which includes, but is not limited to:
 - a. Vertical louver blinds.

1.3 REFERENCES

- A. ASTM E84 – Standard Methods of Fire Tests for Flame Propagation of Textiles and Films.
- B. CPSC – U.S. Consumer Product Safety Commission.
- C. WCSC – Window Covering Safety Council.
- D. FBC – Florida Building Code.

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Shop Drawings: For louver blinds include fabrication and installation details.
- C. Samples: For each exposed product and for each color available, 12 inches long. Include samples of accessories involving color selection.

1.5 INFORMATIONAL SUBMITTALS

- A. Product Test Reports: For vertical louver blinds with polymer louvers that have been tested for compliance with NFPA 701 for tests performed by a qualified testing agency.

1.6 QUALITY CONTROL

- A. Manufacturer's Qualifications: Provide products from a firm that makes the indicated products as a regular production item and with not less than ten (10) years experience.
- B. Installer Qualifications: An entity that employs installers and supervisors who are trained and approved by manufacturer for both installation of specified materials and assemblies with not less than five (5) years experience.

1.7 MAINTENANCE MATERIAL SUBMITTALS

- A. Furnish extra materials, from the same product run, that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Louver Blinds: Full-size units equal to 5 percent of quantity installed for each size, color, texture, pattern, and finish indicated, but no fewer than two (2) units.

1.8 DELIVERY, STORAGE, AND HANDLING

- A. Deliver vertical louver blinds in factory packages, marked with manufacturer and product name, and location of installation using same designations indicated on Drawings.
- B. Products shall be handled and stored to prevent damage to materials, finishes and operating mechanisms.

1.9 FIELD CONDITIONS

- A. Environmental Limitations: Do not install louver blinds until construction and wet-work and finish work in spaces, including painting, is complete and dry and ambient temperature and humidity conditions are maintained at the levels indicated for Project when occupied for its intended use.
- B. Field Measurements: Where louver blinds are indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication and indicate measurements on Shop Drawings. Allow clearances for operating hardware of operable glazed units through entire operating range. Notify Architect of installation conditions that vary from Drawings. Coordinate fabrication schedule with construction progress to avoid delaying the Work.

1.10 WARRANTY

- A. Warranty: Manufacturer shall warrant the product against defects in materials or workmanship and agrees to repair or replace components that fail within specified warranty period. The warranty period shall commence at the time of substantial completion and extend for a period of three (3) years.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturer shall be the following however products of other manufacturers will be considered for acceptance provided they equal or exceed the material requirements and functional qualities of the specified product and acceptance is provided by the Architect in writing prior to bidding.
 1. Springs Window Fashions LLC

2.2 VERTICAL LOUVER BLINDS

- A. Basis of Design: "Graber G-71 Super-Vue"
- B. Louvers: Louvers shall be solid PVC crowned louver 3-1/2" wide.
- C. Headrail: Channel, extruded aluminum alloy 6063-T5 with long edges returned or rolled and ends capped. Headrail shall be 1-15/16" wide by 1-3/8" high with average wall thickness of .050" and encloses operating mechanisms including carrier-spacing mechanism that provides uniform vane spacing when blinds are traversed fully across headrail with satin finish.

- D. Carriers shall be made of molded acetyl and traverse on self-lubricated wheels for smooth operation. Carriers shall be centrally located making the headrail reversible. Stems shall be made of clear, non-yellowing, UV-stabilized nylon and are impact-resistant. Carriers and stems shall be replaceable without demounting the headrail.
- E. Rotation control shall consist of #10 nickel-plated steel bead chain and a dual rack and pinion gear system providing 180° direct rotation. The pinion rod shall be extruded aluminum 0.30" diameter. Standard E-Z Open™ feature will automatically rotate louvers to the open position when the traverse cord is operated.
- F. Traversing control shall be a pantograph system made of hard-tempered, 18 gauge (0.046") plated steel, ensuring precise and proportional louver spacing. Traverse cord is #3 braided polyester with a fiberglass core, 0.094" diameter and is equipped with a cord weight and cord clip. The cord clip is anchored to the wall or window jamb during installation in accordance with CPSC recommendations.
- G. Valance: Manufacturer's standard with vane insert.
- H. Mounting Brackets: With spacers and shims required for blind placement and alignment indicated. Provide intermediate support brackets to produce support spacing recommended by blind manufacturer for weight and size of blind.

2.3 LOCATION

- A. Location: As indicated on the drawings.

2.4 FINISH

- A. Vane Colors: See Drawings for selection or as selected by Architect.
- B. Components: Provide materials exposed to view matching or coordinating with vanes unless otherwise indicated.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances, operational clearances, and other conditions affecting performance of the Work.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. Install vertical louver blinds level and plumb, aligned and centered on openings, and aligned with adjacent units according to manufacturer's written instructions.
- B. Locate so exterior vane edges are not closer than 2 inches from interior faces of glass and not closer than 1-1/2 inches from interior faces of glazing frames through full operating ranges of blinds.
- C. Install mounting and intermediate brackets to prevent deflection of headrails.
- D. Install with clearances that prevent interference with adjacent blinds, adjacent construction, and operating hardware of glazed openings, other window treatments, and similar building components and furnishings.

3.3 ADJUSTING

- A. Adjust vertical louver blinds to operate free of binding or malfunction through full operating ranges.

3.4 CLEANING AND PROTECTION

- A. Clean vertical louver blind surfaces after installation according to manufacturer's written instructions.
- B. Provide final protection and maintain conditions in a manner acceptable to manufacturer and Installer that ensures that louver blinds are without damage or deterioration at time of Substantial Completion.
- C. Replace damaged vertical louver blinds that cannot be repaired in a manner approved by Architect before time of Substantial Completion.

END OF SECTION 12 21 16

SECTION 12 48 12
ENTRANCE FLOOR MATS

PART 1 GENERAL

1.1 RELATED DOCUMENTS

- A. The provisions of the General Conditions, Supplementary Conditions, Drawings, Specifications, and the Sections included under Division 1, General Requirements and References are included as a part of this Section as though bound herein.

1.2 SECTION INCLUDES

- A. Provide labor, materials, services, and equipment necessary to furnish and install work as indicated and as specified herein, which includes, but is not limited to:
 - 1. Surface-type foot grille mats.

1.3 SUBMITTALS

- A. Submit manufacturer's specifications and installation instructions for each type of entrance mat.
- B. Include methods of installation for each type of substrate.
- C. Submit samples for each type and color of exposed entrance mat, frames, and accessories required.
- D. Provide 12" square samples of mat materials and 12" lengths of frame members.

1.4 MAINTENANCE DATA

- A. Maintenance Data: Submit manufacturer's printed instructions for cleaning, drying, maintaining, and re-handling of removable entrance mat units.

1.5 FIELD MEASUREMENTS

- A. Verify that field measurements are as indicated on shop drawings.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturer shall be the following however products of other manufacturers will be considered for acceptance provided they equal or exceed the material requirements and functional qualities of the specified product.
 - 1. Forbo Entrance Systems

2.2 MATERIALS AND FABRICATION

- A. General: Provide colors/patterns/profiles of materials, including metals and metal finishes, as indicated on drawings or by this specification or, where not indicated, as selected by Architect from manufacturer's standard colors/ patterns/ profiles.

1. Shop-fabricate the entrance mat work to greatest extent possible, in sizes as indicated on plans.
 2. Where not otherwise indicated, provide single unit for each mat installation, but do not exceed manufacturer's maximum size recommendation for units intended for removal and cleaning.
 3. Where joints in mats are necessary, space them symmetrically and away from normal traffic lanes.
 4. Miter corner joints in framing elements, with hairline joints, or provide prefabricated corner units without joints.
 5. Where possible, verify sizes by field measurement prior to shop fabrication.
- B. Entrance Mat Systems:
1. Provide model Forbo coral mats entrance system approved equal.
 2. Vinyl edge accessories to accommodate mat application as indicated per manufacturer.
 3. All building entrance doors shall have mats provided except for mechanical/electrical room doors.
 4. All entrance mats are to provide 6'-0" minimum travel length in accordance with LEED – EQ Credit 5.
 5. Color: As selected by the Architect from the manufacturer's standard color palette. Provide samples for approval.
 6. Mat size shall be 6'-0" deep and 6" wider than the door opening on each side.
 7. The Contractor is to verify quantity of mats to be provided.

PART 3 EXECUTION

3.1 INSTALLATION

- A. Install surface-type units to comply with manufacturer's instructions, at locations indicated and coordinated with entrance locations and traffic patterns.
1. Anchor the fixed surface type frame members to floor with devices spaced as recommended by manufacturer.

END OF SECTION

21

DIVISION

FIRE SUPPRESSION

SECTION 21 00 02
FIRE SUPPRESSION SYSTEMS – PERFORMANCE BASED

PART 1 - GENERAL

1.1 SYSTEM DESCRIPTION

- A. Layout and provide automatic wet pipe fire sprinkler system in accordance with but not limited to NFPA 101, NFPA 13, local and county codes and all applicable codes set forth by the Authority Having Jurisdiction. Discharge from individual heads in the hydraulically most remote/demanding areas shall be hydraulically calculated to an acceptable margin of safety not less than 10 psi for growth and fluctuation in the available water supply of the area. Each system shall include materials, accessories, and equipment inside and outside the building to provide each system complete and ready for use. Design and provide each system to give full consideration to blind spaces, piping, electrical equipment, ducts, HVAC equipment, access space needed for maintenance of equipment and other construction and equipment in accordance with detailed working drawings to be submitted for approval. Locate sprinkler heads in a consistent pattern with ceiling grid, lights, diffuser, registers and grilles. Provide sprinkler heads and piping system layout. Devices and equipment for fire protection services shall be U.L. listed or F.M. approved for use in wet pipe system.

1.2 QUALITY ASSURANCE

- A. Qualification of installers.
 - 1. The entire fire protection system shall be fabricated, installed and tested by a company approved by owner. Contractor shall qualify himself as to experience, insurability and capability by submitting an “AIA” and a 306 contractor’s qualification statement. Satisfactory completion of similar projects is required.
- B. All fire protection systems and equipment shall conform to the applicable standards and requirements of the following:
 - 1. Sprinkler systems: NFPA 13, 2013
 - 2. Florida Administrative code 61G15-32.003 and 61G15-32.004.
 - 3. Florida Building Code, 2017
 - 4. Life Safety Code - NFPA 101, 2015
 - 5. Florida Fire Prevention Code, 2017
 - 6. Local codes or standards incorporated by the authority having jurisdiction.
 - 7. All components shall be U.L. listed and FM (Factory Mutual) approved and labeled where applicable.
 - 8. Installation of sprinkler system components shall be per the more stringent or either U.L. listed or FM (Factory Mutual) approved installation requirements.
 - 9. The entire fire protection system shall be approved by the authority having jurisdiction. Any adjustments or additions to this system required to secure the approvals, shall be part of the work of this Section.

1.3 SUBMITTALS

- A. Working plans shall be submitted by a State of Florida license fire protection contractor.
- B. Working plans shall be drawn on sheets of uniform size at a scale of not less than 1/8" - ft., with plan of each floor on reproducible material, and shall show the following data:
 - 1. Name of Owner and Occupant.

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2. Location, including street address.
 3. Point of compass.
 4. Ceiling construction.
 5. Full height cross section.
 6. Location of fire walls.
 7. Location of partitions.
 8. Occupancy of each area or room.
 9. Location and size of concealed spaces and closets.
 10. Any questionable small enclosures in which no sprinklers are to be installed.
 11. Size of city main in street, pressure and whether dead-end or circulating and, if dead-end, direction and distance to nearest circulating main, city main test results.
 12. Other sources of water supply, with pressure or elevation.
 13. Make, type and nominal orifice size of sprinkler.
 14. Temperature rating and location of high temperature sprinklers.
 15. Total area protected by each system on each floor.
 16. Number of sprinklers on each riser per floor.
 17. Make, type, model and size of each valve.
 18. Make, type, and location of each interior and exterior alarm as required by local Code.
 19. Total number of sprinklers on each system.
 20. Approximate capacity in gallons of each system.
 21. Pipe type and schedule of wall thickness.
 22. Nominal pipe size and cutting lengths of pipe.
 23. Location and size of riser nipples.
 24. Type of fittings and joints and location of all welds and bends.
 25. Type and locations of hangers and sleeves.
 26. All control valves, check valves, drain pipes and test pipes.
 27. Size and location of hand hose, hose outlets and related equipment.
 28. Make, type, model and size of all fire department connections.
 29. Underground pipe size, length, location, weight, material, points of connection to city main; type of valves, meters and valve pits; and the depth that the top of pipe is laid below finished grade.
 30. Provisions for flushings.
 31. Hydraulic data nameplate with name and address of contractor.
 32. Cross connection protection devices as required by the local authority.
 33. Drawings, cuts and catalog information showing manufacturer name, product numbers, or other means of identification, of all pipe, fittings, valves, and other materials, dimensions, weight, performance, etc., of all equipment. All information shall be submitted on reproducible copies.
 34. Schedules of all material showing manufacturer.
 35. Drawings and details showing pumps, jockey pumps, controls, mains, risers, drains, runs, branches, valves, alarms, fire hose racks, etc., for complete fire protection system.
 36. In addition to submittals to the authority having jurisdiction furnish to the Architect copies of working plans in quantities for review and comment. Any adjustments to the installation or materials of the system required by the Architect as noted on the plans shall be part of the work of this section.
- C. Approval of the complete system shall be obtained from the authorities having jurisdiction, and a copy of the same shall be delivered to the Owner's representative for delivery to owner.

1.4 APPROVAL

- A. The installer shall perform all required acceptance tests, complete the contractor's material and test certificate and forward the certificates to the authority having jurisdiction prior to asking for approval of the installation.
- B. The general contractor & the Owner's authorized representative shall schedule all inspections with the AHJ and the AHJ shall be given a 24 hour prior to any requested inspection.
- C. When the authority having jurisdiction desires to be present during the conduct of acceptance tests, the installer shall give advance notification of the time and date the testing will be performed.
- D. All acceptance tests shall be in strict compliance with NFPA #13, Chapter 16 'Acceptance Tests' including, but not limited to the following:
 - 1. All piping and attached appurtenances subjected to system working pressure shall be hydrostatically tested at 200 psi (13.8 bar) and shall maintain that pressure without loss for 2 hours.
 - 2. Contractor must fill out the "Contractor's Material and Test Certification for Aboveground Piping" and submit to the Building Department and Engineer, as stated in Figure 16.1 of NFPA Chapter 16.
 - 3. Portions of systems normally subject to system working pressures in excess of 150 psi (10.4 bar) shall be tested as described in NFPA 13-16.2.2.1 at a pressure of 50 psi (3.5 bar) in excess of system working pressure.
 - 4. Loss shall be determined by a drop in gauge pressure or visual leakage.
 - 5. The test pressure shall be read from a gauge located at the low elevation point of the system or portion being tested.
 - 6. Additives, corrosive chemicals such as sodium silicate, or derivatives of sodium silicate, brine, or other chemicals shall not be used while hydrostatically testing systems or stopping leaks.
 - 7. Provisions shall be made for the proper disposal of water used for flushing or testing.

PART 2 - PRODUCTS

2.1 EQUIPMENT

- A. Provide sprinkler heads of type indicated and to suit each location. Types noted on drawings.
- B. Sprinkler heads in areas with ceilings shall be the pendent type, white finish with two-piece escutcheon plates. All other heads to be brass finish. Sprinkler head guards are to be installed in areas where heads are exposed to damage.
- C. Sprinkler heads in areas with no ceiling (no tiles or gypsum board) shall be a brass upright sprinkler type. Sprinkler head guards shall be installed in areas where heads are exposed to damages.
- D. Side wall heads mounted on a wall or soffit shall be provided with white finish.
- E. Teflon pendent sprinklers shall be installed in areas prone to high moisture (showers, locker Rooms, etc).
- F. Corrosion resistant sprinklers shall be installed in areas prone to corrosion.
- G. Pendent sprinklers shall be installed in all areas with lay-in ceilings. Sprinkler shall be located in the center of the tile.
- H. Orifice size for all sprinkler heads shall be 1/2 inch unless conditions occur which will require another size.
- I. Sprinkler pipe hangers and supports shall be subject to applicable requirements of NFPA 13.

- J. Provide a surface mounted cabinet at system riser location with spare heads of each type used and wrenches to fit heads in accordance with NFPA 13.
- K. Provide a siamese connection branded "AUTO. SPKR." with caps and chains, check valve and ball drip as directed by the local official for connection by the fire department.
- L. Provide water motor gong.
- M. Provide all appropriate signage to properly identify all fire protection system components.
- N. All manufacturers' instruction on installation, operation and maintenance shall be provided to owner upon completion of installation.

2.2 MATERIALS

- A. Product Handling:
 - 1. Protection: Use all means necessary to protect fire sprinkler system materials before, during and after installation and to protect the installed work of all other trades.
 - 2. Replacements: In the event of damage, immediately make all repairs and replacements necessary to the approval of the Architect and at no additional cost to the Owner.
- B. Steel Piping:
 - 1. Pipe shall be new, designed for 175 psi working pressure, conforming to ASTM specifications and have the manufacturers name and brand, along with the applicable ASTM standard, marked on each length of pipe.
 - a. Overhead – Steel piping shall be black or galvanized steel.
 - 1) Standard Wall: Overhead piping to be black steel, electric resistance welded and shall comply to the specifications of ASTM-135. Piping 2-1/2" and larger to be schedule 10 and 2" and smaller to be Schedule 40. All pipe and fittings to be in accordance with NFPA.
 - 2) Thin Wall: Overhead pipe sizes of 2-1/2" and larger for welded and seamless type specified in ASTM A 53-80 used in welded systems shall have a minimum pipe wall thickness for pressures up to 300 psi as follows: Schedule 10 in sizes up to 5-inch; 0.134 inches for 6-inch; and 0.188 inches for 8-inch pipe. Pipe ends shall be roll grooved or welded in accordance with NFPA 13.
 - b. Underground: Ductile iron pipe to be utilized under the building to a point 5'-0" outside the building line. All underground fittings to be mechanical joint per NFPA A24. Refer to civil specifications for site underground piping materials.
- C. Fittings:
 - 1. Changes in direction shall be accomplished by the use of fittings suitable for use in sprinkler systems and defined in NFPA 13. Bushings shall not be used unless written approval is obtained from the Engineer.
 - a. Steel Pipe Fittings:
 - 1) Fittings shall withstand a cold water working pressure of not less than 175 psi and shall be cast or malleable iron in compliance with the NFPA Standards. Victaulic fittings are equally acceptable.
 - 2) Fittings for pipe size 2" and under shall be screwed and for pipe sizes 2-1/2" and over may be grooved coupling or flanged to suit the NFPA requirements.
 - 3) Flanged fittings shall be cast iron, short body, Class 125, black and in accordance with ANSI B 16.1. Gaskets shall be full face on 1/8 inch minimum thickness red sheet rubber. Flange bolts shall be hexagon head nuts, cadmium plated, having dimensions in accordance with NSI B 18.2.
 - 4) Weld fittings shall be steel, standard weights, black and in accordance with ANSI B 16.9, ANSI B 16.25, ANSI B16.11 and ASTM A 234.

- 5) Grooved couplings and mechanical fittings shall be malleable iron, 500 psi working pressure, in accordance with ASTM A 47. The couplings gasket material shall be butyl rubber. Grooved couplings and mechanical fittings shall be tested and listed by UL and/or FM and products of the same manufacturer.
 - 6) Push-on fittings shall not be used.
- D. Shut-Off Valves:
1. Except as hereinafter specified, valves used on the system shall be 175 lbs. UL listed and approved by FM Insurance Group.
 2. All control valves shall be butterfly type with grooved or wafer body. Valve shall be of the indicator type and UL/FM approved. Central Mode BFV or equal.
 3. Check valves shall be UL and FM approved swing check type for 175 psi pressure, as manufactured by Crane, Jenkins or Victaulic.
 4. Valves, where noted, shall be supervised type. Supervisory switches at the valve shall be as manufactured by Potter Electric Signal & Mfg., Co. Ltd. Model OSTS-B or PTS to suit valve size with two (2) sets of form 'C' contacts for remote monitoring switches shall be UL and FM approved.
 5. Wiring from the supervised valve up to and including the supervisory annunciator will be done under the Electrical Division 26.
- E. Riser Check Valves and Flow Indicators:
1. Riser check valve assemblies shall be provided complete with gate valves, test connections, pressure gauges and flow switches.
 2. Provide flow indicators where shown and as manufactured by Grinnell Co., or Potter Electric.
 3. Flow switches shall be provided with two (2) sets of form 'C' (SPDT) contacts.
 4. Alarm check valves and flow indicators will be connect to the fire alarm system under Electrical Division 26.
 5. Riser check valves for wet system shall be as manufactured by Automatic Sprinkler Company, Viking Sprinkler Company, Grinnell Company, Star Sprinkler Corporation and/or Reliable Automatic Sprinkler Company.
- F. Drains for Test Connections: Provisions shall be made to run drain line from sprinkler test connection to the outside of the building.
- G. Alarm Systems:
1. Provide one normally open and one normally closed 120 volt A.C., rated alarm contacts on the alarm valves.
 2. Alarm contacts to the fire alarm annunciator will be connected under Electrical Division 26, including wiring, conduit and annunciator.

PART 3 - EXECUTION

3.1 SYSTEM DESIGN CONDITIONS

- A. The sprinkler piping shall be hydraulically designed and shall be governed by NFPA #13, Chapter 7, Hydraulically Designed Sprinkler Systems.
- B. Coordinate setting of equipment with the requirements of other trades so as to avoid conflicts and to insure compatibility. Equipment shall not block access for installation of other equipment.
- C. Set base mounted equipment on permanent and finished supports. Temporary support, if any, shall be removed prior to making final pipe connections to equipment.
- D. Adjust suspended equipment to final elevation prior to making pipe connections.
- E. Exercise caution during equipment placing operations to insure that structure is not overloaded.

- F. Installation of the fire protection systems shall be entrusted to none but fully experienced workers. The fire protection system shall be installed by responsible parties equipped to do the work under the approved detailed plans and specifications.
- G. Provide sleeves and escutcheon plates at all pipe/wall penetrations.
- H. All surfaces shall be protected during installation and testing of system.
- I. During progress of work, maintain an accurate record of all changes made in the fire system installation from layout materials shown on the approved shop drawings.

PART 4 - TRAINING

4.1 TRAINING OF FACILITIES STAFF

- A. The sprinkler contractor shall provide training in the time required for staff to fully understand the basic information of the sprinkler system and requirement to keep the sprinkler system certified.
- B. The training shall be held on site for the familiarity of the system to the staff.
- C. Contractor is responsible for providing handout to all staff to be trained and provide one electronic copy reproducible by the St. John’s County School District.
- D. Contactor shall provide a schedule for testing and maintenance to maintain a certified sprinkler system.
- E. Contractor shall advise staff on recommended procedures in occurrence of an accidental sprinkler head discharge.
- F. Testing schedule requirements per the Table below:

Training Schedule							
Div.	Training Description	Subcontractor	Demo . Date	Time	Hours	Comments	Personnel to attend training
	Automatic Sprinkler System – Wet Pipe				2 hours	Demonstrate to owner selected personnel the operation of entire system, required maintenance and emergency procedures.	

END OF SECTION

23

DIVISION

HEATING, VENTILATION AND AIR-CONDITIONING

SECTION 23 02 00
BASIC MATERIALS AND METHODS FOR HVAC SYSTEMS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.
- B. Refer to Division 1 for all requirements pertaining to General Provisions.

1.2 WORK INCLUDED

- A. Access doors.
- B. Piping and equipment identification.
- C. Electrical requirements.
- D. Painting.
- E. Concrete work.
- F. Fabricated steel supports.
- G. Excavation, trenching and backfilling.
- H. Placing of equipment.

1.3 RELATED WORK

- A. DIVISION 9 - FINISHES (Access Doors - Painting).
- B. DIVISION 3 - CONCRETE.
- C. DIVISION 31- SITEWORK (Excavation).

1.4 APPLICABLE PUBLICATIONS

- A. The publications listed below form a part of this Section to the extent referenced.
 - 1. American Institute of Steel Construction (AISC) Publications
 - 2. American National Standards Institute (ANSI) Standards
 - 3. American Society for Testing and Materials (ASTM) Publications
 - 4. American Welding Society (AWS) Publications
 - 5. Underwriters Laboratories, Inc. (UL) Standards

1.5 SUBMITTALS

- A. General: Where submittals are required, comply with Division 1 requirements.
- B. Shop Drawings: Submit drawings of fabricated steel supports where proposed supports are not in accordance with details on drawings, or where drawings do not detail supports. Submittal for acceptance is required.
- C. Product Data: Submittal for other than fabricated steel supports is not required. Product data for the following shall be included in the operation and maintenance manuals. Submittal for acceptance is not required.
 - 1. Access doors.
 - 2. Piping and equipment identification.

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

- A. Access Doors:
 - 1. Acudor
 - 2. Elmodor Manufacturing, Co.
 - 3. Karp Metal Associates, Inc.
 - 4. Larsen's Manufacturing Co.
 - 5. Milcor
- B. Piping and Equipment Identification:
 - 1. Communications Technology Corp.
 - 2. Craftmark Identification Systems, Inc.
 - 3. EMED Co., Inc.
 - 4. Florida Marking Products, Inc.
 - 5. Marking Services, Inc.
 - 6. Seton Name Plate Corp.
 - 7. W.H. Brady Co., Signmark Division

2.2 FABRICATION

- A. Access doors:
 - 1. Access doors: UL labeled where installed in fire rated walls, partitions, and ceilings. Door rating shall be not less than wall, partition, or ceiling rating.
 - 2. Frames: 16 gauge steel, flush trim, with corners welded and ground smooth, masonry anchor strap for masonry walls, bolt holes for mounting in framed openings.
 - 3. Non-fire rated doors: 13 gauge steel, concealed continuous piano hinge with dust flap, flush screwdriver operated lock with stainless steel cam and studs.
 - 4. Fire rated doors: 20 gauge steel welded pan type, concealed continuous piano hinge with stainless steel pins, key-operated latch bolt, interior latch release, automatic door closer, automatic door latch when door closes. The door panel shall contain 2- inch thick insulation in sandwich type construction.
 - 5. Finish of doors and frames: Prime coat of rust inhibitive baked enamel, except as specified otherwise.
 - 6. Finish of doors and frames in wet areas, and in areas with surfaces subject to wet cleaning: No. 4 satin stainless steel.
- B. Piping and Equipment Identification:
 - 1. Pipe markers: Sub-surface printed plastic, with protective undercoating. Markers shall be permanently curled for snap-on installation for pipe sizes (including insulation) up to 6" diameter. For external diameters above 8". Marker shall be secured using cable ties for indoor use and stainless steel banding or ultraviolet resistant plastic for exterior use. Markers for outdoor installation shall be over-laminated with Tedlar™ on polyester ultraviolet damage and fading. Markers shall identify the pipe contents and direction of flow through 360 degree visibility range. Marker size, letter size, letter color, wording and background color shall be in accord with ANSI A13.1 – Scheme for the Identification of Piping Systems. Based on Marking Services Inc. Model MS-970 Coiled Plastic Markers for indoor use and Model MS-995 Maxilar Marker for exterior use.
 - 2. Valve tags: Contractors Option:
 - a. Indoor:
 - 1) 19 gauge brass, 1-1/2 inch round, with 1/4 inch high black pipe service letter

- abbreviation above 1/2 inch high black valve number. Pipe service letter abbreviation shall be in accord with legend on drawings. Valve tag attachment shall be 4 ply 0.018 copper wire meter seal or #6 solid brass bead chain with locking link. Based on Marking Services Inc.
- 2) 1/16 inch thick plastic, 1-1/2" round, with 1/4 inch high black pipe service abbreviation above 1/2 inch high black valve number. Pipe service letter abbreviation shall be in accord with legend on drawings. Color of valve tag shall match pipe marker color. Valve tag attachment shall be 4 ply 0.018 copper wire meter seal or #6 solid brass bead chain with locking link. Based on Marking Services Inc.
- b. Outdoor Service:
- 1) 19 gauge brass, 1-1/2 inch round, with 1/4 inch high black pipe service letter abbreviation above 1/2 inch high black valve number. Pipe service letter abbreviation shall be in accord with legend on drawings. Valve tag attachment shall be 4 ply 0.018 copper wire meter seal or #6 solid brass bead chain with locking link. Based on Marking Services Inc.
 - 2) 19 gauge Type 304 stainless steel, 1-1/2" round, with 1/4 inch high pipe service abbreviation above 1/2 inch high black valve number. Pipe service letter abbreviation shall be in accord with legend on drawings. Color of valve tag shall match pipe marker color. Valve tag attachment shall be 4 ply 0.018 stainless wire meter seal or #6 Type 304 stainless steel bead chain with locking link. Based on Marking Services, Inc.
3. Valve chart frame: Self-closing, satin-finished, extruded aluminum with glass window, 8-1/2 inch by 11 inch chart size.
4. Equipment nameplates:
- a. Indoor: Shall be 1/16 inch thick plastic with black satin surface and white core. Lettering shall be engraved through the surface color to expose the core color. Plate size shall be a minimum of 2-1/2 inch by 4 inch, with 3/4 inch high lettering for equipment and 3/4 inch by 2-1/2 inch, with 3/16 inch high lettering for ceiling grid labeling. Equipment identifying name and number shall be in accord with schedules on the Contract Documents. Plate manufacturer shall furnish pre-drilled hole locations for pop riveting. Where pop riveting is not suitable, a suitable adhesive for permanently attaching plate to equipment shall be provided.
 - b. Outdoor: Shall be 125 Mil rigid plastic constructed of printed legend sealed between two layers of chemically-resistant plastic to resist ultraviolet damage. Plate size shall be a minimum of 2-1/2 inch by 4 inch, with 3/4 inch high lettering for equipment. Equipment identifying name and number shall be in accord with schedules on the Contract Documents. Plate manufacturer shall furnish pre-drilled hole locations for pop riveting. Where pop riveting is not suitable, a suitable adhesive for permanently attaching plate to equipment shall be provided.
 - c. Based on Marking Services Inc. Model MS-215 Max-Tex.
- C. Electrical Requirements: Product description not applicable to this Section.
- D. Painting: Product specified in Division 9 - FINISHES.
- E. Concrete Work: All work is provided under Division 3.
- F. Fabricated Steel Supports:
1. Steel angles, channels, and plate shall be in accordance with ASTM A36.
 2. Steel members, including fasteners, exposed to weather shall be galvanized.
- G. Excavation, Trenching, and Backfilling: Product description not applicable.
- H. Placing of Equipment: Product description not applicable.

PART 3 - EXECUTION

3.1 GENERAL

- A. Installation of materials and equipment shall be in accord with the manufacturer's written instructions, except as specified.

3.2 INSTALLATION

- A. Access Doors:
 - 1. Furnish access doors for installation under Division 9 - FINISHES.
 - 2. Deliver access doors to the appropriate trade well in advance of the time they are needed so as to avoid unnecessary delay of the work.
 - 3. Access doors shall be sized as indicated on drawings. If no size is given, provide access door of size suitable for servicing equipment or valve. Unless otherwise noted, the minimum size for an access door shall be 12" x 12".
 - 4. Access doors shall be provided where indicated and if not indicated, where required.
 - 5. Access doors shall be installed so as to allow full door swing.
 - 6. Where full swing and access is not possible, removable doors shall be provided.
 - 7. Access doors not required in lay-in-tile ceilings.
- B. Piping and Equipment Identification:
 - 1. Install pipe markers adjacent to each valve and fitting, at each branch connection, on each side of wall, floor, and ceiling penetrations, where entering and leaving underground areas, and at minimum 40 foot spacing on horizontal and vertical pipe runs. Markers shall be arranged for easy reading at eye level.
 - 2. Provide valve tags on all valves exposed or concealed unless otherwise noted.
 - 3. Attach valve tag to stem of each valve to be tagged. Valve numbers shall follow in sequence the Owner's existing valve numbers, where applicable.
 - 4. Provide a marker for each valve and equipment to be tagged, located above lift-out tile ceilings. The marker shall be 1/16 inch thick plastic with a satin surface and white core. Color of the marker shall match color of piping identification system. Lettering shall be engraved through the surface color to expose the core color. Plate size shall be 3/4 inch by 2-1/2 inch, with 3/16 inch high lettering for ceiling grid labeling. Plate manufacturer shall furnish suitable adhesive for permanently attaching plate to ceiling grid.
 - 5. Provide a minimum of 4 valve charts. Chart information shall indicate job name, Contractor name, date of installation, valve number, valve location, valve type, valve purpose, and system in which installed. Mount framed chart in equipment room, and insert copy of chart in each operating and maintenance manual under separate tabbed section labeled "Valve Chart". Where project drawings include a piping flow schematic, request AutoCad file from Engineer and label all of the valves according to the valve chart and frame in an 18" x 24" frame in main mechanical or pump room.
 - 6. Provide air and water flow diagrams installed in waterproof, laminated frames on the wall in each Mechanical Room. Air flow diagrams shall show locations of dampers, sensors, and exhaust fans associated with the air handling unit. Water flow diagrams shall show shut-off valves and control valve locations.
 - 7. Permanently affix nameplate to each item of equipment using stainless steel pop rivets. Where irregular surface impede direct attachment of plates, affix plate to sheet metal bracket and attach bracket to equipment with screws, bolts or suitable adhesive from nameplate manufacturer.

8. Refrigeration System - Additional Requirements:
 - a. Marking and Signage:
 - (1) Provide a permanent sign containing the following information:
 - (a) Name and address of installer.
 - (b) Kind of refrigerant.
 - (c) Lbs. of refrigerant.
 - (d) Field test pressure applied.
 - (2) Provide a permanent sign: Main electrical supply, i.e., main compr. disc.
 - (3) Provide metal tags with 0.5" letters:
 - (a) Shut-off valves to each vessel, i.e., L.P. receiver shut-off.
 - (b) Relief valve.
 - (4) Piping shall be marked as either:
 - (a) Refrigerant - High Pressure - Liquid or Hot Gas.
 - (b) Refrigerant - Low Pressure - Suction, Pumped Liquid Supply or Pumped Liquid Return.
- C. Electrical Requirements: Refer to Division 26 for electrical requirements.
- D. Painting:
 1. All equipment shall be furnished with a factory- applied galvanized, prime paint, or finish paint finish. Touch-up damaged surfaces of equipment immediately.
 2. Paint for galvanized surfaces shall be in accordance with ASTM A780 using zinc rich compound.
 3. Paint wooden mounting backboards with two coats of gray enamel prior to making attachments to the board.
 4. For quality control refer to DIVISION 9 - FINISHES.
 5. Remove all dirt, rust, scale, grease, pipe dope, solder flux, and welding slag from all surfaces to be painted.
 6. Paint immediately, under this Division, all damaged galvanized surfaces. Paint galvanized metal surfaces behind grilles with two coats of flat black paint.
 7. Apply rust inhibitive primer to ferrous surfaces of shop fabricated steel supports.
 8. Paint immediately under this division all field and shop welded joints in piping or equipment supports with 2 coats of grey metal primer.
 9. All exposed piping shall have a PVC jacket, per ANSI Standard with the following colors:
 - a. Chilled water supply Dark blue
 - b. Chilled water return Light blue
 - c. Condensate piping Orange
- E. Concrete Work:
 1. Concrete pads and curbs for supports of equipment shall be a minimum of 4" high with chamfered edges and sized for approved equipment. Furnish drawings to Division 3 Contractor.
 2. Surfaces of concrete shall be troweled smooth. When forms are removed, fill voids with cement and rub smooth with rubbing stone.
 3. Do not pour concrete when ambient temperature is less than 40°F, and falling.
- F. Fabricated Steel Supports:
 1. Because of the small scale of the drawings, details of equipment support are not always shown. It shall be the responsibility of the contractor to provide supports as required for safe and adequate support.
 2. Fabricated steel supports and ladders may be shop or field-fabricated, and shall be in accord with details on drawings.

3. When details are not indicated, the contractor shall submit proposed support detail for review. The contractor shall bear all cost in producing this detail in the bid. This includes but is not limited to structural engineering support.
 4. Steel members shall be saw cut, with corners ground smooth, and shall be assembled with welded or bolted connections at Contractor's option. Connections shall be in accord with specified AISC Publications.
- G. Excavation, Trenching, and Backfilling:
1. Definitions:
 - a. Satisfactory material includes all materials except those classified "unsatisfactory", "unyielding" or "unstable".
 - b. Unsatisfactory material includes those materials containing roots, organic matter, trash, debris, frozen materials, stones larger than 3 inches in any dimension, and materials classified by ASTM D 2487 as OL, OH, and PT.
 - c. Unyielding material consists of rock and gravely soils with stones greater than 3 inches in any dimension, or as defined by the pipe or tank manufacturer, whichever is smaller.
 - d. Unstable material consists of material too wet to properly support the pipe or tank.
 - e. Select granular material consists of well- graded sand, gravel, crushed gravel, crushed stone, or crushed gravel, crushed stone, or crushed slag composed of hard, tough, and durable particles, and shall contain not more than 10 percent by weight of material passing a No. 200 mesh sieve, and no less than 95 percent by weight passing the 1 inch sieve. The maximum allowable aggregate size shall be 3 inches, or the maximum size recommended by the pipe or tank manufacturer, whichever is smaller.
 2. Excavation, trenching, and backfilling for site utility piping systems as specified in DIVISION 31 - SITEWORK.
- H. Placing of Equipment:
1. Coordinate setting of equipment with the requirements of other trades so as to avoid conflicts and to insure compatibility. Equipment shall not block access for installation of other equipment.
 2. Set base mounted equipment on permanent and finished supports. Temporary support, if any, shall be removed prior to making final pipe, duct, or electrical connections to equipment.
 3. Adjust suspended equipment to final elevation prior to making pipe, duct or electrical connections.
 4. Exercise caution during equipment placing operations to insure that structure is not overloaded.
 5. Do not move heavy equipment across floor or roof of insufficient load bearing capacity to support such equipment. Provide bracing or shoring as required, or use crane to place equipment directly on permanent and finished support.
 6. Secure all roof mounted equipment to the structure adequately to resist overturning, uplift and sliding forces for basic wind speeds indicated for this location in Figure 1609 of the Florida Building Code, Latest Edition.

7. Guards shall be provided where appliances, equipment, fans or other components that require service are located within 10 feet of a roof edge or open side of a walking surface and such edge or open side is located more than 30 inches above the floor, roof or grade below. The guard shall extend not less than 30 inches beyond each end of such appliance, equipment, fan or component and the top of the guard shall be located not less than 42 inches above the elevated surface adjacent to the guard. The guard shall be constructed so as to prevent the passage of a 21-inch-diameter sphere and shall comply with the loading requirements for guards specified in the Florida Building Code.

END OF SECTION

SECTION 23 05 00
COMMON WORK RESULTS FOR HVAC SYSTEMS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.
- B. Comply with Sections 01 33 00 – Submittal Procedures and 01 60 00 – Material Equipment and Approved Equals.

1.2 ARTICLES INCLUDED

- A. Definitions.
- B. Permits, Fees and Notices.
- C. Applicable Publications.
- D. Code Compliance.
- E. Scope of Work.
- F. Record Drawings.
- G. Intent of Drawings and Specifications.
- H. Quality Assurance.
- I. Submittals.
- J. Product Requirements, Equals and Substitutions.
- K. Manufacturers Instructions.
- L. Transportation and Handling.
- M. Storage and Protection.
- N. Cutting, Patching and Demolition.
- O. Cleaning Up/Removal of Debris.
- P. Operating and Maintenance Manuals.
- Q. Training of Owners Operators.
- R. Guarantee of Work.
- S. System Testing.

1.3 ARTICLES

- A. Definitions:
 - 1. The term "As indicated" means as shown on drawings by notes, graphics or schedules, or written into other portions of contract documents. Terms such as "shown", "noted", "scheduled" and "specified" have same meaning as "indicated", and are used to assist the reader in locating particular information.
 - 2. The term "Provide", means furnish and install as part of the work covered in Division 23.
 - 3. The term "Furnish" means furnish only, for installation, as part of this contract, by other Divisions.
 - 4. The term "Install only" means to install under the work of Division 23 equipment furnished by other Divisions, or by the Owner.
 - 5. The term "Owner's Representative" when referenced herein shall be the Architect or the Engineer acting as his designated representative unless otherwise noted.

6. The term "design" as it pertains to the work of this division shall describe the basic intent, component sizing, component relationships and overall architecture of the Plumbing system. The design is generally schematic in nature and will require specific detailing after the accepted products are determined.
 7. The term "detail" as it pertains to the work of this division shall describe the work required by the contractor to assure a fully coordinated installation of the material and equipment supplied. When requested, the contractor shall produce detailed shop drawings or sketches indicating the actual placement of the equipment or material supplied; also including how the equipment or material interfaces with work of other sections or divisions within the contract documents.
 8. The term "workman-like manner" as it pertains to the work of this division shall describe a neat well organized high quality installation system (piping, etc.). Routing shall be well thought out providing adequate service clearance and maximum use of space. Equipment placement shall exhibit proper clearances for service. All lines (piping, etc.) shall be run straight and true, parallel or perpendicular to building structure neatly supported.
 9. For additional definitions refer to the General Conditions.
- B. Permits, Fees and Notices: Comply with the General Conditions.
- C. Applicable Publications:
1. Publications listed in each Section form a part of that Section to the extent referenced.
 2. When a standard is specified by reference, comply with requirements of that standard, except when requirements are modified by the Contract Documents, or applicable codes establish stricter standards.
 3. The Publication or Standard is the publication in effect as of the bid date, except when a specific date is listed.
- D. Code Compliance:
1. Life Safety Code - NFPA 101
 2. Florida Building Code 2017
 3. Florida Accessibility Code, 2017
 4. National Electric Code 2014
 5. Florida Mechanical Code 2017)
 6. State Requirements for Educational Facilities (SREF), 2014
 7. NFPA Standards, Latest Edition.
- E. Scope of Work: The work to be performed under this Division consists of the satisfactory completion of all HVAC as indicated in the Contract Documents.
- F. Record Drawings: Comply with the General Conditions.
- G. Intent of Drawings and Specifications:
1. The intent of the drawings and specifications is to establish minimum acceptable quality standards for materials, equipment and workmanship, and to provide operable HVAC systems complete in every respect.
 2. Existing conditions, dimensions, etcetera, depicted on the drawings are taken from the "as-built" drawings of the original construction supplemented by field observation. The contractor is cautioned to field verify all existing conditions, dimensions, etcetera, notifying the Owner's Representative of any discrepancies other than those minor in nature, for direction, prior to ordering or fabricating equipment or materials. Anything mentioned in the specifications and not shown on the drawings, or shown on the drawings and not mentioned in the specifications, shall be of like effect as if shown or mentioned in both. In case of difference between drawing and specifications, the more stringent shall govern, unless the discrepancy conflicts with applicable codes, wherein the code shall govern.

3. The drawings are diagrammatic, intending to show general arrangement, capacity and location of system components, and are not intended to be rigid in detail. Final placement of equipment, other system components, and coordination of all related trades shall be the contractor's responsibility.
 4. Due to the small scale of the drawings, and to unforeseen job conditions, all required offsets and fittings may not be shown but shall be provided at no additional change in contract cost.
 5. In the event of a conflict, the Owner's Representative will render an interpretation in accordance with the General Conditions.
- H. Quality Assurance:
1. All equipment furnished under this Division shall be listed and labeled by U.L., ETL or a nationally recognized testing laboratory (NRTL).
 2. Material furnished under this Division shall be standard catalogued products of recognized manufacturers regularly engaged in the production of such material and shall be the latest design.
 3. Materials shall be the best of their respective kinds. Materials shall be new except where the specifications permit reuse of certain existing materials.
 4. Work provided for in these specifications shall be constructed and finished in every part in a workmanlike manner.
 5. All items necessary for the completion of the work and the successful operation of a product shall be provided even though not fully specified or indicated on the drawings.
 6. All work to be performed by qualified and experienced personnel specifically trained in their respective field.
 7. All work of this division shall be carefully interfaced with the work of other divisions to assure a complete, functioning system or systems.
- I. Submittals:
1. In addition to all other submittal requirements elsewhere in the contract documents, the contractor shall comply with the following.
 2. Submittal for acceptance is required only on those items specifically requested in the specification section that applies.
 3. For products and equipment that do not require a submittal for acceptance, submit a separate letter for each specification section certifying that all products and equipment will be provided in compliance with the contract documents.
 4. Provide submittal data in accordance with the General Conditions and/or as listed below.
 5. Designate in the construction schedule, or in a separate coordinated schedule, the dates for submission and the dates that the submittals will be needed in order to meet construction schedule. This schedule shall be submitted prior to or in conjunction with the first submittal. Processing of submittals may be delayed pending the receipt of this schedule at the reviewer's discretion.
 6. Submittal data shall be presented in a clear and thorough manner and referenced to the specification section.
 - a. Where applicable, data shall be identified by reference to sheet and detail, schedule or room numbers, equipment or unit number as shown on Contract Drawings.
 7. Prepare performance and product data as follows:
 - a. Clearly mark each copy to identify pertinent products or models, delete non-pertinent data.
 - b. Show performance characteristic and capacities.
 - c. Show dimensions and clearances required.
 - d. Show wiring or piping diagrams and controls.

- e. Clearly list any deviation in the submittals from the requirements of the contract documents.
- f. Include installation requirements.
8. Manufacturer's standard schematic drawings and diagrams:
 - a. Modify drawings and diagrams to delete information not applicable to the work of this project.
 - b. Supplement standard information to provide information specifically applicable to the work of this project.
9. Prohibition of Asbestos and PCB:
 - a. The use of any process involving asbestos or PCB, and the installation of any product, insulation, compound of material containing or incorporating asbestos or PCB, is prohibited. The requirements of this specification for complete and operating mechanical systems shall be met without the use of asbestos or PCB.
 - b. Prior to the Final Review field visit the Contractor shall certify in writing that the equipment and materials installed in this Project under this Division 22 contain no asbestos or PCB. Additionally, all manufacturers shall provide a statement with their submittal that indicates that their product contains no asbestos or PCB. This statement shall be signed by a duly authorized agent of the manufacturer.
10. Letter of Certification: Where a submittal is not required, provide letter certifying that the work will be completed in strict accordance of the specified requirements. In the event the contractor wishes to alter the requirements of the specification for whatever reason, this should be clearly explained in this letter noting that this alteration may require additional submittal requirements.
11. Schedules: Where schedules are called for, submit schedule indicating which products will be used and to what extent by system, location, size, etc.
12. Where samples are requested, samples shall be of sufficient size and quantity to clearly illustrate:
 - a. Functional characteristics of the product, with integral related parts and attachment devices.
 - b. Full range of color, texture and pattern.
 - c. Where a mock-up is specified, erect at the Project site, in a location acceptable to the Owner's Representative. Size or area shall be that specified or as agreed upon during pre-construction or other job site meetings.
 - d. Where mock-up is not a permanent part of the installation, remove mock-ups at conclusion of work or when acceptable to the Owner's Representative.
13. The Contractor shall:
 - a. Review Shop Drawings, Product Data and Samples prior to submission.
 - b. Determine and verify:
 - 1) Field measurements.
 - 2) Field construction criteria.
 - 3) Catalog numbers and similar data.
 - 4) Conformance with specifications.
 - 5) All submittals have been properly interfaced with the requirements of this and other divisions of work so as to assure a complete, functioning system in accordance with the contract documents.
 - 6) Provide ¼" drawings of ALL mechanical rooms, with dimensions clearly indicating equipment maintenance clearances and electrical NEC required clearances. NO mechanical room walls shall be built until the engineer and the owner have approved the shop drawings for the mechanical equipment and clearances.

- c. Coordinate each submittal with requirements of the work and of the Contract Documents.
 - d. Clearly identify any deviations in the submittals from requirements of the Contract Documents. Any deviations not specifically disclosed in the submittal shall be solely at the risk of the Contractor, and shall be subject to discovery at any time. Any undisclosed deviations shall be corrected by the Contractor to comply with the requirements of the Contract Documents at no cost to the Owner regardless of the action code accorded the submittal by the Owner's Representative.
 - e. Do not release equipment for shipment, begin fabrication or work on any items requiring submittals for acceptance until all submittals are returned with the Owner's Representative acceptance.
 - f. Make submittals promptly, and in such sequence as to cause no delay in the work or in the work of any other contractor.
14. Number of Submittals: Comply with the Division 1, Specification Section 01 33 00 – Submittal Procedures.
15. Submittals shall contain:
- a. The date of submission and the dates of any previous submissions.
 - b. The Project title and number.
 - c. Contract identification.
 - d. The names and phone numbers including personal contact of:
 - 1) Contractor.
 - 2) Supplier.
 - 3) Manufacturer.
 - e. Identification of the product, with the specification section number and contract document description clearly indicated.
 - f. Field dimensions, clearly identified as such.
 - g. Relation to adjacent or critical features of the work or materials.
 - h. Applicable standards.
 - i. Identification of deviations from Contract Documents.
 - j. Identification of revisions on re-submittals.
 - k. Contractor's stamp, initialed or signed, certifying to review of submittal, verification of products, field measurements and field construction criteria, and coordination of the information within the submittal with requirements of the work and of Contract Documents.
 - l. Each submittal shall be limited to a single specification section. Submittals shall not be grouped with other sections in common binders or under common control sheets except as defined in paragraph m. below. Each submittal shall have a cover/control sheet containing the information listed above (a thru k) and have a minimum of 8" x 3" clear space for the general contractors, engineers and architects review stamp.
 - m. The first group of submittals shall be sent in a minimum of one (or if required) two hard cover view type 3-ring binder(s) White, sized to hold 8-1/2" x 11" sheets:
 - 1) Binder is to be adequately sized to comfortably hold required submittals. Minimum spline size to be 1", maximum spline size to be 3" (provide additional binders if 3" size is not sufficient to properly hold submittals).
 - 2) Binder cover and spline to have outer clear vinyl pockets. Provide correct designation of project in each pocket. Description sheets are to be white with black letters, minimum of 11" high and full width of pocket. Description is to describe project and match project drawing/project manual description.
 - n. Submittals not complying with these requirements may be returned with no action taken at the reviewer's discretion.

16. Re-submittals shall contain:
 - a. The date of re-submission and the dates of all previous submissions.
 - b. A copy of the Engineer's comments from the previous submittal.
 - c. An itemized response to each of the Engineer's comments specifically outlining the changes or corrections being made. As an example; this could be either noting the page(s) of the previous submission that are affected and what changes have been made or noting specific additional information being provided.
 - d. Submittals not complying with these requirements may be returned with no action taken at the reviewer's discretion.
 - e. Turnaround time and copies as indicated in Section 01 33 00 – Submittal Procedures.
17. The Owner's Representative will (if they so desire):
 - a. Review submittals promptly and where special attention is requested, review in accordance with the schedule required.
 - b. Review the submittal for general compliance with the contract documents. The contractor is responsible for quantities, dimensions, placement of the product, coordination with all other trades occupying the space, maintain service clearance, function and compliance with the written installation instructions.
 - c. Turnaround time will be per Division 1.
 - d. Review comments will be per Division 1.
18. Resubmission requirements for "as specified" products.
 - a. Make any corrections or changes in the submittals required by the Owner's Representative and resubmit until accepted.
 - b. A submittal shall only be reviewed a maximum of 3 times. If upon the second resubmission an accepted action cannot be rendered (No Exceptions Noted or Make Corrections as Noted), the contractor shall supply the basis of design product and bear all costs incurred by the Owner's Representative during the review process until an accepted submittal is achieved.
19. The Contractor shall maintain one copy of all accepted submittal data including letters of compliance in a job site file.
- J. Product Requirements, Equals and Substitutions: *Comply with the General Conditions, but the following are in addition to:*
 1. In addition to all other requirements for submittals, equals and substitutions elsewhere in the contract documents, the contractor shall comply with the following.
 2. Product Requirements:
 - a. The specifications sections under Article 2.1 "ACCEPTABLE MANUFACTURER", lists suppliers found acceptable for this project. The names listed are manufacturers who meet the minimum acceptable standards that this project dictates. The list is furnished as a guide. Even though a manufacturer is named, he must still provide the type and quality of equipment specified as well as equipment that will fit within the allotted space and within the design weight allowance, etc. Being named does not imply permission for that manufacturer to provide an alternative product or design. Other manufacturers not named will be considered to be equal providing they furnish a product of the type and quality specified.

- b. In certain cases, foundations and/or structural supports or electrical requirements for equipment specified in this Division are provided under other divisions of the specifications. Where an alternate acceptable manufacturer's product is provided, this contractor shall coordinate the revised requirements and include an allowance for any cost differential.
 - c. If the list, under Article 2.1 "ACCEPTABLE MANUFACTURERS" names only one manufacturer followed by "No Substitutions" that product shall be supplied.
3. Substitutions: *Comply with the General Conditions, but the following are in addition to:*
 - a. A substitution is defined as any product not meeting the requirements as outlined in PART 2 - PRODUCTS. A different design accomplishing the same result will be considered a substitution. The same design requiring a larger motor, or more space or a structural change to accommodate larger weight, etc., will be considered a substitution. If a manufacturer who is not listed as an "ACCEPTABLE MANUFACTURER" wants to have his product considered as an equal or as a substitution, he shall submit details to the Engineer 10 days in advance of bid date and a decision will be rendered. If necessary, a clarification will be issued in the form of an Addendum. No substitution requests shall be considered after the Bid.
 - b. Submit a separate request for each product, supported with complete data, with drawings and samples as appropriate, including.
 - 1) Comparison of the qualities of the proposed substitution with that specified in tabulated format.
 - 2) Changes required in other elements of the work because of the substitution.
 - 3) Effect on the construction schedule.
 - 4) Cost, extra credit or statement of no change in contract price.
 - 5) Any required license fees or royalties.
 - 6) Availability of maintenance service, and source of replacement materials.
 - c. The Engineer shall be the judge of the acceptability of the proposed substitution.
 - d. A request for a substitution constitutes that the Contractor:
 - 1) Has investigated the proposed product and determined that it is equal to or superior in all respects to that specified.
 - 2) Will provide the same warranties for the substitution as for the product specified.
 - 3) Will coordinate the installation of the substitution into the work, and make such other changes as may be required to make the work complete in all respects.
 - 4) Waives all claims for additional costs, under his responsibility, which may subsequently become apparent.
 - 5) Will absorb all costs incurred by the substitution when affecting other trades including but not limited to electrical, structural, architectural, etc.
 - 6) Will absorb any cost incurred by the Engineer in review of the substituted product if the acceptance of the substituted item creates the need for system modification and/or redesign, or if the substituting contractor exhibits negligence in his substituting procedure thus submitting inferior, misapplied or miss-sized equipment. In the event of additional engineering costs the billing structure shall be agreed upon prior to review by all involved parties.
 - 7) Will provide drawing to prove substituted manufacturer meets all accessibility requirements.
4. Engineer will review requests for substitutions with reasonable promptness, and will issue an addendum or notify Contractor, in writing, of the decision to accept or reject the requested substitution.

5. Substitutions will not be considered when they are indicated or implied on shop drawing or product data submittals, without separate written request, or if acceptance requires revision to the contract documents.
 6. The engineer will review substitution submittals for compliance a maximum of two times. If the submittal or substituted product does not comply with the contract documents on the second submittal, the submittal and product will be rejected and the specified product will be required.
 7. The contractor may request further review of the substitution after the second submittal rejection if the contractor agrees in writing to accept responsibility for the cost of additional review time and expenses by the Engineer.
 8. In the event a substitution is rejected, supply the products which constituted the basis of design at no change in the contract price.
 9. Installation of substitutions without the Owners approval shall be cause of immediate rejection and removal without extra cost to the Owner.
- K. Manufacturer's Instructions:
1. Installation of work shall comply with manufacturer's printed instructions.
 2. Should job conditions or specified requirements conflict with manufacturer's instructions, consult with Engineer for clarification. Do not proceed with work without clear instructions.
- L. Transportation and Handling: Comply with General Conditions.
- M. Storage and Protection:
1. Store products in accord with manufacturer's instructions, with seals and labels intact and legible.
 2. Store products to prevent damage by the elements. Space temperature shall be controlled as required to prevent condensation and metal corrosion or damage to electrical or electronic parts are the result of condensation.
 3. Arrange storage in a manner to provide easy access for inspection. Make periodic inspections of stored products to assure that products are maintained under specified conditions, and free from damage or deterioration.
 4. Provide protection as necessary to prevent damage after installation.
 5. Products which suffer damage due to improper storage shall not be installed and if found in place, shall be removed and replaced at the contractors expense.
- N. Cutting and Patching: Comply with the General Conditions.
- O. Cleaning Up/Removal of Debris:
1. Comply with the General Conditions.
 2. Maintain a clean work area. Construction debris shall be immediately removed from all newly erected work.
- P. Operating and Maintenance Manuals: *Comply with the General Conditions, but the following are in addition to:*
1. Quantity: Comply with the General Conditions.
 2. Format: Adequately sized for contents, minimum 1" and maximum 3" spline size, hard cover, view type, 8-1/2" x 11 loose leaf binders. Binder covers to have outer clear vinyl pocket on front cover and spline. Provide correct project designation and contents description in each pocket. Use as many as required. Do not overload binders.
 3. Content:
 - a. Cover sheet.
 - b. Table of contents (as follows):
 - 1) Description of systems.
 - 2) Design parameters.

- c. Point by Point System Check-out: Provide tabulated results indicating compliance with contract document requirements.
4. Detailed Preparation Requirements:
 - a. The cover sheet shall list: project name, location, architect, structure engineer, mechanical engineer and electrical engineering firm name with address, telephone number and project manager's name for this project.
 - b. Each major heading in the table of contents shall have a large distinctive, clearly marked, non-erasable, plastic encased tab.
 - c. The description of systems will be provided by the design engineer for insertion at the time of review and turn-over to owner. This description of systems will be an updated version of the narrative included in this Section and will be an overview of the entire system. It will be the basis for the starting of the owner's instruction program.
 - d. Each section shall have the following sub-tabs. Sub-tabs shall be similar to the main tabs but of a different color.
 - 1) Specifications: The specification shall be copied and inserted complete with all addenda.
 - 2) Submittal: This section shall include all accepted submittal data. If submittal was not required, include technical data as specified.
 - 3) Installation Instructions: If the product, such as pipe, etc., does not have any written installation instructions, include a statement "Manufacturer's Written Installation Instructions not Available - Product Installed in Accordance with Specifications and Good Practice".
 - 4) Operation and Maintenance Instructions: These shall be the written manufacturer's data edited to omit reference to products or data not applicable to this installation.
 - 5) Parts List: These shall be edited to omit reference to items not applying to this installation.
 - 6) Equipment Supplier: This section shall include the name, address and telephone number of the manufacturer's agent and/or service agency supplying or installing and starting up of the equipment.
 - 7) System Description: This section shall include that portion of the overall description included in the beginning of the manual as it applies to each sub-section. In sections such as pipe, valves and fittings, a statement shall be included "Not Applicable to this Section." Data for this section will be added by the design engineer when the manuals are submitted for review and forwarded to the owner.
- Q. Training of Owners Operators:
 1. The manufacturer shall provide a comprehensive training outline for the Owner & Engineer to review within 90 days of final completion.
 2. The manufacturer & contractor shall provide 24 hours of training on the plumbing system, plumbing fixtures and all water heating systems.
 3. The owners shall be given comprehensive training in the understanding of the systems and the operation and maintenance of each major piece of equipment.
 4. The contractor shall be responsible for scheduling the training which shall start with classroom sessions followed by hands on training on each piece of equipment. Hands on training shall include start-up, operation in all modes possible, shut-down and any emergency procedures.
 5. The manufacturer's representative shall provide the instructions on each major piece of equipment. These sessions shall use the printed installation, operation and maintenance instruction material included in the O&M manuals and shall emphasize safe and proper operating requirements and preventative maintenance.

- R. Guarantee of Work:
 1. Comply with the General Conditions.
 2. Where applicable, furnish manufacturer's written warranty for materials and equipment.
 3. Insert warranties in appropriate locations in operating and maintenance manuals.
 4. Materials and equipment having seasonal operation limitations, shall be guaranteed for a minimum of one year from date of seasonally appropriate test, and acceptance in writing by the Owner, unless specific Division 23 specifications specify a longer period.
- S. System Testing:
 1. Provide all necessary labor, materials and equipment to successfully complete all system testing necessary for building occupancy and owner acceptance.
 2. Provide all necessary labor, materials and equipment to assist contractors of other division to complete system testing necessary for building occupancy and owner acceptance, wherever an inter-relationship between Division 23 and the work of other divisions exists.
 3. Tests shall be repeated as necessary until all occupancy and operation permits are granted and the owner accepts the project.
 4. Testing schedule requirements per the Table below:

Training Schedule							
Div.	Training Description	Subcontractor	Demo . Date	Time	Hours	Comments	Personnel to attend training
	Energy Management System				16 hours	On the job owner training conducted by a technician fully qualified to conduct such training.	
	HVAC Systems				80 hours	Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain units. See specifications for complete list of training requirements.	

PART 2 – PRODUCTS (Not Applicable)

PART 3 – EXECUTION (Not Applicable)

END OF SECTION

SECTION 23 05 93
TESTING, ADJUSTING, BALANCING OF HVAC SYSTEMS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Specification Sections, apply to this Section.

1.2 WORK INCLUDED

- A. Checking each piece of equipment for proper installation and operation.
- B. Balancing air and water distribution systems to provide design fluid quantities.
- C. Measuring and recording of fluid quantities.
- D. Electrical measurement.
- E. Verification of performance of all equipment and sequence of operation of automatic controls.
- F. Checking sound levels and vibration isolators for proper function and measurement and correction where a problem or question of acceptability exists.
- G. Recording and reporting results on sub-contractors standard report forms and on commissioning data sheets where these have been provided.
- H. Provide testing of all smoke detectors that are installed in the HVAC system.
- I. The HVAC system shall be tested and balanced twice: once in the summer cooling mode and once in the winter heating mode.

1.3 REFERENCES

- A. Air Diffusion Council (ADC) 1062R3 Equipment Test Code
- B. Associated Air Balance Council (AABC)
National Standards for Field Measurements and Instrumentation, Total Balance System Balance, Air Distribution - Hydronic Systems, Volume 1.

1.4 SUBMITTALS

- A. Submit complete description of procedures, instrument calibration and qualifications of personnel actually doing testing and balancing on this project prior to beginning of any balancing.
- B. Submit schedules of test data readings in organized, schematic, tabulated format. Include schematic drawing showing location of all readings.
- C. Submit as-built drawings showing locations of all readings.

1.5 QUALITY ASSURANCE

- A. Adjusting, balancing and testing procedures and compilation of test data shall be performed by a Certified Test and Balance Engineer or by personnel trained and supervised by a Certified Test and Balance Engineer.
- B. Test and balance personnel shall be qualified to perform testing and balancing in accordance with AABC or NEBB procedures.

1.6 TOLERANCES

- A. Balance final air and water flow to within plus or minus 5 percent of specified quantities. Caution is urged on systems where diversity has been taken and the total flow exceeds the equipment capacity. In this case, the system must be sectioned as necessary to get proper terminal flow.

1.7 GENERAL COMMENTS

- A. Water Balance: Readings from venturi flow meters, or automatic pressure independent flow control devices will be given highest priority as to accuracy. Where neither is specified pump curves and chiller or boiler pressure drops are to be correlated to establish flow. Pressure drop across coils or chillers is to be used to proportion flow. Volt and ampere readings will be used as checks. Temperature data will be used only as a performance check and not for balancing.
- B. Air Balance: Readings from a pitot tube traverse will be given highest priority as to accuracy. Terminal flow shall be as taken from the terminal DDC flow readings. Outlet flow as established by flow hood will be used to pro-rate air flow. Pressure readings as well as voltage and ampere readings will be used for check purposes only. Temperature readings will be used as a check against performance.
- C. All readings shall be cross-checked for accuracy. These cross-checks shall be tabulated within the report.

PART 2 – PRODUCTS (Not Applicable)

PART 3 – EXECUTION

3.1 INTENT OF DRAWINGS AND SPECIFICATIONS

- A. Review drawings and specifications with regard to adjusting and balancing.
- B. Additional balancing devices which, in the opinion of the TAB sub-contractor, would aid in the adjusting and balancing of the systems shall be brought to the attention of the contractor prior to bid time so that the contractor may make allowances to cover the provision of these additional devices in the original bid.
- C. Minor modifications in system design, which in the opinion of the Contractor, would aid in the adjusting and balancing of the systems may be provided subject to approval of the Owner's Representative at no additional cost to the Owner. Design modifications shall not lessen the operating efficiency of the systems.

3.2 WATER BALANCE

- A. Ascertain that piping systems have been cleaned, flushed, drained and properly refilled and that all strainer baskets have been removed, cleaned and properly reinstalled prior to beginning water balancing procedure.
- B. In the event that TAB work is started prior to the completion of the water treatment portion of work, the TAB contractor shall make a random recheck as directed by the Owner's Representative. The results of this re-check shall be included in the final report.
- C. Variable flow pumping systems having two-way control valves and using automatic pressure independent system of flow control for secondary hot water heating and chilled water systems.

1. With one pump running and all manual and automatic control valves open, record GPM stamped on each automatic flow control device and read and record the pressure drop across those which have dual pressure taps, as well as across each coil and applicable equipment.
 2. With pump running as described above and all manual and automatic control valves open read and record pressure drop across each pump. Also read and record pressure drop at shut off. Plot these points on the submitted pump curves using the sum of the flow control device GPM as the total system flow.
 3. Record the pump speed required to get the pressure drop across the flow control valve having the highest pressure drop to 6 PSI. If this is 85% or greater, no pump impeller change will be required. If less than 85%, the pump impeller will have to be trimmed. Advise the Owners Representative before proceeding.
 4. Operate lag pump to be sure performance is the same at each step.
 5. Manually set pump speed to 20% (minimum speed) and record flow and pressure difference.
- D. For constant flow systems without automatic flow control devices, using manual valves with memory stop. Before balancing the system, the following procedures shall be executed. Where multiple cooling towers and chillers are shown, all systems shall be in operation.
1. With all balancing devices and all manual and automatic control valves wide open, read and record pressure drop across each chiller.
 2. With all balancing devices and all manual and automatic control valves wide open, read and record pressure drop across each pump. Also read and record pressure drop across pump at shut off. Plot point on submitted pump curve.
 3. If pressure drop exceeds the design and the pump pressure readings indicated a flow in excess of design, the pump impeller may have to be trimmed. Submit this data to the Owners Representative for early review, before proceeding with balancing to determine if an impeller trim is warranted.
 4. In multiple unit systems, balance with all units in operation. Then record readings with each possible combination in use, i.e., in a three chiller installation, balance with all three in operation, then record each combination of two and finally each individual unit operating alone.

3.3 AIR BALANCE

- A. Check system visually and audibly for leakage and proceed with balancing as outlined by AABC or NEBB.
- B. Balance for full flow shall be based on dirty friction loss across the filters. Artificially blank-off sections on a uniform pattern as required to simulate this condition.
- C. Variable Volume Systems:
 1. With supply fan running at 100% speed and all terminals calling for full airflow, read and record flow and fan suction and discharge static pressure readings. Pressure readings shall be obtained using procedures outlined in AMCA Publication 203-90 Field Performance Measurement of Fan Systems. Plot on submitted fan curve.
 2. Set flow at each terminal for maximum values as indicated in terminal schedule using hand held operators terminal (HHOT) furnished with the terminal controls. Provide actual measured outlet flow to temperature controls sub-contractor for setting calibration constants in DDC controls. Normally diversity is taken in the fan selection. Close other terminals as required to get full flow as required for balancing. Pro-rate terminal flow to diffusers.
 3. Set minimum flow to values as indicated in terminal schedule.
 4. Where applicable, adjust return fan for specified differential flow. Record fan signal fan speed and other data at full flow and at minimum flow.

5. Record all data on terminals and supply and return fan including voltage and amperage on primary air fans and return fans at full flow.
- D. Constant Volume Systems:
1. Adjust each fan to deliver the specified quantity of air at the specified temperatures to all areas of the building served by the air system. Where the installed drive can not be adjusted to obtain the required flow, advise the contractor so that the necessary drive change can be made. Adjust speed, in direct proportion to actual vs. required cfm. Exercise caution because amps vary with the cube of speed.
 2. Determine air volume in ducts by use of pitot tube, and inclined manometer. Plug all holes in duct.
 3. Determine air quantity through air grilles or diffusers by use of flow hood with direct readout meter calibrated in CFM. If use of flow hood is not possible, use velometer nozzle as recommended by air device manufacturer. Calculate air quantity based on air device area factors provided by the air device manufacturer.
 4. Compare duct traverse to accumulated airflow at diffusers. If the two do not reconcile, examine system for leaks and, report to contractor so that he can repair and repeat.

3.4 AIR HANDLING UNIT PERFORMANCE TESTING

- A. Recognizing that it will be unlikely that the performance testing will be done on a design day, cooling and heating coil performance shall be recorded as follows.
1. With fan delivering design air flow and control valves open to deliver design water flow, read and record entering and leaving drybulb and wetbulb temperatures, air and waterside flow, pressure loss values and water temperatures.
 2. Through the contractor, request performance data from the equipment supplier based on the measured air flow and entering air temperatures and measured water flow and entering water temperature. Submit this data with test data for review.

3.6 CONTROLS ADJUSTMENT

- A. Check the automatic temperature controls to ascertain that the specified sequence of operation is occurring. Record thermostat set point and room conditions in each space. This includes checking each terminal box to ensure that supply air goes to minimum position before heat comes on.
- B. Compare temperature of space (taken with test instrument) to temperature read by thermostat or temperature sensor. Tabulate results.

3.7 TEST DATA SCHEDULES

- A. Submit typewritten schedules of test data readings.
- B. Schedules shall record the specified reading, the first reading taken and the final balanced reading for the following items.
- C. Where Commissioning Forms are provided, equipment data shall be recorded on these forms for comparison with submitted design data.
- D. In the case of off season performance testing of air handling equipment and refrigeration equipment, include manufacturer's projected performance for comparison.
- E. Pumps (Provide all parameters in the normal and ice making modes):
1. Mark number
 2. Manufacturer and model number
 3. gpm flow - specified and actual

4. Shut-off head
 5. Pump heat and full load amperage - specified and actual
 6. Motor hp - specified and actual
 7. Voltage, phase, and cycles - specified and actual
- F. Fans:
1. Mark number
 2. Manufacturer and model number
 3. Total cfm supply and rpm - specified and actual
 4. Static pressure (discharge static - suction static)
 5. Full load amperage - specified and actual
 6. Voltage, phase, and cycles - specified and actual
- G. Air Devices (Grilles, Registers, Diffusers, and Louvers):
1. Mark number
 2. Room number
 3. cfm - specified and actual
 4. Size
 5. Effective area
 6. Velocity FPM - specified and actual
- H. Chiller (Provide all parameters in the normal and ice making modes):
1. Mark number
 2. Unit manufacturer and model number
 3. Total chilled water and condenser water gpm - specified and actual
 4. Chilled water entering and leaving temperature - specified and actual - one hour log
 5. Cooler and condenser pressure drop - specified and actual
 6. Compressors full load amperage - specified and actual
 7. Voltage, phase, and cycle - specified and actual
 8. Ambient temperature, DB/WB, time of day, and weather conditions at time of test
 9. Cooler tons, condenser tons, and operating kW compared to specified conditions
- I. Variable Volume Boxes:
1. Mark number
 2. Unit manufacturer and model number
 3. Location and room number
 4. Air handler number
 5. Maximum / minimum and heating supply cfm - specified and actual
 6. For DDC controls: measure and record computer readout and calibration factor at design conditions.
 7. Electric heat, KW – specified and actual
 8. Voltage, phase and cycles – specified and actual
- J. Air Monitor:
1. Mark number
 2. Unit manufacturer and model number
 3. Duct size/monitor size factor
 4. Cfm - specified and actual.
 5. Velocity or velocity pressure
- K. Direct Expansion Cooling Coil:
1. Designation.
 2. Nameplate data.
 3. Entering air DB (F).
 4. Entering air WB (F).
 5. Leaving air DB (F).

6. Leaving air WB (F).
 7. Evaporative pressure (PSIG).
 8. Air flow (CFM).
 9. Load calculation (tons).
- L. Heat Exchangers:
1. Designation.
 2. Nameplate data.
 3. Pressure, entering and leaving ice water.
 4. Calculated/measured flow (GPM) ice water.
 5. Temperature, entering and leaving chilled water.
 6. Pressure, entering and leaving chilled water.
 7. Calculated/measured flow (GPM) chilled water.
 8. Temperature, entering and leaving chilled water.
 9. Heat balance: ice water tons vs. chilled water tons.
- M. Kitchen Exhaust Hoods:
1. Designation.
 2. Nameplate data.
 3. Exhaust air CFM, from pilot tube traverse.
 4. CFM and velocity in capture area.
 5. All final readings used to determine cfm.
- N. Motors:
1. Designation.
 2. Nameplate HP, voltage, and full load amperes.
 3. RPM.
 4. Motor amperes and voltage under operating conditions.
 5. For belt drive applications, motor amperes and voltage under no load condition.
- O. Fans:
1. Designation.
 2. Nameplate data.
 3. RPM.
 4. Static pressure, inlet and discharge.
 5. CFM from pitot tube traverse of discharge duct.
 6. Final pitot tube traverse sheets showing all readings.
- P. Main and Sub-main Ducts:
1. Designation and location.
 2. CFM from pitot tube traverse.
 3. Final pitot tube traverse sheets showing all readings.
- Q. Air Handlers:
1. Mark number
 2. Unit manufacturers and model number
 3. Total supply air cfm and rpm - specified and actual
 4. Return air cfm - specified and actual
 5. Outside air cfm - specified and actual
 6. Unit static pressure profile, including total fan static
 7. Specified total and external static pressure
 8. Water gpm flow, coil pressure drop, and entering and leaving temps - specified and actual
 9. Coil - entering and leaving air DB/◆F and WB/◆F - specified and actual
 10. Outside air DBF and WBF at time of test
 11. Voltage, phase, and cycle specified load conditions

12. Hand calculations of the BTUh at test conditions of Total cooling, Latent cooling and Sensible cooling.
13. Btu per hour when converted to specified load conditions gpm by means of heat transfer test.

3.8 OPERATING TESTS

- A. Operate systems to demonstrate that systems have been properly adjusted and balanced, and to demonstrate that the systems' performance conforms with the intent of the specifications and drawings.
- B. The balancing contractor shall make available to the Owner's operating personnel a Certified Test and Balance Engineer for a minimum of 16 hours, two working days, not necessarily consecutive, with all necessary equipment to demonstrate that all systems operate as intended and that the balancing reports are accurate.
- C. This demonstration will occur after the balancing contractor has submitted his reports to confirm that all systems or portions of the systems that coincide with the building's occupancy schedule, are adjusted and balanced.
- D. Conduct tests with natural building heating and/or cooling loads for a minimum 4 hours duration.

END OF SECTION

SECTION 23 07 00
HVAC INSULATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.
- B. Refer to Division 1 for all requirements pertaining to General Provisions.

1.2 WORK INCLUDED

- A. Duct Systems Insulation.
- B. Piping Systems Insulation.
- C. Equipment Insulation.
- D. Underground Pipe Insulation.
- E. Cold Pipe Hanger Support Blocks.
- F. Accessories.

1.3 QUALITY ASSURANCE

- A. All products within the conditioned air stream or active plenums shall comply with the NFPA 90A Flame/Smoke rating of 25/50 and comply with UL 181 erosion limitations. Fire hazard ratings shall be as determined by NFPA-255, "Method of Test of Surface Burning Characteristics of Building Materials" - ASTM E84 or UL 723.
- B. All adhesives, cements, finishes, jackets, etc., shall be UL listed or labeled for use as applied to insulation and designed specifically for use in the installation.
- C. All insulation shall be installed in accordance with National Commercial & Industrial Insulation Standards (NCIA).
- D. Kitchen hood exhaust duct fireproofing system shall have specific acceptance by ICBO, and SBCCI. Material shall be non-hazardous and contain no asbestos or toxic materials. Suitable for 2 hour fire rating.

1.4 SUBMITTALS

- A. Submit schedule indicating type of insulation, thickness, vapor barrier or coating by system and size.
- B. Product data, along with installation operation and maintenance instructions, shall be included in the operation and maintenance manuals.
- C. Submit details of insulated removable covers using the actual equipment dimensions, concrete base sizes and piping arrangements.
- D. Submit in accordance with Division 1 requirements.

1.5 GENERAL REQUIREMENTS

- A. Factory-applied insulation is specified under the applicable equipment Section of these specifications. It is listed here for reference only.
- B. Acoustical duct liner is specified under Section 23 31 01 - Shop Fabricated Ductwork. It is listed here for reference only.

- C. Packages and standard containers of materials shall be delivered unopened to job site and shall have the manufacturer's label attached giving a complete description of the material.

1.6 DEFINITIONS

- A. The term "exposed" means exposed to view in finished spaces, in equipment rooms, in fan rooms, in closets, in utility corridors, in tunnels, on roof, in storage rooms, and in other spaces as indicated.
- B. The term "concealed" means concealed from view, and includes all spaces not defined as exposed.
- C. The term "unconditioned" space shall mean all places where the temperature surrounding the pipe or duct has not been conditioned consistent with conditioned spaces, and shall include mechanical equipment rooms, non-active ceiling plenums, and non-accessible chases. This term shall also include conditioned spaces where the humidity levels are allowed to rise above 65% RH.

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

- A. Fiberglass Insulation:
 - 1. Owens-Corning Fiberglas
 - 2. Knauf Fiberglass
 - 3. CertainTeed
 - 4. Johns Manville
- B. Closed Cell Elastomeric Insulation:
 - 1. Armacell LLC
 - 2. Johns Manville
 - 3. Rubatex
- C. Foamglass Insulation:
 - 1. Pittsburgh Corning
 - 2. Cell-U-Foam Corp.

2.2 DUCT INSULATION AND FIREPROOFING REQUIREMENTS

- A. Refer to the drawings for insulation size and type requirements. Please contact the engineer prior to bid with any questions regarding the insulation requirements.

2.3 PIPE INSULATION REQUIREMENTS

- A. Refer to Section 23 02 00 for PVC jacket color specifications requirements on all piping exposed or concealed.

2.4 MATERIALS

- A. Duct Insulation: Blanket Fiberglass: Flexible fibrous glass, flame retardant factory laminated foil-skrim-kraft (FSK) vapor barrier, 2" stapling flange, maximum vapor permeance of .02 perm/in., minimum density of 1.5 lb/cf, maximum conductivity per 1" thickness of .28 at 75°F mean temperature. Based on Knauf Duct Wrap.

B. Pipe Insulation (to 450°F):

1. Rigid Fiberglass: Resin bonded fibrous glass, flame retardant, factory applied all service jacket vapor barrier with self sealing pressure sensitive lap joints, molded to accommodate pipe, maximum vapor permeance of .02 perm/in. and a puncture resistance of 50 units, minimum density 4.0 lb/cf, maximum conductivity per 1" thickness of .23 at 75°F, .29 at 200°F and .43 at 400°F mean temperature. Based on Knauf Pipe Insulation.
2. Closed Cell Elastomeric (Small Pipe Sizes up to 5 Inches): Flexible, elastomeric, closed cellular, tubular molded to accommodate piping, smooth outer surface suitable for painting with vinyl lacquer type coating, water resistant, non absorbent, ozone resistant, minimum density of 4 lb/cf, maximum conductivity per 1" thickness of .27 at 75°F mean temperature. Based on Armacell LLC AP Armaflex and Self-seal Armaflex 2000.
3. Closed Cell Elastomeric (Large Pipe Sizes, 6" and Larger): Sheet type, flexible, elastomeric, closed cellular, smooth outer surface suitable for painting with vinyl lacquer type coating, water resistant, non absorbent, ozone resistant, minimum density of 4 lb/cf, maximum conductivity per 1" thickness of 2.7 at 75°F mean temperature. Based on Armacell LLC Armaflex II.
4. Foamglas: Rigid, preformed sections of 100% rigid cellular glass dimensionally complying with ASTM C585 standards, non-absorptive of moisture after immersion, water vapor permeability 0.00 perm/in. impervious to common acids (except hydrofluoric), non-combustible, 100 PSI compressive strength when capped with hot asphalt, 8.5 #/cu.ft. density, thermal conductivity 0.33 BTU-In./Hr./Sq.Ft./F @ 50°F. Based on Pittsburgh Corning Foamglas.

C. Equipment Insulation:

1. Closed Cell Elastomeric Sheet type, flexible, elastomeric, closed cellular, smooth outer surface suitable for painting with vinyl lacquer type coating, water resistant, non absorbent, ozone resistant, minimum density of 6 lb/cf, maximum conductivity per 1" thickness of .27 at 75°F mean temperature. Based on Armacell LLC Armaflex II.
2. Foamglas: Sections of 100% rigid cellular glass, non-absorptive of moisture after immersion, water vapor permeability 0.00 perm/in., impervious to common acids (except hydrofluoric), non-combustible, 100 PSI compressive strength when capped with hot asphalt, 8.5 #/cu.ft. density, thermal conductivity 0.32 BTU-In./Hr./Sq.Ft./F @ 50°F. Based on Pittsburgh Corning Foamglas.

D. Insulation Accessories: Aluminum Pipe Jacket and Fitting Covers: Jacket shall be 0.016" thick (26 gauge) embossed aluminum, sized to provide a 2" (min.) lap joint both longitudinally and circumferentially, with 3/4" min. wide x 0.015" min. (30 gauge) thick draw bands. Fitting covers shall be aluminum, 0.025" (22 gauge), min., thickness.

E. Cold Pipe Hanger Support Blocks: Lightweight, rigid, closed cell material having 100 lb/sq.in. compressive strength when capped with hot asphalt according to ASTM C240. Based on Pittsburgh Corning Foamglas.

F. Accessories:

1. Aluminum Pipe Jacket and Fitting Covers: Jacket .016" thick (28 ga.) embossed aluminum sized to provide a minimum 2" lap joint both longitudinal and circumferentially, minimum 3/4 inch x .015 inch thick (30 ga) draw bands. Covers .024 inch thick.
2. PVC pipe jacket and fitting covers used with insulation for pipe, elbows, tees, couplings, 25/50 flame/smoke ratings, suitable for temperatures to 500°F.
3. Glass Cloth Pipe, Duct and Equipment Jacket: Glass lagging cloth, 8 oz/sy treated weight. Secure with elastomeric insulating adhesive on elastomeric insulation, for fiberglass insulation use appropriate mastic finish as recommended by the insulation manufacturer with the perm rating of the mastic equal to or less than that of the insulation it is sealing.

4. Corner angles shall be minimum 28 gauge, 1 inch by 1 inch aluminum adhered to 2 inch by 2 inch heavy kraft paper.
5. Glass tape shall be a minimum density of 1.6 ounces per square yard, 4 inch wide with a 10 x 10 thread count per inch of width. Glass cloth shall be untreated.
6. Staples shall be outward clinching type, Type 304 or 316 stainless steel in accord with ASTM A 167 or Monel® coated.
7. Wire shall be soft annealed galvanized, or copper, 16 gauge, or nickel copper alloy.
8. Closed cell elastomeric insulated finish shall be a white water based flexible, acrylic latex enamel equal to WB Armaflex finish.
9. Insulation Tape: Closed cell elastomeric insulation: 2" wide x 1/8" thick.
10. Elastomeric Insulation Adhesive: Air drying contact adhesive for securing sheets to flat or curved metal surfaces and joining seams and butt joints of elastomeric insulation. Suitable for temperatures to 180°F, dried film not to exceed 25 for flame spread and 50 for smoke development when tested per ASTM E 84-84A method.
11. Vapor Barrier Mastic: Air drying flexible water based mastic used for applying a vapor barrier joint with glass cloth at insulation joints. Suitable for temperatures to 180°F, wet and dried film not to exceed 25 for flame spread and 50 for smoke development when tested per ASTM E 84-84A method. Maximum Perm rating of 0.08. , Childers Products Company, Inc. CP-35 Chil Therm® WB, Foster Products Corp. Product Data 30-80 Foster Vapor Safe® Coating, Marathon Industries, Inc. 590 LO-PERM, Richard's Paint Manufacturing CO., Inc. VBM-4, Vimasco Corp. 749 Vapor-Blok, or equal.
12. Acrylic Latex Finish and Sealers:
 - a. Elastomeric Insulations: Air drying flexible water based finish used for finishing flexible elastomeric insulation. Suitable for temperatures to 180°F, wet and dried film not to exceed 25 for flame spread and 50 for smoke development when tested per ASTM E 84-84A method. Armacell LLC WB Armaflex finish.
 - b. Foamglass Insulation: Air drying flexible water based sealer used for applying a vapor barrier seal over microscopic cracks that develop in the insulation. Suitable for temperatures to 180°F, wet and dried film not to exceed 25 for flame spread and 50 for smoke development when tested per ASTM E 84-84A method. Maximum Perm rating of 0.08. , Childers Products Company, Inc. CP-35 Chil Therm® WB, Foster Products Corp. Product Data 30-80 Foster Vapor Safe® Coating, Marathon Industries, Inc. 590 LO-PERM, Richard's Paint Manufacturing CO., Inc. VBM-4, Vimasco Corp. 749 Vapor-Blok, or equal.

PART 3 - EXECUTION

3.1 GENERAL REQUIREMENTS

- A. Install all insulation in strict accordance with the manufacturers written installation instructions.
- B. Provide a PVC jacket on all exposed rain leader piping, including but not limited to the Gym.
- C. All insulation work shall be performed by skilled mechanics regularly engaged in the insulation trade.
- D. Properly coordinate the insulation work with the other trades so that installation is performed with a minimum of conflict.
- E. Insulation shall not be applied on any piping or duct system requiring testing until testing is completed and approved by Engineer.
- F. Insulation shall not be applied until all systems are clean, dry, free of dirt, dust or grease.

- G. The finished installation shall present a neat and acceptable appearance which includes but is not limited to: all jackets smooth, all vapor barriers sealed properly, no evidence of "ballooning" of the jackets, or sagging insulation, all valves, dampers, gauges, unions, etc. accessible. The Engineer shall be the final judge of acceptance of workmanship.
- H. All equipment nameplates on hot equipment shall be left uncovered. All equipment nameplates on cold equipment shall have a removable section sized to expose the nameplate. This section shall be clearly marked "NAMEPLATE".
- I. If proper maintenance procedures require access to the insulated equipment removable panels, sections or covers shall be provided to accomplish this. These access devices shall be constructed in a manner to assure easy access and sturdy construction. The contractor shall assume the responsibility to coordinate all equipment requiring insulation to be either factory or field insulated.
- J. Insulation and accessories shall be applied only at suitable application temperature and conditions as recommended by the manufacturer. Do not apply insulation to any surface while it is wet.
- K. Insulation shall be protected from moisture and weather during storage and installation.
- L. Insulation which has sustained moisture damage, torn jackets, or other damage due to improper storage or other reasons shall not be used. If evidence of this is sighted the Owner's representative reserves the right to require the insulating contractor to remove any and/or all insulation until the Engineer is satisfied that there is no longer any inferior insulation installed on this project.
- M. Insulation, fabric and jacketing shall be protected from damage during construction. Damage by the insulator shall be repaired without cost to the Owner. Damage by others shall be reported in writing to the contractor.
- N. The insulation subcontractor is responsible for proper material storage at the work site.
- O. Work performed prior to receipt of approved documents or submittals, which later proves to be incorrect or inappropriate, shall be promptly replaced by the contractor without cost to the purchaser.
- P. Insulation shall not be installed until adequate access and clearances at control mechanisms, dampers, sleeves, columns and walls have been provided.
- Q. All insulation at handholes, access doors or other openings, and adjacent to flanges and valves shall be neatly finished where exposed to view.
- R. All materials, accessories and methods of installation and fabrication are subject to the Owner's Representatives inspection and approval during any phase of the work.
- S. The insulation subcontractor shall prevent the accumulation of insulation debris in the buildings and on the premises of the Owner.
- T. The insulation subcontractor shall be responsible for his own safety program at the work site, and shall provide instruction on safe practices for his workers assigned to the project. All employees are subject to the work rules at the job site.
- U. The insulation subcontractor shall familiarize himself with the progress and execution of the job and notify the proper parties of interferences and any problems with the proper installation of his materials.

3.2 INSTALLATION

- A. Duct Insulation:
 - 1. General:
 - a. Insulate or internally line all flexible duct connectors equal to or greater than adjacent insulation thickness.

- b. The tops of all diffusers shall be insulated same as connecting ductwork to prevent condensation.
 - c. Duct insulation at fire dampers shall be extended over supporting angle iron and sealed to wall.
2. Blanket Fiberglass Insulation:
- a. Insulation shall be tightly wrapped on the ductwork with all circumferential joints butted and longitudinal joints lapped 2 inches and stapled. Joints shall be finished with two coats of an approved vapor barrier mastic, reinforced with glass cloth extending 2 inches onto adjacent insulation. One coat of mastic shall be applied to the insulation prior to the application of the glass cloth, which shall be embedded in the mastic to ensure complete adhesion of the cloth. Additionally secure insulation to bottom of rectangular ducts over 24 inches wide with weld pins at no more than 18 inches on center.
 - b. Insulation shall be butted with facing overlapping all joints shall be finished with two coats of an approved vapor barrier mastic, reinforced with glass cloth extending 2 inches onto adjacent insulation. One coat of mastic shall be applied to the insulation prior to the application of the glass cloth, which shall be embedded in the mastic to ensure complete adhesion of the cloth. Breaks, punctures, pin penetrations in facing shall be sealed with vapor barrier tape and vapor barrier adhesive.
3. Rigid Fiberglass Insulation:
- a. Use boards in largest possible size to minimize seams. Do not use "scraps".
 - b. Shall be installed in all non-public exposed areas up to 10'-0" above finished floor.
 - c. Provide corner angles where insulation is subject to harm.
 - d. All fasteners shall be non corroding.
 - e. The insulation shall be applied by use of cup head weld pins. Such fasteners shall be spaced in accordance with NCIA recommendations, where NCIA standards do not address exact dimensions, cup head weld pins shall be spaced on 12" centers. Pin caps shall be covered with a round vapor seal patch that matches the jacket on the ASJ board. On cold ducts, these shall be coated so as to not cause condensation.
 - f. Ducts having sharp bends shall have the insulation scored as required to conform to the curved surfaces to provide a neat and acceptable appearance when finished.
 - g. Insulation edges and joints shall be finished with two coats of an approved vapor barrier mastic, reinforced with glass cloth extending 2 inches onto adjacent insulation. One coat of mastic shall be applied to the insulation prior to the application of the glass cloth, which shall be embedded in the mastic to ensure complete adhesion of the cloth.
 - h. Generally, rigid fiberglass material will only be used in finished or exposed areas, and it is intended that the finish present a neat and uniform appearance as to color and workmanship.
 - i. In finished areas, molded glass fiber insulation shall be used to insulate round ducts where commercially available sizes can be used.
 - j. Fittings on round ducts in finished areas shall be covered with premolded fiberglass fitting insulators equal to Insul-Coustic where sizes are available. For sizes where premolded fittings are not available use miter-cut segments of molded pipe insulation, wired in place, with all joints sealed with adhesive and smoothed out with a coat of insulating cement.

- k. On cold ducts, the fittings shall be finished with two coats of an approved vapor barrier mastic, reinforced with glass cloth extending 2 inches onto adjacent insulation. One coat of mastic shall be applied to the insulation prior to the application of the glass cloth, which shall be embedded in the mastic to ensure complete adhesion of the cloth. Hot ducts shall be finished in a similar manner, except the mastic need not be of the vapor barrier type.
- B. Pipe Insulation:
1. General:
 - a. All locations where the insulated surface is supported by hangers, the insulation shall be protected by shields or saddles properly skimmed to maintain a smooth outer surface, and proper insulation thickness. Chilled water piping, 3" and over shall have a section of foamglas insulation installed between the pipe and shield. 3 and 4" to be 12" long, 5" and 6" to be 18" long and 8" and over, 24" long. If the possibility exists that the hanger may conduct the temperature of the conveyed medium and thus cause condensation or personal injury due to high temperature, the hanger shall also be insulated. Joints between foamglas and pipe insulation shall be properly sealed.
 - b. All devices connected to or in line with the piping system shall be insulated greater than or equal to the connecting piping. This includes but is not limited to valves, air separators, expansion tanks, control valves, control devices, gauge connections, thermometer stems, chemical feed equipment, piping flexible connectors, etc. This is particularly important on ice water and refrigerant lines.
 - c. The insulation at threaded unions in steam and hot water piping shall be tapered and terminated with cement and glass lagging cloth and lagging adhesives.
 - d. Insulate exterior surfaces of all anchors and guides for chilled water and dual temperature piping systems.
 - e. A complete moisture and vapor barrier shall be installed wherever insulation is penetrated by hangers or other projections through insulation and in contact with cold surfaces for which a vapor seal is specified.
 - f. Cover fittings, flanges, unions, valves, anchors, and accessories with premolded or segmented insulation of the same thickness and material as the adjoining pipe insulation. Where nesting size insulation is used overlap pipe insulation 2 inches or one pipe diameter. Fill voids with insulating cement and trowel smooth. Elbows shall have not less than 3 segments per elbow. Secure insulation with wire or tape until finish is applied. Blanket inserts in lieu of premolded or segmented insulation is not allowed. Cover fittings with preformed PVC fitting covers.
 - g. Wrap all pressure gauge taps, thermometer wells and all other penetrations through insulation with closed cell insulation tape so as to prevent condensation.
 - h. Seal all raw edges of insulation.
 - i. For piping supported by hangers outdoors, apply a rainshield to prevent water entry.
 2. Rigid Fiberglass:
 - a. Provide PVC fitting covers for all fittings.
 - b. Align all jacket seams.
 - c. Assure all vapor barriers are properly sealed.
 - d. Provide PVC jacket over all exposed insulation in the equipment room.
 - e. All corner angles below 6'-10" shall have padded insulation and be marked with yellow stripes.
 3. Closed Cell Elastomeric:
 - a. All joints shall be sealed with adhesives.
 - b. Where the thickness is to be obtained by use of two layers of insulation, install with staggered joints.

- c. Finish:
 - 1) Concealed Indoors: No additional finish.
 - 2) Exposed Indoors: Provide PVC jacket over all insulation.
 - 3) Concealed Indoors: Provide PVC jacket over fittings fabricated from insulation sections or sheet.
 - 4) Outdoors: Provide aluminum pipe jacket.
- 4. Foamglas:
 - a. All joints, both longitudinal and circumferential shall be sealed with a vapor barrier mastic.
 - b. Thickness shown for refrigeration pipe to be obtained by use of two layers of insulation with staggered joints.
 - c. Finish:
 - 1) Exposed Indoors: Provide PVC jacket over all insulation that shall be sealed with an acrylic latex finish.
 - 2) Concealed: Provide PVC jacket over fittings fabricated from insulation sections or sheet. Provide ASJ over all other.
 - 3) Exposed Outdoors: Provide acrylic latex finish and aluminum pipe jacket.
- C. Equipment Insulation:
 - 1. Vessel and Large Pipe Insulation:
 - a. Insulation shall be of the same material as the piping which serves it and it shall be layered to obtain the required thickness. Maximum of 1-1/2" thick per layer.
 - b. All joints shall be staggered to avoid thermal gaps.
 - c. Sheet size shall be as large as possible to minimize seams. Do not use "scraps".
 - d. Securing shall be by welded studs and/or non-corrosive banding wire. Do not weld brackets, clips or other devices to ASME coded pressure vessels or piping. Insulation pins or studs shall be as specified and installed in accordance with NCIA standards.
 - e. Finish shall be with PVC jacket or galvanized steel mesh wire and a finish coat of insulating cement minimum of 1/4" thick. After cement has cured apply glass lagging cloth and proper coating as directed by manufacturer. All corners shall have metal corner beads and provide acrylic latex finish.
 - 2. Removable Covers:
 - a. Equipment specified to have removable covers shall have insulation as specified in Paragraph 2.4, fastened to the inside surfaces of a 20 gauge galvanized sheet metal equipment cover.
 - b. The covers shall be of a sectionalized design, and shall be custom-fitted around each piece of equipment. For ease of removal, joints between sections shall coincide with the splits or joints in the equipment. Joints between sections of the cover shall be held together with quick-connect trunk latches, and shall be gasketed to form a vapor-tite seal cover (for the passage of pipes, etc.) shall be provided with closed cell elastomeric collars to ensure a tight fit.
 - c. The box shall be fitted around each piece of equipment and split for removal to coincide with the split in the casing. The sections of the box shall be held together with quick disconnect trunk latches. Joints between box sections shall be gasketed to form a vapor seal. Void spaces in the box shall be packed with flexible fiberglass insulation. Openings around pump casing shall be provided with closed cell elastomeric collar to ensure tight fit.
 - d. Provide acrylic latex finish.
 - e. Coordinate the piping of the drain, vent, gauge, and control lines to exit through the base or back section of the removable cover. The insulation of these pipes shall be totally independent of the removable cover.

3. Chilled Water Compression Tank and Filtering Systems: Surfaces shall be insulated with 1 inch thick closed cell elastomeric insulation board or pipe insulation, as applicable. Finish as specified for vessel and large pipe insulation.
- D. Cold Pipe Hanger Support Blocks:
 1. Provide on all chilled fluid systems pipe hangers and supports.
 2. Apply Pittcote 404 acrylic latex mastic filler over insulation and on ends.
 3. Apply Pittseal 444 butyl joint and penetration sealant at joint between foamglas and adjacent insulation.
 4. Provide vapor barrier system to match the vapor barrier on the adjacent system.
 5. Provide 20 gauge (min.) galvanized shield between the insulation and the hanger or support.
- E. PVC Jacket:
 1. Provide PVC sheet jacket over all exposed, indoor piping or insulation.
 2. Provide PVC pipe jacket over all exposed, indoor foamglas or elastomeric pipe insulation.
 3. Provide PVC fitting covers over all fittings fabricated from insulation sections or sheet material.
 4. PVC pipe jacket shall be applied with special attention given to achieving positive seal at all longitudinal and circumferential joints using a welding solvent on the longitudinal joint as recommended by the manufacturer. Slip joints to have 4" minimum lap and no welding solvent.
- F. Glass Cloth Jacket:
 1. Provide where specified.
 2. Provide acrylic latex finish.
- G. Flexible Acrylic Latex:
 1. Apply two coats to glass cloth jacket, concealed foamglas and closed cell elastomeric insulation.
 2. Refer to Division 9 for color to be used. If no instructions are given, provide a white finish.

3.3 MISCELLANEOUS ITEMS

- A. General: Provide insulation of any portion of a system or piece of equipment not previously discussed where ambient operating conditions will allow condensation to occur or whose surface temperature exceeds 115°F. Insulation materials and method shall be as directed by the Designer.
- B. Final Inspection: At final inspection, the finished surfaces of all exposed insulation shall be clean and without stains or blemishes. Repair and clean the insulation surfaces and, if necessary, to obtain a new appearance, shall coat discolored surfaces with off-white latex water-base semi-gloss paint or lagging adhesive, without a change in the contract price.

END OF SECTION

SECTION 23 31 00
HVAC DUCTS AND CASINGS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.
- B. Refer to Division 1 for all requirements pertaining to General Provisions.

1.2 WORK INCLUDED

- A. Single Wall Round Ductwork and Fittings.
- B. Single Wall Round Snaplock Seam Galvanized Steel Ductwork and Fittings.
- C. Double Wall Round Ductwork and Fittings.
- D. Round Stainless Steel Ductwork and Fittings.
- E. Single Wall Round Flexible Ductwork.
- F. Insulated Round Flexible Ductwork.

1.3 QUALITY ASSURANCE

- A. All ductwork shall be fabricated within the guidelines established by the Sheet Metal and Air Conditioning Contractors National Association, Inc. (SMACNA) HVAC Duct Construction Standards - Metal and Flexible, latest edition.
- B. All ductwork shall be fabricated to withstand the pressure and velocity required on this project.
- C. All components, fasteners, sealants, adhesives, etc. in the conditioned air stream or exposed in active or non- active plenums shall conform to the NFPA 90A Standard for the Installation of Air Conditioning and Ventilating Systems and Standard for Flame/Smoke/Fire Contribution of 25/50/0.
- D. All ductwork shall conform to UL standard UL 181 Factory Made Air Duct Materials and Duct Connectors, latest edition. Applicable sections shall apply to shop fabricated ductwork.
- E. After fabrication and installation of all shop fabricated ductwork the fabricator and installer, if not the same, shall certify in writing to the Owner's representative that all shop fabricated ductwork and installation of same meets or exceeds the quality standards established by SMACNA.

1.4 SUBMITTALS

- A. Submission for acceptance is required.
- B. Product data, along with installation operation and maintenance instructions, shall be included in the operation and maintenance manuals.
- C. Submit in accordance with Division 1 requirements.

1.5 SHOP DRAWINGS

- A. Shop Drawings: Provide shop drawings of ductwork as follows:
 - 1. Draw to a scale of not less than 1/4 inch to one foot on the same size sheets as the contract drawings.
 - 2. Show duct sizes.

3. Show fitting details.
4. Show lighting and ceiling diffusers.

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

- A. Single Wall Round Ductwork and Fittings:
 1. Autoduct, Inc.
 2. Eastern Sheetmetal
 3. Hamlin Sheetmetal, Inc.
 4. Impulse Air.
 5. Lindab
 6. Semco Manufacturing, Inc.
 7. United McGill
- B. Single Wall Round Snaplock Seam Galvanized Steel Ductwork and Fittings:
 1. Alco Manufacturing Company.
 2. Crown Products Company.
 3. Hughes.
- C. Double Wall Round Ductwork and Fittings:
 1. Autoduct, Inc.
 2. Eastern Sheetmetal
 3. Hamlin Sheetmetal, Inc.
 4. Impulse Air.
 5. Lindab
 6. Semco Manufacturing, Inc.
 7. United McGill
- D. Round Stainless Steel Ductwork and Fittings:
 1. Autoduct, Inc.
 2. Eastern Sheetmetal
 3. Hamlin Sheetmetal, Inc.
 4. Impulse Air.
 5. Lindab
 6. Semco Manufacturing, Inc.
 7. United McGill
- E. Single Wall Round Flexible Ductwork:
 1. ATCO Rubber Products, Inc.
 2. Flexmaster USA, Inc.
 3. Flexible Technologies - Thermaflex®
- F. Insulated Round Flexible Ductwork:
 1. ATCO Rubber Products, Inc.
 2. Flexmaster USA, Inc.
 3. Flexible Technologies - Thermaflex®

2.2 FABRICATION

- A. Single Wall Round Ductwork and Fittings:
 1. Materials: Hot rolled, continuously annealed, hot dipped galvanized steel minimum of G-90, 0.90 oz/sf coating, conforms to ASTM A653.

2. Metal Gauges: Conform to the Sheet Metal and Air Conditioning Contractor's National Association, Inc. (SMACNA) HVAC Duct Construction Standards - Metal and Flexible, latest edition. The following table shall establish a minimum guideline unless the manufacturer has U.L. Standard 181 test results that show that lighter gages (thinner wall thickness) with intermediate corrugations (ribs) allow the gage reduction:

Pipe Diameter	Positive Internal Static Pressure in W.G.					
	0" - 2.0"		2.1" - 4.0"		4.1" - 10.0"	
	Spiral		Spiral		Spiral	
	Pipe	Fittings	Pipe	Fittings	Pipe	Fittings
6" - 10"	28	26	28	24	28	24
12"	28	26	28	24	26	24
14"	28	26	26	24	26	24
16"	26	24	26	22	24	22
18" - 26"	26	24	24	22	24	22
27" - 36"	24	22	22	20	22	20
37" - 50"	22	20	20	20	20	20
51" - 60"	20	18	18	18	18	18
61" - 84"	18	16	18	16	18	16

3. Duct Construction: Spiral wound, lockseam construction, slip joint or flanged connections as noted below under couplings.
4. Fitting Construction:
- a. 90 Deg. and 45 Deg. Ells: Solid - welded seam construction for dust collector use, Solid - welded seam or spot welded and bonded for general use. Radiused ells to be full radiused unless otherwise noted, mitered ells to have single thickness, turning vanes, slip joint or flanged connections.
 - b. Tees or Crosses: Solid - welded seam construction for dust collector use, Solid - welded seam or spot welded and bonded for general use. Tangential, unless otherwise noted or detailed, conical take off or reduction, slip joint or coupled ends. 180 Deg. or 45 Deg. as indicated.
 - c. Bellmouth: Solid - welded seam construction for dust collector use, Solid - welded seam or spot welded and bonded for general use. Spun metal, smooth converging bellmouth, round, gauge equal or greater than connecting duct.
 - d. Access Section:
 - 1) 7" Diameter and Less: Minimum 12" long flanged section, minimum four bolts per flange.
 - 2) 8" Diameter and Larger: Round or rectangular access cover, on welded raised section, pressure sensitive release suitable for manual release or emergency vacuum release, chain retainer, (see Para. 3.5: Schedules for Sizes).
 - e. Couplings:
 - 1) Joints 36" or less shall have 2" slip coupling.
 - 2) 38" or over shall be spiral mate.
 - f. Based on United McGill
- B. Single Wall Round Snaplock Seam Galvanized Steel Ductwork and Fittings:
- 1. Materials: Hot rolled, continuously annealed, hot dipped galvanized steel minimum of G-90, 0.90 oz/sf coating, conforms to ASTM A653.

2. Metal Gauges: Minimum of 26 gauge, with remaining sizes conforming to the Sheet Metal and Air Conditioning Contractor's National Association, Inc. (SMACNA) HVAC Duct Construction Standards Metal and Flexible, latest edition. The following table shall establish a minimum guideline:

Round Ducts:

<u>Duct Diameter</u>	<u>Spiral Pipe</u>	<u>Fittings and Longitudinal Seam Pipe</u>
3" thru 14"	26	24
15" thru 26"	24	22
27" thru 30"	22	20

3. Duct Construction: Snaplock seam construction, slip joint or flanged connections.
 4. Fitting Construction:
 a. 90 Deg. and 45 Deg. Ells: Adjustable ells to be full radiused unless otherwise noted, slip joint or flanged connections.
 b. Tees or Crosses: Adjustable, unless otherwise noted or detailed, conical take off or reduction, slip joint or coupled ends. 180 Deg. or 45 Deg. as indicated.

C. Double Wall Round Ductwork and Fittings:

1. Materials:

- a. Outer Duct: Hot rolled, continuously annealed hot dipped galvanized steel, minimum G- 90, 0.90 oz/sf (.001 inch thick/side) coating, conforms to ASTM 653.
 b. Liner: 1" thickness flexible fibrous glass minimum density 1.5 lb/cf, maximum conductivity per 1" thickness of .27 at 75°F mean temperature with a mylar coating.
 c. Inner Duct: Hot rolled continuously annealed, perforated hot dipped, galvanized steel, minimum G-90, 0.90 oz/sf (.001 inch thick/side) coating, conforms to ASTM 653.

2. Metal Gauges:

- a. Outer Duct: Conform to the Sheet Metal and Air Conditioning Contractor's National Association, Inc. (SMACNA) Duct Construction Standards, Metal and Flexible, latest edition. The following table shall establish a minimum guideline unless the manufacturer has U.L. Standard 181 test results that show that lighter gages (thinner wall thickness) with intermediate corrugations (ribs) allow the gage reduction:

Round Ducts:

<u>Spiral Pipe Inside Dia.</u>	<u>Shell</u>	<u>Perf. Liner</u>	<u>Fittings and Seam Pipe</u>	
			<u>Longitudinal Shell</u>	<u>Perf. Liner</u>
3" thru 8"	24	26 Non-Ribbed	24	24
9" thru 12"	24	28 Ribbed	24	24
13" thru 24"	22	28 Ribbed	22	24
25" thru 34"	20	28 Ribbed	20	24
35" thru 48"	20	28 Ribbed	20	22
49" thru 52"	18	28 Ribbed	18	22
53" thru 58"	18	26 Ribbed	18	22
59" thru 62"	16	26 Ribbed	16	22
63" thru 82"	16	22 Non-Ribbed	16	22

3. Duct Construction:

- a. Outer Duct: Spiral wound, lockseam construction, slip joint or flanged connections as noted below under couplings.
 b. Inner Duct: Spiral wound, lockseam construction, slip joint connections, mechanically bound to outer duct for vertical installation.

4. Fitting Construction:
 - a. 90 Deg. and 45 Deg. Ells: Die formed or welded segmented construction, radiused ell to be full radiused unless otherwise noted, mitered ell to have single thickness turning vanes, liner and inner duct continuous.
 - b. Tees or Crosses: Tangential unless otherwise noted, conical take off or reduction coupled ends, 180 Deg. or 45 Deg. as indicated.
 - c. Bellmouth: Spun metal smooth converging bellmouth, round, single wall gauge equal to or greater than connecting duct.
 - d. Access Section:
 - 1) 7" Diameter and Less: Flanged section, minimum four bolts per flange. Double wall section.
 - 2) 8" Diameter and Larger: Round or rectangular access cover, on welded raised sections, pressure sensitive release suitable for manual release or emergency vacuum release, chain retainer, (see Para. 3.5 - Schedules for Sizes).
 - e. Couplings:
 - 1) Joints 36" or less shall have 2" slip coupling.
 - 2) 38" or over shall be spiral mate.
 - f. Based on United McGill.
- D. Round Stainless Steel Ductwork and Fittings:
 1. Materials: Exhaust duct shall be constructed of 304 or 316 stainless steel as scheduled with a 2B mill finish.
 2. Metal Gauges: Conform to the Sheet Metal and Air Conditioning Contractor's National Association, Inc. (SMACNA) Duct Construction Standards, Metal and Flexible, latest edition. The following table shall establish a minimum guideline unless the manufacturer has U.L. Standard 181 test results that show that lighter gages (thinner wall thickness) with intermediate corrugations (ribs) allow the gage reduction:

Pipe Diameter	Negative Internal Static Pressure in W.G.					
	0" - 2.0"		2.1" - 6.0"		6.1" - 10.0"	
	Pipe	Fittings	Pipe	Fittings	Pipe	Fittings
9" - 15"	26	24	24	22	24	22
16" - 26"	24	22	22	20	20	18
28" - 36"	22	20	20	18	18	16
38" - 50"	20	18	18	16	18**	16
52" - 60"	18	16	16	14	18**	16*

* Companion angle rings required.
 ** Girth rings required 60" O.C.

3. Duct Construction: Round and oval ducts shall be of the spiral lockseam or all welded construction.
4. Fitting Construction: Fittings shall be factory fabricated with all seams continuously welded.
5. Fitting Type: Refer to Section 2.2.A.4.
6. Joints:
 - a. Joints 36" or less shall have 2" slip coupling.
 - b. 38" or over shall be spiral mate.

- E. Uninsulated Round Flexible Ductwork:
1. High Pressure Application: Factory fabricated assembly of a trilaminate of aluminum foil, fiberglass and polyester with a perm rating of .02 high tear strength and properties to resist temperature change, mildew and age hardening. It shall be mechanically locked, without adhesives, into a formed aluminum helix on the ducts outside surface and be U.L. listed 181 Class 1 and comply with NFPA 90A and 90B. The material shall have a pressure rating of 12" w.g. positive pressure and -5" w.g. negative pressure through a temperature range of -20°F to +250°F. Based on Type NI-35 as manufactured by Flexmaster U.S.A., Inc., ATCO Rubber Products UPC #7 or Flexible Technologies – Thermaflex S-LP-10.
- F. Insulated Round Flexible Ductwork:
1. High Pressure Application:
 - a. Factory fabricated assembly of a trilaminate of aluminum foil, fiberglass and polyester with a perm rating of .02, high tear strength and properties to resist temperature change, mildew and age hardening. It shall be mechanically locked, without adhesives, into a formed aluminum helix on the ducts outside surface and be U.L. listed 181 Class 1 and comply with NFPA 90A and 90B. The material shall have a pressure rating of 12" w.g. positive pressure and -5" w.g. negative pressure through a temperature range of -20°F to +250°F.
 - b. The duct material shall be factory wrapped in a blanket of fiberglass insulation with a C factor of .23 or less. The insulation shall be encased in a fire retardant reinforced aluminum material vapor barrier with a perm rating of not over .05 grains per square ft. per hour per inch of mercury.
 - c. Based on Type 3M as manufactured by Flexmaster U.S.A., Inc., ATCO Rubber Products UPC #036 or Omni Air 1200, or Flexible Technologies – Thermaflex M-KF.
 2. Low Pressure Application:
 - a. Factory fabricated assembly of a tri-laminate of aluminum foil, fiberglass and polyester with a perm rating of .02, high tear strength and properties to resist temperature change, mildew and age hardening. It shall be mechanically locked, without adhesives, into a formed aluminum helix on the ducts outside surface. It shall be U.L. listed 181 Class 1 and comply with NFPA 90A and 90B. The material shall have a pressure rating not less than 6" w.g. positive pressure and -3" w.g. negative pressure through a temperature range of -20°F to +250°F.
 - b. The duct material shall be factory wrapped in a blanket of fiberglass insulation with a C factor of .23 or less. The insulation shall be encased in a fire retardant reinforced aluminum material vapor barrier with a perm rating of not over .05 grains per square ft. per hour per inch of mercury.
 - c. Based on Type 5M as manufactured by Flexmaster U.S.A., Inc., ATCO Rubber Products UPC #036 or Omni Air 1200, or Flexible Technologies – Thermaflex M-KF.
- G. Ductwork, General: Each duct section shall have both ends covered with polyethylene or other suitable material to protect against the entrance of dirt, debris or water during shipment and storage prior to installation.
- H. DUCT SEALANT: Water-Based Joint and Seam Sealant: Flexible, adhesive sealant, used indoors or outdoors. Foster 32-19 Duct Fas, Childers CP-146 Chil Flex or Duro Dyne SAS.

PART 3 - EXECUTION

3.1 GENERAL REQUIREMENTS:

- A. Install in strict accordance with the manufacturer's written installation instructions.
- B. The drawings, due to their small scale, are diagrammatic in nature and are not necessarily complete in all details. For this reason not all necessary offsets, rises or falls are shown. Coordinate the installation of the ductwork with all other trades and to provide all necessary offsets, etc. as required for completion of this project without any additional cost to the Owner, Architect or Engineer.
- C. All ductwork shall be run parallel or perpendicular to building structure and seams or spirals shall be aligned whenever possible.
- D. All sizes indicated on the drawings are inside clear dimensions.
- E. All ductwork shall be properly sealed in a neat clean manner with all excess sealer wiped clean.
- F. Coordinate the location of, provide the necessary access and install all devices provided in other specification sections within Division 23, including but not limited to fire, smoke and/or balancing dampers, access and mounting for control devices, air flow measuring stations, etc., as apply to this project.
- G. All ducts passing through partitions or walls shall be properly and neatly sealed. If partition or wall carries a fire rating (fire damper indicated or if architectural plans indicate a rated wall) the duct shall be sleeved with the space between the sleeve and duct properly sealed with firestopping material (Refer to Division 7 for firestopping material). The sleeve shall be permanently affixed to the wall.
- H. Coordinate the proper duct pressure classification with the system served and to provide the proper ductwork to withstand these pressures. (See Para. 3.5 Schedules: System Pressure Classification and Duct Material Schedule.)

3.2 CLEANING AND PROTECTION

- A. During construction, ductwork shall be cleaned of dirt and debris internally section by section as it is installed. At end of each day, ductwork not finally connected to equipment shall be provided with a temporary closure of polyethylene film or other covering material that will prevent entrance of dust, debris or water. Clean exterior surfaces of any material which might cause corrosion or if the duct is to be painted, it shall be cleaned suitable for painting. After substantial completion of the ductwork system the system shall be operated with filters in place to blow-out any remaining dust from the system. Protect all equipment and property from damage or fouling during this cleaning. All prefilters used during cleaning shall be replaced prior to turning the system over to the Owner.

3.3 LEAK TESTING

- A. Duct Leakage Report: The Contractor shall make all the supply, return, outside air, and exhaust duct systems (limited to 1,500 cfm and greater) operationally air-tight, with no more than 2% leakage for duct systems rated at 2" w.c. pressure class, and 1% leakage for systems exceeding 2" w.c. pressure class. Leakage test to be performed by Contractor with all air device openings and fan connections sealed airtight. Test the systems prior to applying any insulation or concealing in soffits or chases. Use a portable fan capable of producing a static pressure equal or greater than the duct test pressure. This fan to have a flow measuring assembly consisting of a straight section of duct with an orifice plate, pressure taps, and a calibrated performance curve for determining leakage rates.

1. Test each section equal to the external static pressure indicated for that fan or air handler with the portable fan assembly. After the fan achieves that steady state design pressure, record the air flow quantity across the orifice and the percent of design air flow. If the test fails, the Contractor shall reseal and retest at no additional cost to the Owner.
2. Repair all duct leaks that can be heard or felt, even if the system has passed the leakage test.
3. Submit duct leakage reports to the Balancer and the Engineer for their review and approval.
4. Refer to specification section 23 05 93 for more information.

3.4 INSTALLATION

A. General:

1. Install generally as indicated.
2. Conceal ductwork in finished spaces unless indicated otherwise.
3. Do not install ductwork in or allow to enter or pass through electrical rooms, elevator machine room, or spaces housing switchboards, panelboards or distribution boards, except ductwork that serves electrical rooms, elevator machine rooms or spaces.
4. Exercise special care to provide tight fitting well fabricated, well braced ductwork systems.
5. Field assemble rectangular, round or flat oval ductwork as follows:
 - a. Use slip joints, couplings, etc. sealed with adhesive pre-applied to couplings or duct mate spiralmate or oval mate on duct sizes 1" and larger.
 - b. Isolate dissimilar metals with elastomeric sealant tape or fiber gaskets and gaskets and washers for bolts.
6. In high pressure ductwork (above 2" w.g.), do not use 2 piece mitered 90 degree elbows with or without vanes unless approved by engineer.
7. Make duct connections from hoods, openings, fans and other devices.

B. Double Wall Round Ductwork and Fittings:

1. Coordinate the liner and/or exterior insulation requirements to assure a continuous vapor barrier and uniform thermal resistance. See Para. 3.5 Schedules for liner/insulation thickness requirements.
2. In unconditioned, non-accessible areas such as chases and dry wall ceiling the lined ducts shall also have an additional layer of duct wrap (See Section 23 07 00 – HVAC Insulation) at all joints to assure condensation control, wrap will extend a minimum of 6" on either side of joint.

C. Uninsulated Round Flexible Ductwork:

1. Provide where indicated or required on return air duct connections only.
2. Maximum length shall be 5'-0".
3. Maximum turn or bend shall be no more than 90 Deg. Provide rigid elbows where 90 Deg. turns are indicated on the drawings.
4. Flexible ductwork shall be cut to the proper length. Coiling or unnecessary offsets will not be permitted.
5. Secure inner liner to terminal collar or duct coupling with duct sealer and sheet metal screws. Wrap with three wraps of duct tape following helix path.
6. Rigid round ductwork may be substituted in lieu of flex unless the flex duct is used for vibration isolation or otherwise detailed.

D. Insulated Round Flexible Ductwork:

1. Provide where indicated or required on supply air ducts.
2. Coordinate the insulation requirements as to assure a continuous and consistent thermal resistance and vapor barrier.
3. Maximum length shall be 5'-0".

4. Maximum turn or bend shall be no more than 90 Deg. Provide rigid elbows where 90 Deg. turns are indicated on the drawings or more than one 90 Deg. turn is required.
5. Flexible ductwork shall be cut to the proper length. Coiling or unnecessary offsets will not be permitted.
6. Secure inner liner to terminal collar or duct coupling with duct sealer and sheet metal screws. Provide Stainless steel draw band to seal inner liner tight to connecting duct. Pull insulation over inner liner and fold vapor barrier over end of insulation. Secure with two coats of an approved vapor barrier mastic, reinforced with glass cloth extending 2 inches onto adjacent insulation. One coat of mastic shall be applied to the insulation prior to the application of the glass cloth, which shall be embedded in the mastic to ensure complete adhesion of the cloth.
7. High pressure flexible duct to be provided upstream of all terminal boxes. Low pressure flexible duct may be used downstream of terminal box.
8. Rigid round ductwork may be substituted in lieu of flex unless the flex duct is used for vibration isolation or otherwise detailed. If omitted, external insulation must be provided per Section 23 07 00 – HVAC Insulation.

3.5 SCHEDULES

A. System Pressure Classification and Duct Material Schedule:

<u>System I.D. No.</u>	<u>System</u>	<u>Section</u>	<u>Maximum Pressure</u>	<u>Duct Material</u>
1.	Supply	AHU to Terminal	4" pos.	A
2.	Supply	Terminal to Diffuser	2" pos.	A
3.	Return	Terminal to AHU	2" neg.	A
4.	Emergency Exhaust	Exhaust Fan		

Schedule Legend:

Duct Material

- A Galvanized Steel
- B PVC Coated Galvanized Steel
- C 304 Stainless Steel

B. Access Door Schedule:

1. Round Duct:

<u>Duct Size</u>	<u>Access Door Size</u>
a. up to 7" dia.	12" long removable section
b. 8" to 12" dia.	8" x 12"
c. 13" to 18" dia.	12" x 12"
d. 19" dia. and up	14" x 20"

END OF SECTION

SECTION 23 31 01
SHOP FABRICATED DUCTWORK

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.
- B. Refer to Division 1 for all requirements pertaining to General Provisions.
- C. Refer to Division 7 for all requirements pertaining to firestopping materials.

1.2 WORK INCLUDED

- A. Galvanized Steel Rectangular Ductwork.
- B. Aluminum Ductwork.
- C. Stainless Steel Ductwork.
- D. Duct Liner.

1.3 QUALITY ASSURANCE

- A. All ductwork shall be fabricated within the guidelines established by the Sheet Metal and Air Conditioning Contractors National Association, Inc. (SMACNA) HVAC Duct Construction Standards - Metal and Flexible, latest edition.
- B. All ductwork shall be fabricated to withstand the pressure and velocity required on this project.
- C. All components, fasteners, sealants, adhesives, etc. in the conditioned air stream or exposed in active or non- active plenums shall conform to the NFPA 90A Standard for the Installation of Air Conditioning and Ventilating Systems and Standard for Flame/Smoke/Fire Contribution of 25/50/0.
- D. All ductwork shall conform to UL standard UL 181 Factory Made Air Duct Materials and Duct Connectors, latest edition. Applicable sections shall apply to shop fabricated ductwork.
- E. After fabrication and installation of all shop fabricated ductwork the fabricator and installer, if not the same, shall certify in writing to the Owner's representative that all shop fabricated ductwork and installation of same meets or exceeds the quality standards established by SMACNA.

1.4 SUBMITTALS

- A. Submission for acceptance is required.
- B. Product data, along with installation operation and maintenance instructions, shall be included in the operation and maintenance manuals.
- C. Submit in accordance with Division 1 requirements.

1.5 SHOP DRAWINGS

- A. Shop Drawings: Provide shop drawings of sheet metal ductwork as follows:
 - 1. Draw to a scale of not less than 1/4 inch to one foot on the same size sheets as the contract drawings.
 - 2. Show duct sizes.
 - 3. Show fitting details.

4. Show lighting and ceiling diffusers.
- B. Floor Plans: Provide sheet metal floor plans drawn to the same scale as the contract drawings.
 1. Use contract drawing sheet size.
 2. Show on each floor plan the floor penetrations, fire dampers and access doors, ducts with sized and bottom elevations, terminal types and air quantities.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Galvanized Steel Ductwork:
 1. Interior, exposed or concealed: Hot rolled steel continuously annealed and hot dipped galvanized sheet or coil, minimum G-90, 0.90 oz/sf coating suitable for forming without flaking or peeling, suitable for welding or soldering. Zinc coating shall not be impaired from double seaming, breaking or roll forming. 14 ga. and lighter conforming to ASTM A653. 13 ga and heavier conforming to ASTM A653.
 2. Exterior or Areas Requiring Painting: Hot rolled steel continuously annealed and hot dipped galvanized sheet or coil, minimum G-90, 0.90 oz/sf (.001 inch thick/side) coating with a mill applied phosphate film suitable for insulating the paint from the drying action of the zinc, capable of forming without flaking or peeling, suitable for welding or soldering. Zinc coating shall not be impaired from double seaming, breaking or roll forming. 14 ga. and lighter conforming to ASTM A653. 13 ga. and heavier conforming to ASTM A653.
 3. Double Wall Galvanized Steel Ductwork:
 - a. Outer Duct: Hot rolled, continuously annealed hot dipped galvanized steel, minimum G-90, 0.90 oz/sf (.001 inch thick/side) coating, conforms to ASTM 653.
 - b. Liner: 1" thickness flexible fibrous glass minimum density 1.5 lb/cf, maximum conductivity per 1" thickness of .27 at 75°F mean temperature with a mylar coating.
 - c. Inner Duct: Hot rolled continuously annealed, perforated hot dipped, galvanized steel, minimum G-90, 0.90 oz/sf (.001 inch thick/side) coating, conforms to ASTM 653.
- B. Aluminum Ductwork: Interior or Exterior: Non heat treatable (common) alloy 1100, commercially pure (99.00% minimum). Corrosion resistant, suitable for welding, shows no signs of cracking when seaming, braking or roll forming, tensile strength range: 14,000 to 24,000 psi tensile strength, conforming to Federal Specification QQ-A-250/1.
- C. Stainless Steel Ductwork:
 1. Interior Concealed or Exterior: Type 304, finish No. 2D conforming to ASTM A 240 and Federal Specification QQ-S-766.
 2. Interior Exposed: Type 304, finish No. 4, conforming to ASTM A 240 and Federal Specification QQ-S-766.

2.2 FABRICATION

- A. Galvanized Steel Ductwork:
 1. Fabricate ductwork as indicated on the drawings. Sizes given are inside clear dimensions. Allowances must be made for duct liner if indicated. Unless otherwise indicated on the drawings, the metal gauge shall be in accordance with SMACNA-HVAC Duct Construction Standards - Metal and Flexible, Latest Edition.
 2. Elbow Fabrication:
 - a. 90 deg. elbows 12" or less in width shall be radiused whenever possible.
 - b. All radiused elbows shall be full radiused (R=1.5).

- c. All mitered 90 deg. elbows shall have turning vanes. Ducts with a width/depth ratio of 1 or more shall have double thickness turning vanes; single thickness is permissible for less than 1.
 3. Tee or Take-off Fabrication:
 - a. Take-off to round run-outs shall be conical or bell mouth. Where conical or bellmouth fittings can not be used due to take-off size to main, provide factory fabricated side takeoff fitting equal to Flexmaster U.S.A., Inc. Type "STO". Provide with handle extension for insulated ducts to clear the insulation thickness specified.
 - b. Take-off to square or rectangular shall be 45 deg. clinch collar or proportional divisions.
 - c. A volume damper shall be located downstream of each take off on square and rectangular take-offs, and integral to round run-outs.
 4. Transitions:
 - a. Concentric Transition: Maximum angle 45 deg. diverging, 60 deg. converging (SMACNA Fig. 2-7).
 - b. Eccentric Transition: Maximum angle 30 deg. diverging or converging (SMACNA Fig. 2-7).
 5. At the Contractor's option, ductwork may be joined at the transverse joints with prefabricated galvanized Ductmate Industries, Inc. ("25" or "35") or Ward Industries, Inc. sections, or with fabricated TDF or TDC T-24 type flanged transverse joints with bolted corners, gaskets, and sealants, constructed in accordance with the SMACNA HVAC Duct Construction Standards - Metal and Flexible, latest edition, Table 1-12. Ductmate "25" may be used only on ductwork with a pressure classification of 2" w.g. or less on the discharge side of air handling units or fan power terminal units. Plastic joint clips are not acceptable. Flanged and prefabricated joints by different manufacturers shall not be jointed. Formed on flanges shall not be used.
- B. Aluminum Ductwork:
 1. Fabricate ductwork as indicated on the drawings. Sizes given are inside clear dimensions. Allowances must be made for duct liner if indicated. Unless otherwise indicated on the drawings, the metal gauge shall be in accordance with SMACNA-HVAC Duct Construction Standards - Metal and Flexible, Latest Edition.
 2. Elbow Fabrication:
 - a. 90 deg. Elbows 12" or less in width shall be radiused whenever possible.
 - b. All radiused elbows shall be full radiused (R=1.5).
 - c. All mitered 90 deg. Elbows shall have single thickness turning vanes.
 3. Tee or Take Off Fabrication:
 - a. Take off to round run-outs shall be conical or bell mouth.
 - b. Take off to square or rectangular shall be 45 deg. clinch collar or proportional divisions.
 - c. A volume damper is to be located downstream of each take off.
 4. Transitions:
 - a. Concentric Transition: Maximum angle 45 deg. diverging, 60 deg. converging (SMACNA Fig. 2-7).
 - b. Eccentric Transition: Maximum angle 30 deg. diverging or converging (SMACNA Fig. 2-7).
 5. All seams shall be welded or sealed to provide watertight construction and all joints to be flanged and gasketed.
 6. All attachment of turning vane, balancing dampers, etc. shall be welded whenever possible.
 7. Access doors when required, will be installed on the side of the duct, not the bottom.
 8. Provide welded tabs for hanging, spacing as required.

- C. Stainless Steel Duct:
 - 1. Fabricate ductwork as indicated on the drawings. Sizes given are inside clear dimensions. Allowances must be made for duct liner if indicated. Unless otherwise indicated on the drawings, the metal gauge shall be in accordance with SMACNA-HVAC Duct Construction Standards - Metal and Flexible, Latest Edition.
 - 2. Elbow Fabrication:
 - a. All elbows shall be full radiused whenever possible.
 - b. All elbows required to be mitered shall have single thickness turning vanes. Vanes shall be welded in place. No protruding screws will be permitted.
 - 3. All seams shall be welded with interior weld ground smooth and all slag and/or splatter removed.
 - 4. All joints shall be constructed using Ductmate DM35 or equal stainless steel flange connections of the same grade as the duct material. All joints shall be sealed completely (externally or internally) with United Duct Sealer or an approved equal. No duct leakage will be allowed.
 - 5. Unless otherwise noted all material shall be 18 gauge.
 - 6. Provide welded tabs for hanging. Spacing as required.
- D. Ductwork, General: Each duct section shall have both ends covered with polyethylene or other suitable material to protect against the entrance of dirt, debris or water during shipment and storage prior to installation.

PART 3 - EXECUTION

3.1 GENERAL REQUIREMENTS

- A. Install in strict accordance with the Sheet Metal and Air Conditioning Contractor's National Association, Inc.'s (SMACNA) recommendations.
- B. The drawings, due to their small scale, are diagrammatic in nature and are not necessarily complete in all details. For this reason not all necessary offsets, risers or falls are shown. Coordinate the installation of the ductwork with all other trades and to provide all necessary offsets, etc. as required for completion of this project without any additional cost to the Owner, Architect and/or Engineer.
- C. All ductwork shall be run parallel or perpendicular to building structure whenever possible.
- D. All ductwork shall be properly sealed.
- E. Coordinate the location, provide the necessary access and install all devices provided in other specification sections within Division 23. Including but not limited to fire, smoke and/or balancing dampers, access and mounting for control devices, air flow measuring stations, etc. as apply to this project.
- F. All ducts passing through partitions or walls shall pass through at a 90 degree angle. The duct shall be sleeved with the space between the sleeve and duct properly sealed with firestopping material (Refer to Division 7 for Firestopping materials). The sleeve shall be permanently affixed to the wall (see Section 23 05 29 - Hangers and Supports for HVAC Systems for sleeve specifications).
- G. Coordinate the proper duct pressure classification with the systems served and to construct the ductwork to withstand these pressures. (See 3.6 Schedules; System Pressure Classification and Duct Material Schedules.)
- H. All ducts located outdoors and not of welded construction shall have seams and transverse joints sealed water tight with duct sealer, arranged to shed water and finished with insulating duct coating as specified in Section 23 33 00 – Air Duct Accessories.

3.2 CLEANING AND PROTECTION

- A. During construction, ductwork shall be cleaned of dirt and debris internally section by section as it is installed. At end of each day, ductwork not finally connected to equipment shall be provided with a temporary closure of polyethylene film or other covering material that will prevent entrance of duct, debris or water. Clean exterior surfaces of any material which might cause corrosion or if the duct is to be painted, it shall be cleaned suitable for painting. After substantial completion of the ductwork system, the system shall be operated with filters in place to blow-out any remaining dust from the system. Protect all equipment and property from damage or fouling during this cleaning. All prefilters used during cleaning shall be replaced prior to turning the system over to the Owner.

3.3 DUCT SEALING REQUIREMENTS

- A. All ducts shall have SMACNA Seal Class A (all transverse joints, longitudinal seams and duct wall penetrations).

3.4 LEAK TESTING

- A. Ductwork rated at over 3" positive pressure shall be leak tested using a test rig as described in the SMACNA Balancing Manual.
- B. Test ductwork that is rated over 3" positive pressure at 25% above specified operating pressure. Ductwork to be tested in segments and CFM leakage shall be limited to 5% of the system airflow for that section.
- C. Leaks must be located and sealed. All audible leaks, regardless of size, must be sealed.
- D. Duct Leakage Report: The Contractor shall make all the supply, return, outside air, and exhaust duct systems (limited to 1,500 cfm and greater) operationally air-tight, with no more than 2% leakage for duct systems rated at 2" w.c. pressure class, and 1% leakage for systems exceeding 2" w.c. pressure class. Leakage test to be performed by Contractor with all air device openings and fan connections sealed airtight. Test the systems prior to applying any insulation or concealing in soffits or chases. Use a portable fan capable of producing a static pressure equal or greater than the duct test pressure. This fan to have a flow measuring assembly consisting of a straight section of duct with an orifice plate, pressure taps, and a calibrated performance curve for determining leakage rates.
 - 1. Test each section equal to the external static pressure indicated for that fan or air handler with the portable fan assembly. After the fan achieves that steady state design pressure, record the air flow quantity across the orifice and the percent of design air flow. If the test fails, the Contractor shall reseal and retest at no additional cost to the Owner.
 - 2. Repair all duct leaks that can be heard or felt, even if the system has passed the leakage test.
 - 3. Submit duct leakage reports to the Balancer and the Engineer for their review and approval.
 - 4. Refer to specification section 23 05 93 for more information.

3.5 INSTALLATION

- A. Galvanized Steel Ductwork:
 - 1. Install ductwork as indicated on the drawings. If any conflict occurs notify the Owner's Representative prior to any extensive rerouting.
 - 2. Install ductwork to allow clearance for the installation of duct insulation.
 - 3. Provide duct liner as specified and/or detailed. (See 3.6 Schedule for liner requirements.)

- B. Aluminum Ductwork:
 1. Connect to equipment served with a solid duct connection.
 2. Slope horizontal runs to inlets at a minimum of 1/4" -/10 LFT. If not possible, slope away from the inlet and provide a continuous drain at the first rise. Coordinate the trapping and drain piping requirements.
 3. All joints shall be sealed water tight.
 4. Do not use penetrating screws or rivets for hanging. Support duct from welded clips or from flanges.
- C. Stainless Steel Ductwork:
 1. Connect to equipment served with a solid connection.
 2. Slope horizontal runs to inlet at a minimum of 1/4 inch per one (1) linear foot.
 3. All joints shall be sealed air and water tight.
- D. Duct Liner:
 1. Coordinate the proper duct liner thickness with the liner thickness schedule included in Para. 3.6 - Schedules.
 2. The liner shall be applied with fire resistant adhesive and weld pin mechanical fasteners on a maximum of 15" centers for velocities less than 1500 FPM and 12" centers for velocities above 1501 FPM. Adhered or clinched pinched type pins not permitted. When installed, fastener heads shall not compress the insulation more than 1/8" based on the nominal insulation thickness.
 3. The liner shall be butted and sealed at all joints, seams and exposed edges to ensure continuous thermal resistance, and condensation control. In unconditioned, non-accessible areas such as chases and dry wall ceilings, the lined duct shall also have an additional layer of duct wrap at the joints for a minimum of 6" either side of the joint to assure condensation control.

3.6 SCHEDULES

- A. Ductwork shown to be round or oval is to be provided under Section 23 31 00 - Pre-Fabricated Ductwork.
- B. System Pressure Classification and Duct Material Schedule for Shop Fabricated Ductwork:

	<u>System</u>	<u>Section</u>	<u>Maximum Pressure</u>	<u>Duct Material</u>
1.	Outside Air Plenum	All	2" neg.	A
2.	Outside Air Duct	All	2" neg.	A
3.	Supply	AHU to terminal	3" pos.	A
4.	Supply	Terminal to Diffuser	2" pos.	A
5.	Return	All AHU Return	2" neg.	A
6.	Gen. Exhaust	Inlet to Unit	2" neg.	A
7.	Kit. Hood Exhaust	All	3" neg.	C
8.	Locker/Shower.	All	2" neg.	B
9.	Laundry Rm. Exh.	All	2" neg.	B
10.	Air Transfer Duct	All	2" neg.	A
11.	Laboratory	Inlet Grille	2" neg.	C
	General Exhaust	To Air Valve		

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Schedule Legend:

Duct Material

- A. Galvanized Steel
- B. Aluminum
- C. Stainless Steel - Type 304

END OF SECTION

SECTION 23 33 00
AIR DUCT ACCESSORIES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.
- B. Refer to Division 1 for all requirements pertaining to General Provisions.

1.2 WORK INCLUDED

- A. Duct access doors.
- B. Fire doors.
- C. Fire dampers.
- D. Smoke dampers.
- E. Smoke/Fire dampers.
- F. Backdraft dampers.
- G. Volume dampers.
- H. Prefabricated casing panels.
- I. Flexible duct connectors.
- J. Roof mounted air outlets and inlets.
- K. Louver (Exhaust).
- L. Louver (Outside Air Intake).
- M. Hardware Cloth.
- N. Aluminum Brick vent.
- O. Install miscellaneous control devices.

1.3 QUALITY ASSURANCE

- A. All products provided for enhancement of Life Safety shall be UL listed and bear the appropriate label stating compliance.
- B. All Products to have a Florida Product Approval Number, as required by the Florida Building Code.
- C. All products located in the conditioned air stream or located in return air plenums shall conform to the NFPA 90A Flame/Smoke/Fuel Contribution of 25/50/0 and all other applicable requirements of NFPA 90A.
- D. Smoke and Smoke/Fire dampers shall be provided with a 60 month from the date of shipment parts only warranty, including freight for all components, including damper operators.
- E. Quality Assurance for Louvers:
 - 1. Source Limitations: Obtain louvers and vents through one source from a single manufacturer where indicated to be of same type, design, or factory-applied color finish.
 - 2. Welding: Qualify procedures and personnel according to the following:
 - a. AWS D1.2, "Structural Welding Code--Aluminum."
 - b. AWS D1.6, "Structural Welding Code - Stainless Steel."
 - 3. SMACNA Standard: Comply with recommendations in SMACNA's "Architectural Sheet Metal Manual" for fabrication, construction details, and installation procedures.

1.4 PERFORMANCE REQUIREMENTS FOR LOUVERS

- A. Structural Performance: Louvers shall withstand the effects of gravity loads and the following loads and stresses within limits and under conditions indicated without permanent deformation of louver components, noise or metal fatigue caused by louver blade rattle or flutter, or permanent damage to fasteners and anchors. Wind pressures shall be considered to act on vertical projection of louvers.
 - 1. Wind Loads: Determine in accordance with Florida Building Code (current edition).

1.5 SUBMITTALS

- A. Submission for acceptance is required.
- B. Product data, along with installation operation and maintenance instructions, shall be included in the operation and maintenance manuals.
- C. Submit in accordance with Division 1 Requirements.
- D. Submittals for Louvers:
 - 1. Product Data: For each type of product indicated.
 - 2. Shop Drawings: For louvers and accessories. Include plans, elevations, sections, details, and attachments to other Work. Show blade profiles, angles, and spacing.
 - a. For installed louvers and vents indicated to comply with design loads, include structural analysis data signed and sealed by the qualified professional engineer responsible for their preparation. Include summary of forces and loads on walls and jambs.
 - 3. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency or by manufacturer and witnessed by a qualified testing agency, for each type of louver.
 - a. Wind-Driven Rain.
 - b. Air-Performance.

1.6 PROJECT CONDITIONS FOR LOUVERS

- A. Field Measurements: Verify louver openings by field measurements before fabrication and indicate measurements on Shop Drawings.
 - 1. Established Dimensions: Where field measurements cannot be made without delaying the Work, establish opening dimensions and proceed with fabricating louvers without field measurements.

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

- A. Duct Access Doors:
 - 1. Air Balance, Inc.
 - 2. Cesco Products
 - 3. Greenheck, Inc.
 - 4. Nailor Industries, Inc.
 - 5. Nystrom
 - 6. Prefco Products, Inc.
 - 7. Ruskin Manufacturing, Co.

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8. Safe Air Inc.
- B. Fire Doors:
 1. Air Balance, Inc.
 2. Cesco Products
 3. Greenheck, Inc.
 4. Nailor Industries, Inc.
 5. Nystrom
 6. Prefco Products, Inc.
 7. Ruskin Manufacturing, Co.
 8. Safe Air Inc.
- C. Fire Dampers:
 1. Air Balance, Inc.
 2. Cesco Products
 3. Greenheck, Inc.
 4. Nailor Industries, Inc.
 5. Prefco Products, Inc.
 6. Ruskin Manufacturing, Co.
 7. Safe Air Inc.
- D. Smoke Dampers:
 1. Air Balance, Inc.
 2. Cesco Products
 3. Greenheck, Inc.
 4. Nailor Industries, Inc.
 5. Prefco Products, Inc.
 6. Ruskin Manufacturing, Co.
 7. Safe Air Inc./Dowco
- E. Smoke/Fire Dampers:
 1. Air Balance, Inc.
 2. Cesco Products
 3. Greenheck, Inc.
 4. Nailor Industries, Inc.
 5. Prefco Products, Inc.
 6. Ruskin Manufacturing, Co.
 7. Safe Air Inc./Dowco
- F. Backdraft Dampers:
 1. Air Balance, Inc.
 2. Cesco Products
 3. Greenheck, Inc.
 4. Nailor Industries, Inc.
 5. Prefco Products, Inc.
 6. Ruskin Manufacturing, Co.
 7. Safe Air Inc./Dowco
- G. Volume Dampers:
 1. Greenheck, Inc.
 2. Air Balance, Inc.
 3. Arrow United Industries, Inc.
 4. Cesco Products
 5. Nailor Industries, Inc.
 6. Prefco Products, Inc.
 7. Ruskin Manufacturing, Co.

8. Safe Air Inc./ Dowco
- H. Prefabricated Casing Panels:
 1. IAC
 2. Ruskin
 3. Semco
 4. United Sheetmetal
 5. Vibro Acoustics
- I. Flexible Duct Connectors:
 1. Ductmate Industries, Inc.
 2. Duro-Dyne
 3. Elgen
 4. Ventfabric
- J. Roof Mounted Air Outlets and Inlets:
 1. Air Balance, Inc.
 2. Cesco Products
 3. Greenheck, Inc.
 4. Leader, Inc.
 5. Loren Cook
 6. Ruskin Manufacturing Company
- K. Louvers (Exhaust)- No Substitutions Accepted:
 1. Greenheck, Inc.
 2. Ruskin Company; Tomkins PLC.
 3. United Enertech
- L. Louvers (Outside Air Intake)- No Substitutions Accepted:
 1. Greenheck, Inc.
 2. Ruskin Company; Tomkins PLC.
 3. United Enertech
- M. Hardware Cloth:
 1. McNichols Co.
 2. or equal.
- N. Aluminum Brick Vent
 1. Greenheck, Inc.
 2. Ruskin Manufacturing Company
 3. United

2.2 FABRICATION

- A. Duct Access Doors:
 1. Low Pressure Ductwork:
 - a. Rating up to 2" wg positive or negative.
 - b. Frame: Minimum 22 gauge galvanized steel or aluminum, minimum 5/8" knock over edge, neoprene gasket between frame and duct and frame and door.
 - c. Door: Minimum 24 gauge galvanized steel or aluminum, continuous hinge and cam latches or minimum 2 cam latches, double wall construction, fiberglass insulated thickness to match ductwork.
 - d. Based on Ruskin Manufacturing Co. ADH24. High Pressure Ductwork:
 - a. Rating: Up to 10" wg positive pressure.
 - b. Frame: Minimum 16 gauge galvanized steel with "Z" shaped reinforced corners, polyurethane gasket between frame and duct and frame and door.

- c. Door: Minimum 16 gauge galvanized steel or aluminum, minimum 2 spring latches, double wall construction, fiberglass insulated with thickness to match ductwork.
 - d. Based on Ruskin Manufacturing Co. ADHP-3.
- B. Fire Doors:
1. Rating: 3 hours (UL approved for installation in Class "A" wall construction).
 2. Minimum 24 gauge galvanized steel frame suitable for connection to ductwork without transition, minimum 24 gauge galvanized steel curtain type blades located out of the airstream, thickness coordinated with wall construction. Where an active smoke control system exists the damper shall be capable of closing in an airstream moving at a minimum of 2000 feet per minute and operating at 4" w.g. pressure (dynamic damper).
 3. Sleeves: UL listed minimum gauge galvanized steel with welded construction corners. Rollformed sleeves will not be acceptable unless contractor guarantees in writing to seal voids in sleeve with UL approved sealer to limit air leakage. Length of sleeve shall be coordinated with the wall or floor.
 4. Operation: Stainless steel constant force closure spring.
 5. Link Setting: 160°F or 165°F
 6. Based on Ruskin Manufacturing Co., IBD23 Style B (Static Systems).
 7. Based on Ruskin Manufacturing Co., DIBD23 Style B (Active smoke control systems only).
- C. Fire Dampers:
1. Rating: 1-1/2 hours (UL approved for installation in 2 hour walls).
 2. Construction: Minimum 24 gauge galvanized steel frame suitable for connection to ductwork without transition, minimum 24 gauge galvanized steel curtain type blades located out of the airstream, thickness coordinated with wall construction. Where an active smoke control system exists the damper shall be capable of closing in an airstream moving at a minimum of 2000 feet per minute and operating at 4" w.g. pressure (dynamic damper).
 3. Sleeves: UL listed minimum gauge galvanized steel with welded construction corners. Rollformed sleeves will not be acceptable unless contractor guarantees in writing to seal voids in sleeve with UL approved sealer to limit air leakage. Length of sleeve shall be coordinated with the wall or floor.
 4. Operation: Stainless steel constant force closure spring.
 5. Link Setting: 160°F or 165°F.
 6. Based on Ruskin Manufacturing Co. IBD2 Style B. (Static Systems).
 7. Based on Ruskin Manufacturing Co., DIBD2 Style B. (Active smoke control systems only).
- D. Smoke Dampers:
1. Low and Medium Pressure Ductwork:
 - a. UL labeled under UL 555S low leakage rated, no more than 10 CFM/SF @ 1" w.g. (UL Class II) after exposure to 1000°F for 1 hour (non-degradable). Classified for both horizontal and vertical mounting.
 - b. Construction:
 - 1) Frame 16 galvanized steel.
 - 2) Damper Blades: 14 gauge true airfoil design constructed of galvanized steel of low leakage non-heat degradable design with friction free silicone rubber edge type for a smoke seal to 450°F incorporated into blade and frame shapes. Blade shall be suitable for installation in systems with a maximum velocity of 4,000 FPM and 8" w.g. pressure at closure.

- c. Damper operation by means of an electric actuator 120V AC, 24V AC or signal from smoke detector alarm circuit. Electric motor actuator to be UL listed with damper assembly for power open, spring closed operation with a maximum travel time of 15 seconds. Motor furnished with all connecting linkage and mounting hardware.
 - d. Damper and actuator shall be provided with a 60 month warranty as described in Paragraph 1.3.C.
 - e. Based on Ruskin Manufacturing Co., SD60-II.
- E. Smoke/Fire Dampers:
- 1. Low and Medium Pressure Ductwork:
 - a. UL labeled under the following standards:
 - 1) UL 555 - 1-1/2 hr. fire endurance.
 - 2) UL 555S - Low leakage rated, no more than 10 CFM/SF @ 1" w.g. (UL Class II) after exposure to 1000°F for 1 hour (non-degradable).
 - 3) Classified for both horizontal and vertical mounting.
 - b. Construction: Single damper designed and rated for combination smoke/fire duty.
 - 1) Frame: 16 ga. galvanized steel.
 - 2) Damper Blades: 14 gauge true airfoil design constructed of galvanized steel of low leakage non-heat degradable design with friction free inflatable silicone coated fiberglass material to maintain smoke leakage rating to a minimum of 450°F and galvanized steel for flame seal to 1900°F. Blade shall be suitable for installation in systems with a maximum velocity of 2,000 FPM and 4" w.g. pressure at closure.
 - 3) Duct sleeve provided by others.
 - c. Operation:
 - 1) Smoke/fire damper operation by means of an integral resettable and re-useable UL listed electric-ambient temperature link, UL listed releasing device and mechanical lock assembly. Link activated by either electric, 120V AC or 24V AC signal from smoke detector alarm circuit or 350°F duct ambient temperature. Damper shall be capable of being reopened by remote signal when the duct temperature drops to 150°F. Electric motor actuator shall be UL listed with the damper assembly for power open/spring closed operation. Motor actuator shall be factory furnished with all connecting linkage and mounting hardware and shall be factory tested for proper operation.
 - 2) Damper and actuator shall be provided with a 60 month warranty as described in Paragraph 1.3.C.
 - d. Based on Ruskin Manufacturing, Co., FSD60-2.
- F. Backdraft Dampers:
- 1. Low Pressure Ductwork:
 - a. Rating: Up to 1" wg positive or negative.
 - b. Frame: Minimum 16 gauge (.064") galvanized steel or extruded aluminum.
 - c. Blades: Minimum 16 gauge (.064") galvanized steel or extruded aluminum parallel blade action, brass bearing, non-ferrous or de-iron pivot pins, gasketed blades.
 - d. Accessories: Counter balance and weights suitable for assisting or retarding as indicated on the drawings.
 - e. Based on Ruskin Manufacturing, Co. CBD4.
- G. Volume Dampers:
- 1. Provide volume dampers where indicated, in all branch ductwork and construct as follows:
 - a. Provide single blades to a maximum of 10 inch blade width.

- b. Provide inside end synthetic bearings and locking quadrants with wing nuts.
- c. Friction locks are not permitted.
- d. Break damper blades on both edges for stiffness.
- e. Provide multi-blades on dampers 12 inches and larger with inside pins and molded synthetic bearings, and 2 inches wide by 1/8 inch thick structural galvanized channel frame.
- f. Provide galvanized connecting bar with molded synthetic bearings on multi-blade dampers.
- g. Provide stand off bracket for installation in externally insulated duct.
- h. Based on Ruskin Manufacturing, Co. MD35 for rectangular ducts (MDSR25 for round ducts) with velocities up to 1500 feet per minute.
- i. Based on Ruskin Manufacturing, Co. CD30AF1 for rectangular ducts (CDR82 for round ducts) with velocities over 1501 feet per minute.

H. Prefabricated Casing Panels:

1. Panel sections shall consist of an outer sheet of 18 gauge and an inner sheet of 22 gauge galvanized steel. Inside panel surfaces shall have 3/32 inch diameter perforations on 3/16 inch centers.
2. Panels shall be completely metal enclosed; shall be minimum (2) (4) inches thick; and the space between inner and outer surfaces shall be filled with acoustic material which will not settle, shed or dust.
3. Housing shall be factory fabricated and field assembled with joining members serving to provide structural rigidity to 10 inches water pressure differential, either positive or negative. Structure shall be tested and rated for known structural deflection.
4. The joining members shall be fabricated from galvanized sheet steel, minimum 20 gauge, and shall be arranged to provide a pressure tight air seal against 10 inches pressure differential, either positive or negative. Use Sealing Mastic when joining parallel panels, roof to wall panels, joints and corner joints. Housing shall be fabricated to withstand floor and roof loads of 40 pounds per square foot plus any concentrated loads.
5. Assembly shall be secured against the separation forces of air pressure with cadmium plated metal fasteners.
6. The panel shall have minimum airborne sound transmission loss when tested according to ASTM E90-70.

Transmission Loss in DB

Octave

Band HZ	63	125	250	500	1K	2K	4K
Loss	30	16	24	35	45	52	58

7. The thermal conductivity of the panel shall not exceed 0.07 Btu/hr-square foot-degrees F.
8. Insulated access doors shall be provided. Doors shall be constructed of 20 gauge galvanized steel, adequately hinged. Doors shall open against the pressure force and be equipped with safety features such as latches operable from both sides of door and wire glass double pane windows not less than 6 inches x 6 inches square. Doors shall seat against neoprene gaskets. Doors shall have Ventfabrics No. 260 "Ventlok" latches.
9. All openings in the casing for ductwork connections shall be cut and framed at the factory by the panel manufacturer. All openings shall be sealed to prevent air leakage and condensation in accordance with the manufacturer's instructions.
10. All joints, corners, etc., in the panels and floor shall be so designed that no direct path for sound or air leakage can occur.
11. The casing manufacturer shall guarantee that the casings, doors and housings shall meet the acoustical, thermal and air pressure performance specified, when installed in accordance with the manufacturer's recommendations and as noted herein.

- I. Flexible Duct Connectors (Required on all duct transitions from AHU to ductwork):
 1. Indoor Applications:
 - a. Material: Heavy glass fabric double - Coated with neoprene, Minimum of 30 oz/sy, Resistant to abrasion and damage due to repeated flexing, waterproof and air tight, minimum 26 gauge galvanized steel or .032" aluminum edge a minimum of 2-1/2" wide each side. Coordinate the flex width with the schedule in 3.3 - Schedule.
 - b. Rating:
 - 1) Temperature: -10°F to 200°F
 - 2) Pressure: 10" positive
10" negative
 - c. Based on Ventfabric and Ventglass
 2. Outdoor Applications:
 - a. Heavy glass fabric double - Coated with neoprene, Minimum of 30 oz/sy, resistant to abrasion and damage due to repeated flexing, water proof, airtight and resistant to damage from direct sunlight, minimum 26 gauge galvanized steel or .032" aluminum edge at minimum of 2-1/2" wide each side. Coordinate the flex width with the schedule in 3.3 - Schedule.
 - b. Rating:
 - 1) Temperature: -10°F to 250°F
 - 2) Pressure: 10" positive
10" negative
 - c. Based on Ventfabrics Ventlon.
- J. Louvers (Exhaust):
 1. Subject to compliance with requirements, provide either of the following unless a specific orientation is indicated:
 2. Horizontal Storm-Resistant Louver.
 3. Frame and Blade Nominal Thickness: As required to comply with structural performance requirements, but not less than 0.080 inch (2.0 mm).
 4. Performance Requirements:
 - a. Wind-Driven Rain Performance: Not less than 99 percent effectiveness when subjected to a rainfall rate of 3 inches (75 mm) per hour and a wind speed of 29 mph (13 m/s) at a core-area intake velocity of 700-fpm (3.6-m/s).
 - b. Air Performance: Not more than 0.10-inch wg (25-Pa) static pressure drop at 600-fpm (3.0-m/s) free-area intake velocity.
 - c. Free Area: Not less than 7.0 sq.ft. (0.65 sq.m) for 48-inch-(1220-mm-) wide by 48-inch-(1220-mm-) high louver.
 5. AMCA Seal: Mark units with AMCA Certified Ratings Seal.
 6. Acceptable Products – Horizontal:
 - a. Greenheck EHH-501-X.
 - b. Ruskin EME-520-MD.
 - c. UEC SED-5.
Must be Miami Dade NOA approved and also have a Florida Product Approval Number.
 7. EHPA Acceptable Products – Vertical:
 - a. Based on Ruskin Manufacturing, Co. EME6325D /CD-50 Miami Dade/Hurricane Tested & Missile Impact Tested and approved. (Vertical Blade). This louver shall be used on ALL EHPA Buildings as specified on the Architectural Drawings.
- K. Louvers (Outside Air Intake):
 1. Subject to compliance with requirements, provide either of the following unless a specific orientation is indicated:

- a. Horizontal Storm-Resistant Louver.
2. Frame and Blade Nominal Thickness: As required to comply with structural performance requirements, but not less than 0.080 inch (2.0 mm).
3. Performance Requirements:
 - a. Wind-Driven Rain Performance: Not less than 99 percent effectiveness when subjected to a rainfall rate of 3 inches (75 mm) per hour and a wind speed of 29 mph (13 m/s) at a core-area intake velocity of 700-fpm (3.6-m/s).
 - b. Air Performance: Not more than 0.10-inch wg (25-Pa) static pressure drop at 600-fpm (3.0-m/s) free-area intake velocity.
 - c. Free Area: Not less than 7.0 sq.ft. (0.65 sq.m) for 48-inch-(1220-mm-) wide by 48-inch-(1220-mm-) high louver.
4. AMCA Seal: Mark units with AMCA Certified Ratings Seal.
5. Acceptable Products – Horizontal:
 - a. Greenheck EHH-501-X.
 - b. Ruskin EME-520-MD.
 - c. UEC SED-5.
Must be Miami Dade NOA approved and also have a Florida Product Approval Number.
6. EHPA Acceptable Products – Vertical:
 - a. Based on Ruskin Manufacturing, Co. EME6325D /CD-50 Miami Dade/Hurricane Tested & Missile Impact Tested and approved. (Vertical Blade). This louver shall be used on ALL EHPA Buildings as specified on the Architectural Drawings.
- L. Hardware Cloth: 4 mesh galvanized steel, plain weave with .035 wire.
- M. Aluminum Brick Vent
 1. Extruded aluminum, 0.100” minimum wall thickness for frame and blades. Frame depth 4”.
 2. 8-1/8”W x 7-3/4”H with 1-1/2 flanged frame and aluminum mesh screen.
 3. Finish to be “Kynar 500” fluropolymmer coating having dry thickness of approximately 1.2 mils when baked at 450°F. Color to be selected by Architect.
 4. Minimum free area shall be 39% of nominal size.
 5. Based on Ruskin Manufacturing, Co. BV100 or Greenheck Model BVF.

2.3 MATERIALS FOR LOUVERS

- A. Aluminum Extrusions: ASTM B 221 (ASTM B 221M), alloy 6063-T5 or T-52.
- B. Aluminum Sheet: ASTM B 209 (ASTM B 209M), alloy 3003 or 5005 with temper as required for forming, or as otherwise recommended by metal producer for required finish.
- C. Aluminum Castings: ASTM B 26/B 26M, alloy 319.
- D. Stainless-Steel Sheet: ASTM A 666, Type 304, with No. 4 finish.
- E. Fasteners: Of same basic metal and alloy as fastened metal or 300 Series stainless steel, unless otherwise indicated. Do not use metals that are incompatible with joined materials.
 1. Use types and sizes to suit unit installation conditions.
 2. Use Phillips flat-head, hex-head or Phillips pan-head screws for exposed fasteners, unless otherwise indicated.
- F. Postinstalled Fasteners for Concrete and Masonry: Torque-controlled expansion anchors, made from stainless-steel components, with capability to sustain, without failure, a load equal to 4 times the loads imposed, for concrete, or 6 times the load imposed, for masonry, as determined by testing per ASTM E 488, conducted by a qualified independent testing agency.
- G. Bituminous Paint: Cold-applied asphalt emulsion complying with ASTM D 1187.

2.4 FABRICATION, GENERAL FOR LOUVERS

- A. Assemble louvers in factory to minimize field splicing and assembly. Disassemble units as necessary for shipping and handling limitations. Clearly mark units for reassembly and coordinated installation.
- B. Vertical Assemblies: Where height of louver units exceeds fabrication and handling limitations, fabricate units to permit field-bolted assembly with close-fitting joints in jambs and mullions, reinforced with splice plates.
- C. Continuous Vertical Assemblies: Fabricate units without interrupting blade-spacing pattern.
- D. Maintain equal louver blade spacing to produce uniform appearance.
- E. Fabricate frames, including integral sills, to fit in openings of sizes indicated, with allowances made for fabrication and installation tolerances, adjoining material tolerances, and perimeter sealant joints.
- F. Frame Type: As indicated.
- G. Include supports, anchorages, and accessories required for complete assembly.
- H. Provide vertical mullions of type and at spacings indicated, but not more than recommended by manufacturer, or 72 inches (1830 mm) o.c., whichever is less.
- I. Provide subsills or extended sills made of same material as louvers where indicated or required for drainage to exterior and to prevent water penetrating to interior.
- J. Provide with optional wire mesh filter rack and filters.
- K. Join frame members to each other and to fixed louver blades with fillet welds, threaded fasteners, or both, as standard with louver manufacturer, concealed from view, unless otherwise indicated or size of louver assembly makes bolted connections between frame members necessary.

2.5 LOUVER SCREENS

- A. General: Provide screen at each exterior louver.
 - 1. Screen Location for Fixed Louvers: Interior face.
 - 2. Screening Type: Insect screening, unless otherwise indicated; bird screening where indicated.
- B. Secure screens to louver frames with stainless-steel machine screws, spaced a maximum of 6 inches (150 mm) from each corner and at 12 inches (300 mm) o.c.
- C. Louver Screen Frames: Fabricate with mitered corners to louver sizes indicated.
 - 1. Metal: Same kind and form of metal as indicated for louver to which screens are attached. Reinforce extruded-aluminum screen frames at corners with clips.
 - 2. Finish: Same finish as louver frames to which louver screens are attached.
 - 3. Type: Rewirable frames with a driven spline or insert for securing screen mesh.
- D. Louver Screening for Aluminum Louvers:
 - 1. Insect Screening: Aluminum, 18-by-16 (1.4-by-1.6-mm) mesh, 0.012-inch (0.30-mm) wire.
 - 2. Bird Screening: Aluminum, 1/2-inch- (12.7-mm-) square mesh, 0.063-inch (1.6-mm) wire.

2.6 CLOSURE ANGLES AND CLOSURE PLATES FOR LOUVERS

- A. Fabricate from minimum 0.074-inch (2 mm) thick stainless steel or aluminum.
- B. Provide continuous closure angles and closure plates on inside head, jambs, and sill of exterior wall louvers.
- C. Secure angles and plates to louver frames with screws, and to masonry or concrete with fasteners as specified.

- D. Provide minimum 0.032-inch (0.8 mm) thick stainless steel or aluminum sleeves in cavity walls and elsewhere as shown.

2.7 BLANK-OFF PANELS

- A. Uninsulated, Blank-Off Panels:
 - 1. Aluminum sheet for aluminum louvers, not less than 0.050-inch (1.2-mm) nominal thickness, unless otherwise indicated.
 - 2. Panel Finish: Same finish applied to louvers.
 - 3. Attach blank-off panels to back of louver frames with clips or stainless-steel, sheet metal screws.
- B. Insulated, Bland-off Panels: Laminated metal-faced panels consisting of insulating core surfaced on back and front with Metal sheets:
 - 1. Thickness: 2 Inch (50 mm).
 - 2. Metal Facing Sheets: Aluminum sheet, not less than 0.032-inch (0.8-mm) nominal thickness.
 - 3. Insulating Core: Foamed-plastic rigid insulation board.
 - 4. Edge Treatment: Trim perimeter edges of blank-off panels with louver manufacturers standard extruded-aluminum-channel frames, not less than 0.080-inch (2.0-mm) nominal thickness, with corners mitered and with same finish as panels.
 - 5. Seal perimeter joints between panel faces and louver frames with 1/8-by-1-inch (3.2-by-25-mm) PVC compression gaskets.
 - 6. Panel Finish: Same finish applied to louvers.
 - 7. Attach blank-off panels to back of louver frames with clips or stainless steel, sheet metal screws.

2.8 ALUMINUM FINISHES

- A. Finish louvers after assembly.
- B. High-Performance Organic Finish: 2-coat fluoropolymer finish complying with AAMA 2605 and containing not less than 70 percent PVDF resin by weight in color coat. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers written instructions.
 - 1. Color and Gloss: As selected by School Board from manufacturers full range if not indicated as part of the Design Build Package.

PART 3 - EXECUTION

3.1 GENERAL REQUIREMENTS

- A. Install all products in strict accordance with the manufacturer's written installation instructions.
- B. Coordinate the installation of products provided within other sections of Division 23 including but not limited to control dampers, airflow measuring stations, etc.

3.2 INSTALLATION

- A. Duct Access Doors:
 - 1. Coordinate the proper class access door with the system requirements.
 - 2. Duct access doors shall be mounted so as to allow maximum access and/or door swing while also providing easy access from the floor or other personal accessible structures.

3. Duct access doors shall be provided wherever required for proper maintenance of equipment, access to duct mounted control devices, or visual inspection and setting of dampers, etc. All doors, due to the small scale of the drawings, may not be shown, it is the contractor's responsibility to coordinate with all trades concerned to provide the necessary quantity and properly locate all doors.
- B. Fire Doors:
1. Fire doors shall be provided where indicated.
 2. Review the architectural drawings to determine the wall construction rating so as to provide the proper rated damper.
 3. All fire doors shall be mounted within a 16 gauge steel sleeve permanently affixed to the wall by means of perimeter retaining angles.
 4. The fire door shall be permanently attached to the sleeve. All voids around the sleeve and damper and sleeve and wall shall be properly firestopped under Division 07 Section "Firestopping."
 5. Ductwork shall be attached to the fire door by means of a UL approved break away connection.
 6. Access doors or access sections shall be provided at all fire door locations.
- C. Fire Dampers:
1. Fire dampers shall be provided where indicated.
 2. Review the architectural drawings to determine the wall construction rating so as to provide the proper rated damper.
 3. All fire dampers shall be mounted within a UL approved thickness galvanized steel sleeve permanently affixed to the wall by means of perimeter retaining angles.
 4. The fire damper shall be permanently attached to the sleeve. All voids around the sleeve and damper and sleeve and wall shall be properly firestopped under Division 07 Section "Firestopping."
 5. Ductwork shall be attached to the fire damper by means of a UL approved break away connection.
 6. Access doors or access sections shall be provided at all fire damper locations.
- D. Smoke Dampers:
1. Provided where indicated. See combination smoke/fire damper for assemblies in fire rated barriers.
 2. Review the architectural drawings to determine the wall construction rating so as to provide the proper rated damper.
 3. Provide access doors or access sections at all damper locations.
 4. Coordinate the provision of the smoke damper actuator with the automatic temperature control and fire alarm system and ensure adequate space for the mounting of the actuator during installation of the damper and ductwork.
- E. Smoke/Fire Damper:
1. Provided where indicated. All smoke dampers in fire rated barriers to be combination type.
 2. Review the architectural drawings to determine the wall construction rating so as to provide the proper rated damper.
 3. All smoke/fire dampers shall be mounted within a UL approved thickness galvanized steel sleeve permanently affixed to the wall by means of perimeter retaining angles.
 4. The smoke/fire damper shall be permanently attached to the sleeve. All voids around the sleeve and damper and sleeve and wall shall be properly firestopped under Division 07 Section "Firestopping."
 5. Ductwork shall be attached to the smoke/fire damper by means of a UL approved break away connection.
 6. Access doors or access sections shall be provided at all smoke/fire damper locations.

7. Coordinate the provision of the smoke damper actuator with the Building Control System and assure adequate space for the mounting of the actuator during installation of the smoke/fire damper and ductwork.
- F. Backdraft Damper:
1. Securely attach backdraft damper to wall with a suitable sleeve and retaining angles and seal all voids between damper and wall.
 2. Adjust damper to open or close under the design conditions.
- G. Volume Dampers: Install at all branch take-offs.
- H. Prefabricated Casing Panels:
1. Casing shall be constructed as detailed on drawings. All necessary structural steel bracing required but not shown shall be provided.
 2. Casing shall be sealed air tight both positive and negative to ± 10 in. w.g.
 3. Install in accordance with SMACNA duct construction standards for the pressure indicated.
 4. Set access doors minimum 6 inches above floor as detailed on drawings. Arrange door swings so that fan static pressure holds door in closed position.
 5. In casing sections subject to collection of water, where deep seal traps are shown, coordinate with other trades to be certain that traps are properly located.
 6. All openings in casing shall be framed. All pipes shall be sleeved and area between pipe and sleeve sealed.
- I. Flexible Duct Connectors:
1. Flexible duct connectors shall not be omitted where air handling units are provided with internally isolated fans and internal isolation.
 2. Provide flexible duct connectors immediately adjacent to all in-line or ductwork connected fans and/or fan equipped units with or without internal vibration isolation.
 3. Flexible duct connectors shall be properly selected and installed to ensure against collapsing under negative pressure and unacceptable ballooning under positive pressure. Leakage is not permissible. See width schedule in 3.3 - Schedules.
- J. Roof Mounted Air Outlets and Inlets:
1. Install in accordance with manufacturers written installation instructions.
 2. Coordinate installation requirements with roofing sub-contractor.
- K. Hardware Cloth: Install over all open ended ducts. Provide sheet metal pocket over raw edges and secure with sheet metal screws through the metal edge cover.
- L. Aluminum Brick Vent: Receive an unload louvers and deliver to general contractor at jobsite for storage and installation by general contractor.
- M. Install Miscellaneous Control Devices:
1. Install dampers. Provide necessary blank off sections where dampers are installed in factory fabricated mixing box openings.
 2. Install air flow measuring stations. Coordinate size and location with proper access before approving release of units for fabrication and shipment.
 3. Install duct smoke detectors provided under Division 26.

3.3 INSTALLATION FOR LOUVERS

- A. Locate and place louvers level, plumb, and at indicated alignment with adjacent work and in accordance with manufacturer's recommendations to meet requirements of article titled "Performance Requirements".
- B. Use concealed anchorages where possible. Provide brass or lead washers fitted to screws where required to protect metal surfaces and to make a weather-tight connection.
- C. Form closely fitted joints with exposed connections accurately located and secured.
- D. Install closure angles and closure plates.

- E. Provide perimeter reveals and openings of uniform width for sealants and joint fillers, as indicated.
- F. Repair finishes damaged by cutting, welding, soldering, and grinding. Restore finishes so no evidence remains of corrective work. Return items that cannot be refinished in the field to the factory, make required alterations, and refinish entire unit or provide new units.
- G. Protect galvanized and nonferrous-metal surfaces from corrosion or galvanic action by applying a heavy coating of bituminous paint on surfaces that will be in contact with concrete, masonry, or dissimilar metals.
- H. Install concealed gaskets, flashings, joint fillers, and insulation as louver installation progresses, where weather-tight louver joints are required. Comply with Division 7 Section "Joint Sealants" for sealants applied during louver installation.

3.4 ADJUSTING AND CLEANING FOR LOUVERS

- A. Clean exposed surfaces of louvers and vents that are not protected by temporary covering, to remove fingerprints and soil during construction period. Do not let soil accumulate until final cleaning.
- B. Before final inspection, clean exposed surfaces with water and a mild soap or detergent not harmful to finishes. Thoroughly rinse surfaces and dry.
- C. Restore louvers and vents damaged during installation and construction so no evidence remains of corrective work. If results of restoration are unsuccessful, as determined by Architect, remove damaged units and replace with new units.

3.5 SCHEDULES

- A. Access Door Schedule: Square or Rectangular Duct work: Access Door Mounting

	<u>Surface Max. Dim.</u>	<u>Access Door Size</u>
1.	6"	12" long Remov. Section
2.	7" to 8"	6" x 6"
3.	9" to 12"	8" x 8"
4.	13" to 18"	12" x 12"
5.	19" and up	16" x 16"
6.	Special Situations	See Plans

- B. Flexible Duct Connector Schedule: Indoor and Outdoor Material Width Schedule

	<u>Duct Size</u> <u>(Max. Dim.)</u>	<u>Pressure</u> <u>(Max.)</u>	<u>Width</u>
1.	12" and less	positive	3"
2.	13" and up	positive	6"
3.	12" and less	negative	3"
4.	13" and up	negative	3"

END OF SECTION

SECTION 23 37 13
GRILLES, REGISTERS, AND DIFFUSERS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.
- B. Refer to Division 1 for all requirements pertaining to General Provisions.

1.2 WORK INCLUDED

- A. Grilles.
- B. Registers.
- C. Diffusers.

1.3 QUALITY ASSURANCE

- A. Manufacturer shall certify cataloged performance and ensure correct application of all air outlet types.
- B. All components within the conditioned air stream or exposed in active or non-active plenums shall conform to the NFPA 90A standard for Flame/Smoke/Fire Contribution of 25/50/0.
- C. Manufacturers shall fully comply with LEED IEQ Prerequisite 3 minimum acoustical performance.

1.4 SUBMITTALS

- A. Submit schedule and product data for acceptance. Coordinate submittal by "G" number and include construction details, capacity ratings including airside pressure drops and NC levels.
- B. Product data, along with installation operation and maintenance instructions, shall be included in the operation and maintenance manuals.
- C. Submit in accordance with Division 1 requirements.

PART 2 – PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

- A. Grilles:
 - 1. Titus
 - 2. Anemostat
 - 3. Krueger
 - 4. Metal Aire Division of Metal Industries, Inc.
 - 5. Nailor
 - 6. Price
 - 7. Trox
- B. Registers:
 - 1. Air Concepts
 - 2. Anemostat
 - 3. Krueger

4. Metal* Aire Division of Metal Industries, Inc.
 5. Nailor
 6. Price
 7. Titus
 8. Trox
- C. Diffusers:
1. Anemostat
 2. Krueger
 3. Metal* Aire Division of Metal Industries, Inc.
 4. Nailor
 5. Price
 6. Titus
 7. Trox.

2.2 FABRICATION

- A. Grilles:
1. Sidewall or Ceiling Mounted Return/Exhaust Grille:
 - a. Construction: Heavy gauge aluminum border. Size as indicated.
 - b. Baked enamel finish.
 - c. Based on Titus Model 272FL.
 2. Sidewall Double Deflection Supply Grille:
 - a. Construction: Aluminum frame with aluminum shaped blades having long blades on front. Size as indicated.
 - b. Baked enamel finish.
 - c. Based on Titus Model 7DCA-AA.
 3. Ceiling Mounted Return Air Filter Grille:
 - a. Construction: Heavy gauge aluminum border. Concealed hinged core with integral filter frame and start-up plus spare filter. Border suitable for use in ceiling specified in Contract Documents. Size as indicated.
 - b. Baked enamel finish.
 - c. Based on Titus Model 4FL.
- B. Registers:
1. Sidewall or Ceiling Mounted, Return Register (G-5 & G-6):
 - a. Construction: Heavy gauge frame and horizontal bars. Bars set at 45° fixed deflection. Allen key operated opposed blade damper.
 - b. Baked enamel finish.
 - c. Based on Titus Model 350FL (aluminum) with/without Model AG-35AA opposed blade aluminum damper (refer to schedule and drawings for requirements).
- C. Diffusers:
1. Square Ceiling Diffuser (G-1):
 - a. Construction: Surface or lay-in mounted, 3 cone diffuser. Round collar size as indicated. Aluminum construction only.
 - b. Baked enamel finish.
 - c. Based on Titus TMS-AA (aluminum).

PART 3 - EXECUTION

3.1 GENERAL

- A. Install all devices in strict accordance with the manufacturer's written installation instructions.
- B. Coordinate the proper grille style and frame style with the final approved ceiling construction and install grilles, registers, and diffusers in accordance with the requirements of the architectural reflected ceiling plan.
- C. Due to the small scale of the drawings the contractor shall assume the responsibility to coordinate the air outlet and inlet locations with the reflected ceiling plans, lighting plans, sections and or details.
- D. Any unlined or otherwise exposed parts beyond the grille, register, or diffuser face exposed to sight shall be painted black.
- E. Coordinate the color requirements for all grilles, registers, and diffusers with the Owner's Representative.
- F. Insulate the back pans of all diffusers per the requirements of Specification Section 23 07 00.
- G. Air distribution devices installed in lay-in ceilings shall have a 24"x24" extended panel.
- H. Devices installed in sheetrock or other hard ceilings shall be surface mount type.

END OF SECTION

26

DIVISION

ELECTRICAL

SECTION 26 00 00
SCOPE OF WORK

PART 1: GENERAL

1.1 DESCRIPTION OF SYSTEMS

- A. The work included consists of all supervision, labor, materials, equipment, facilities and installation required for the complete and approved electrical system installation and modifications as indicated on the Contract Documents and called for in this Specification, or as may be reasonably implied by and for the installation of this project.
- B. All notes on the drawings pertaining to the work of this trade shall be considered as part of this specification and contract.
- C. In general, the Electrical Contractor shall make final line voltage connections to equipment furnished by other trades or by Owner. Miscellaneous equipment is to be provided by the Owner, installed, and utilities connected by the Contractor.
- D. Refer to entire Contract Documents for coordination and demolition. The Contractor shall coordinate phasing and staging of all work with all affected trades. Provide demolition as necessary to completely remove all electrical items within the area of work.
- E. Contractor shall confirm existing utilities are capped or shutdown prior to excavation or demolition.
- F. It is the Contractor's responsibility to visit the job site to inspect and confirm field conditions and systems. Advise Consultant of inconsistencies prior to bidding.
- H. The Contractor shall install complete and operating electrical systems as required for the scope of work, including but not limited to, the following:
 - 1. New power feeds to electrical terminal devices and equipment.
 - 2. Installation/relocation of miscellaneous lighting, power, and systems components as required for the renovation/completion.
 - 3. Where indicated, an empty raceway system for telecommunications. Outlet devices, cabling, and hardware to be provided and installed by the Owner.
 - 4. Where indicated, fire alarm system, including all raceways, conductors, devices, equipment start-up and testing, as required for the proposed space modifications.
 - 5. Miscellaneous items required for complete and operating systems, but not specifically called for on the drawings or in the specifications, such as fastening devices, supports, scaffolding, welding, drilling, etc.
 - 6. Miscellaneous raceways, junction boxes, and interconnections to medical equipment provided by third party vendors.

PART 2 – PRODUCTS Not Applicable

PART 3 – EXECUTION Not Applicable

END OF SECTION

SECTION 26 00 01
BASIC ELECTRICAL REQUIREMENTS

PART 1 GENERAL

1.1 SECTION INCLUDES:

- A. Basic Electrical Requirements specifically applicable to Division 16 in addition to Division 1 -General requirements.

1.2 QUALITY ASSURANCE

- A. Electrical supervision shall have a current Local County Journeyman Electricians Certificate of Competency, be licensed to do work in the project location, and be present on site while work is being performed.
- B. Coordinate with other trades to provide adequate working clearance about equipment.
- C. Materials, where applicable, shall bear the label of an approved testing agency, such as:
 - 1. E.T.L. (Electrical Testing Laboratories).
 - 2. U.L. (Underwriters Laboratories, Inc.)
 - 3. F.M. (Factory Mutual).
- D. Materials subject to corrosion shall be protected.

1.3 RELATED WORK

- A. Continuity of Service:
Service or circuits shall not be interrupted or changed without authorization from the Architect and the Owner. Written authorization shall be obtained before work is started.
- B. Demolition:
 - 1. Equipment to be removed and turned over to the Owner shall be delivered to the Owner at a place and time mutually agreed upon.
 - 2. Materials to be turned over to the Owner or reused and installed, shall be maintained in the condition equal to that existing before work began. Repair or replace damaged materials or equipment at no additional cost to the Owner.
- C. Outdoor equipment to be secured to wall surface shall be mounted on stainless steel channel or supports.

1.4 TEMPORARY WIRING

- A. New Construction: Install according to National Electrical Code.
- B. Remodel: Remove temporary wiring upon completion of project. Install according to National Electrical Code.
- C. Grounding: Equipment grounding conductors shall be bonded to available electrodes at each building.

1.5 EQUIPMENT

- A. Equipment of a similar nature shall be identical and of the same manufacturer.

- B. Equipment shall be set level. Where grouped, shall be mounted at the same height, properly aligned, bolted together in sections and fastened in place. Tighten screws, bolts, nuts, clamps, fittings, or other fastening devices. Install all covers, plates, fittings, and accessories.

PART 2 PRODUCTS

Not Applicable

PART 3 EXECUTION

3.1 COMMISSIONING SUPPORT

Not applicable

END OF SECTION

SECTION 26 01 27
CODES, FEES, AND STANDARDS

PART 1: GENERAL

1.1 CODES AND STANDARDS

- A. Unless specifically noted to the contrary, the Contractor shall furnish all equipment, materials, labor, and install and test in accordance with these specifications.
- B. The Contractor shall comply with the latest applicable editions of the following:
 - Florida State Fire Marshall's Rule Chapter 69A-3.012 FAC and Rule Chapter 69A-60 (FAC)
 - NFPA 101 (2015 Edition)
 - Florida Building Code 6th Edition
 - NFPA-70 - National Electrical Code (2014)
 - NFPA-72 - National Fire Alarm Code (2013)
 - U.L. - Underwriter's Laboratories
 - NEMA - National Electrical Manufacturer's Association
 - ASTM - American Society for Testing and Materials
 - IEEE - Institute of Electrical and Electrical Engineers
 - ANSI - American National Standards Institute
 - ADA - Americans with Disabilities Act
 - NFPA-780 – Lightning Protection (2011)
 - Florida Statute Section 633.022
 - Florida Administrative Code 69A – 43.004 and 69A-3.012
- C. Reference to standards shall mean and intend the latest edition of such standards adopted and published at the date of bidding documents.
- D. Materials and installation, as a minimum, shall conform with local and state codes and ordinances.

1.2 FEES, CHARGES, COSTS

- A. It is the contractor's responsibility to contact the appropriate Utility Company and/or Building Department to determine if any fees, charges, or costs will be due to them. This fee, charge or cost shall be included in this contractor's bid price.

END OF SECTION

SECTION 26 05 00
BASIC MATERIALS AND METHODS

PART 1 – GENERAL

1.1 WORK INCLUDES

- A. Contractor shall provide:
 - 1. Work shown on the drawing and specified herein.

1.2 RELATED WORK

- A. Specified Elsewhere
 - 1. Division 1 - Drawings and general provisions of Contract, including, but not limited to, General, Special, and Supplementary Conditions and other Division-1 Specification Sections, apply to the work of this Section.
 - 2. Division 21 & 23 - applicable sections.
 - 3. Division 26 & 28 - applicable sections.

1.3 QUALITY ASSURANCE

- A. All work and materials shall be in accordance with the requirements and codes of the State of Florida, and all other applicable bodies having jurisdiction.
- B. If, in the opinion of the Contractor, any part of the specification or plans do not comply with the laws, codes and regulations, that matter shall be referred in writing to the attention of the Engineer for a decision before proceeding with that part of the work. There shall be no changes in the drawings or specifications made without approval of the Engineer. Where a discrepancy exists between the drawings and this specification, the more stringent shall apply.
- C. This Contractor shall secure and pay for all permits required by local authorities and shall provide the Owner with satisfactory interim and final inspection certificates.
- D. Bidders shall visit the site and familiarize themselves with existing conditions and satisfy themselves as to the nature and scope of the work and the difficulties that attend its execution. The submission of a bid will be construed as evidence that such an examination has been made and that the existing conditions have been allowed for in hid bid.
Before opening any material or doing any work, examine Architectural, Structural, Electrical and Mechanical and Equipment drawings, verify all conditions of project. Any differences which occur between drawings or between them and specifications, or between both of these and actual field measurements shall be reported in writing to Consultant and written instructions for changes obtained before proceeding with work.

1.4 SUBMITTALS

- A. In accord with Division One.
 - 1. Product Data
 - a. Fire Stopping Material
 - b. Conduit seals.
 - 2. Corrections or comments made on the shop drawings during the review do not relieve this Contractor from compliance with requirements of contract documents, plans and specifications. Shop drawings will be checked for general conformance with the design concept of the project and general compliance with information given in the contract documents. Review of the shop drawings shall not relieve the Contractor from

responsibility for details and accuracy, confirming and correlating all quantities and dimensions, selecting fabrication processes, for techniques of assembly and construction, coordinating his work with that of all other trades, and performing his work in a safe and satisfactory manner. Review of shop drawings shall not permit any deviation from plans and specifications.

3. Contractor shall submit point to point wiring diagram for all signal and control systems, control panels, terminal cabinets, etc., for complete systems to be provided under this contract. Shop Drawings shall indicate terminal identification, and barrier strip layout.
- B. Coordination drawings shall be provided showing routing of ALL trades and systems above ceilings and in chases. Objective of coordination drawings is to identify any conflicts and provide resolution, prior to the start of construction. Division 26 subcontractor shall coordinate with the General Contractor for requirements relating to this submittal. This requirement shall not conflict with requirements for coordination drawings as mandated in any other sections of this specification.
- C. In accord with Division One, at the completion of the project, Contractor shall submit operating instructions and maintenance manuals. Submit model number, catalog information, technical data sheets, shop drawings, test reports, wiring diagrams, parts lists and maintenance instructions where applicable for each of the following items of equipment:
 1. Fire Alarm System
- D. Throughout the progress of construction, keep a complete and detailed record of all deviations in the electrical installation from that indicated on the Drawings, specifications and/or shop drawings. At the completion of the project and prior to final payment this marked set of drawings shall be submitted to Engineer. As-Builts shall be legible and clearly indicating depths, dimensions of raceways from unknown points. Provide one mylar set of reproducibles to the Owner, certified and signed, by the Contractor as to their accuracy.
- E. Comply with the following for all work specified in Division 26. As-built information shall be shown to scale, using standard symbols listed in the legend. As a minimum show the following:
 1. Location of stub-outs, dimensioned from permanent building lines.
 2. All routing of raceways, dimensions from building, depths.
 3. Corrected panelboard and equipment schedules.
 4. Corrected circuit numbers as they appear on panelboard directories.
 5. Number, size, type of insulation and number of wires in each conduit or multi-conductor cable whether in conduit or exposed.
 6. Location of junction boxes and splices.
 7. Location of access panels.

1.5 GUARANTEE

- A. Guarantee all materials and workmanship for a period of one year in accord with the General Conditions.

1.6 DELIVERY, STORAGE AND HANDLING

- A. Materials shall be suitably packaged by manufacturer to prevent damage during shipment. Damaged materials will not be acceptable for use.
- B. Store materials on site in clean, dry storage area; when outside, elevated above grade and enclosed with durable watertight wrapping.
- C. Handle all materials carefully to prevent damage. Minor scratches, marks or blemishes to finish shall be repaired by Contractor.

PART 2 – PRODUCTS

2.1 MATERIALS

A. General

1. All equipment and material for permanent installation shall be new unless specifically indicated otherwise. In addition, material shall:
 - a. Be without blemish or defect.
 - b. Not be used for temporary power or lighting without prior written authorization from the Owner.
 - c. Be in accordance with NEMA Standards.
 - d. Bear Underwriter's Label where subject to U.L. label service.
 - e. U.L. listed for its intended service and application.
2. Equipment and materials of the same type of classification and used for the same purposes, shall be products of the same manufacturer.
3. Materials and equipment shall conform in all respects to the requirements set forth in these specifications and the accompanying drawings. However, wherever a product is identified by name, equal products which meet the Consultants written approval may be used (per contract document procedures).
4. Except as otherwise specified, materials and equipment shall be new and bear the approval label of Underwriter's Laboratories, Inc., where applicable.
5. Where equipment and materials are specified or designated on drawings by trade names and catalog numbers, the intent is to establish a standard of quality, appearance, performance, and dimension. Material and equipment of other manufacturers will be considered, provided they are equal in all respects to that specified. However, it will be the Contractor's responsibility to demonstrate equality of substituting with materials or equipment specified by the Consultant. Compensations for "as-built" drawings or contract documents requiring additional engineering services due to Contractor substitutions shall be paid directly by the Contractor to the Consultant. The Consultant shall be compensated by the Contractor for multiple reviews (more than two) of any shop drawing submission.

B. Fire Stopping Material

1. Fire stopping materials shall consist of commercially manufactured products capable of passing ASTM E-814 (UL 1479) Standard Method of Fire Test for Through Penetration Fire Stops.
2. Fire stopping materials shall maintain the rating of the wall, partition or floor opening that penetration is made.
3. Fire stopping materials shall be U.L. classified.
4. Acceptable Products
 - a. 3M - Fire Barrier
 - b. Thomas & Betts - Flame Safe
 - c. Nelson Electric - Flameseal

C. Water Seal

1. Seal penetrations of perimeter walls or floors below grade to prevent entry of water. Use materials compatible with wall or floor construction.
2. Seal penetrations of roof, with flashings compatible with roof design.

D. Nameplates

1. General: Furnish and install nameplates wherever indicated as "required" in these specifications. Wording shall be submitted to the Engineer for review prior to purchase of nameplates.
2. Material: Refer to Section 26 05 53 for requirements.

PART 3 – EXECUTION

3.1 INSTALLATION

- A. All equipment and materials shall be installed and completed in a first-class workmanlike manner. The right is reserved to direct the removal and replacement of any item, which in the opinion of the Owner's Representative and/or Engineer does not present an orderly and reasonably neat or workmanlike appearance, provided such items can be properly installed in an orderly way by usual methods in such work.
- B. Electrical drawings are diagrammatic but shall be followed as closely as actual construction of the building and the work of other trades will permit. Do not scale drawings. Consult Architectural drawings and details for exact location of fixtures and equipment and building element dimensions. Because of the small scale of drawings, it is not possible to indicate all of the offsets, fittings and accessories required. This Subcontractor shall investigate the structural and finish conditions affecting his work and shall arrange such work accordingly, providing fittings, bends, junction boxes, pull boxes, access panels and accessories required to meet such conditions.
- C. No deviations for the plans and specifications shall be made without the full knowledge and consent of the Consultant. Should the Contractor find at any time during the progress of the work that, in his judgment, a modification of the requirements of any particular item is needed, he shall report such item promptly to the Consultant for his decision and instruction.
- D. Discrepancies in Electrical and Mechanical Drawings - it is recognized that locations of piping, ductwork, etc., shown on Mechanical and Electrical drawings are diagrammatic, except for figured dimensions, and that field conditions may arise that will prevent their being installed as noted on drawings, such as runs of pipe crossovers, risers, panelboards, electric outlets, machinery, etc. within limits established by figures on Architectural Drawing. It is the duty of each and all subcontractors to consult with each other, verifying existing conditions and in each case where there is any questions or doubt as to space conditions or location of outlets, etc., to submit a workable solution to the Consultant for their approval before installing any work which is questionable.
- E. The Contractor is specifically directed to the mechanical section of the contract documents for coordination.
- F. The Contractor shall refer to the entire set of contract documents for bidding purposes and completeness of proposal. Items not shown on the electrical project documents, but shown on mechanical requiring wiring, components, raceways, etc., must be included in bid proposal to provide a complete working system. Systems and devices shown on one portion of documents shall be included as if they are shown on all portions of the contract documents.
- G. The Contractor shall, prior to rough-ins, confirm location of all devices with Owner Representative and Architect. Coordinate with architectural drawings and interior elevations for exact locations, mounting heights and dimensions for installation of all items. Coordinate with wall coverings, furniture, etc.
- H. Install all equipment in accord with manufacturer's recommendations.
- I. Provide all necessary anchoring devices and supports.
 - 1. Use structural supports suitable for equipment, or as indicated.
 - 2. Check loadings and dimensions of equipment with shop drawings.
 - 3. Do not cut or weld to building structural members.
- J. Verify that equipment will fit support layouts indicated.
 - 1. Where substitute equipment is used, revise indicated supports to fit.
- K. Arrange for necessary openings to allow for admittance of equipment.
 - 1. Where equipment cannot be installed as structure is being erected, provide, and arrange for building-in of boxes, sleeves or other devices to allow later installation.

- L. Make all penetrations through roofs prior to installation of roofing. For penetrations required after installation of roofing:
 - 1. In built-up roofing (BUR), provide all curbs, cants and base flashings.
 - 2. In elastic sheet roofing (ESR), arrange and pay for base flashing work by authorized roofer.
- M. Install rain hoods and metal counter flashings as indicated and to make all penetrations of electrical work through walls and roof water- and weather-tight.
 - 1. Furnish all clamps, waterproofing material and labor necessary.
 - 2. Where metal flashings are applied over concrete, paint concrete with 1/8 IN of mastic cement first.
 - 3. Set flashing in mastic cement, watertight.
- N. Repair and replace roof construction, damaged by this work, in manner which will not nullify roof guarantee.
- O. Provide equipment guards at all belts, couplings, moving machinery and equipment provided under this division in accord with OSHA.
 - 1. Use suitable structural frames with 12 ga, 3/4 inch maximum opening galvanized mesh, or expanded metal mesh.
 - 2. Attach to equipment by removable clips and bolts with wing nuts, or other approved connectors.
- P. Install equipment to permit easy access for normal maintenance.
 - 1. Maintain easy access to switches, motors, drives, pull boxes, receptacles, etc.
 - 2. Relocate items which interfere with access.
- Q. Provide concrete foundations or pads required for electrical equipment, as indicated or as follows:
 - 1. Where drawings do not show special foundations, install 4 IN high concrete pads.
 - 2. Use 3,000 PSI concrete.
 - 3. Reinforce with 6 x 6 x 10 x 10 mesh, with short dowels into floor at 12 IN OC around perimeter.
 - 4. Chamfer top edges 3/4 IN.
 - 5. Rub all faces smooth with carborundum block.
 - 6. Set anchor bolts for equipment.
- R. All connections shall be tightened to the torque values recommended by that device manufacturer's instructions. If these values are not listed, tighten to pound-inch or pound-foot values recommended in UL Standard 486B, a summary of which may be found in Section 110-4 of the National Electric Code Handbook. Record the torque values of all main pieces of equipment and include in the maintenance manuals.

3.2 LOCATION OF EQUIPMENT

- A. The approximate location of all equipment and devices is shown on the Drawings. The Owner's Representative and/or Engineer reserves the right to change the location of all equipment or devices 8 feet in any direction at no additional cost provided such changes are requested before final installation.
- B. Install all equipment with ample space allowed for removal and repair. Provide ready accessibility to removable parts of equipment and to all wiring without moving equipment which is installed or which is already in place. Provide access panels for all devices installed above non-accessible ceilings and/or within walls or partitions.
- C. In mechanical and electrical equipment spaces, expose ceiling outlets and conduit with due consideration to ventilating ducts and mechanical piping. Where numerous ducts occur, install conduits and outlets after the ventilating ducts. Puncturing of duct work or hanging equipment such as light fixtures, ceiling hangers and conduits from duct work is prohibited unless specifically noted otherwise.

- D. Electrical equipment shall be installed to maintain minimum clearances per Article 110 of NEC and ANSI C2 (National Electrical Safety Code and recommendations of manufacturer/vendor).
- E. Dimensions indicated on documents are limiting dimensions. Do not provide equipment exceeding dimensions indicated or equipment arrangements that reduce required clearances or exceed specified maximum dimensions.

3.3 COORDINATION

- A. Provide day-to-day coordination with the work of other contractors engaged in this project. Execute the work in a manner not to interfere with other contractors.
- B. Coordinate with other contractors regarding the location and size of pipes, raceways, ducts, openings, and devices, so that there may be no interferences between installations or of the progress of any contractor.
- C. If conflict arises in the installation of work, the following preference schedules shall be followed:
 - 1. Recessed lighting fixtures.
 - 2. Sanitary drainage.
 - 3. Chilled water piping.
 - 4. Low pressure ductwork.
 - 5. Domestic water, storm and vent lines.
 - 6. Electric conduits.
- D. This Contractor shall notify all other contractors of any deviations or special conditions necessary for the installation of his work. Interferences between the work of various contractors shall be resolved prior to installation. Work installed not in compliance with the plans and specifications and without properly checking and coordinating as specified above shall, if necessary, be removed and properly reinstalled by this Contractor without additional cost to the Owner. The Consultant or his representative shall be the mediating authority in all deviation and conflict disputes arising on the project.
- E. Insofar as it is possible to determine in advance, this Contractor shall consult with the masonry contractor and others as to leaving the proper chases and openings for his work; and he shall place all of his outlets, anchors, sleeves and supports prior to pouring concrete or masonry work. Should this Contractor neglect doing this, any cutting and/or patching shall be done at this Contractor's expense.
- F. Contractor must notify owner prior to excavation and exercise due caution with regard to disturbance of utilities and services.
- G. Contractor shall be held responsible for any damage and restoration to utilities and services. Restoration shall be made immediately with methods and materials that are approved for the intended use. Provide written report to the Owner detailing occurrence and corrective action.
- H. The locations of existing underground utilities are not shown, and have not been independently verified by the Owner or its representative. The Contractor shall determine the exact location of all existing utilities before commencing work in the vicinity and agree to be fully responsible for any and all damage which might be occasioned by the Contractor's failure to exactly locate and preserve any and all utilities.

3.4 WALL, ROOF AND FLOOR PENETRATIONS AND SLEEVE INSTALLATION

- A. Provide sleeves for all electrical raceways, and wiring passing through walls and floors and roof. Sleeves shall be of sufficient length to extend through the wall, roof, and floors. Wall sleeves shall have ends flush with finished thickness of walls and floor sleeves shall extend 1 inch above finish floor. Interior diameter of sleeves shall provide 1/2 inch clearance all around conduit.

- B. Below grade wall and roof penetration shall be made watertight. Below grade wall penetration shall be sealed with compression type conduit sealing bushings. Roof penetration shall be sealed and flashed per roof manufacturers published recommendations.
- C. Where cutting is required to facilitate construction, this contractor shall patch and repair cut items to the original state. However, structural work shall not be cut without the written approval of the Engineer or his representative.
- D. Holes through concrete and masonry in new and existing structures shall be cut with a diamond core drill or concrete saw. Pneumatic hammer impact, electric hand or manual hammer type drills, shall not be allowed, except where permitted by Engineer as required by limited working space.
- E. Cutting and Patching
 - 1. Any damage caused by cutting or in any other way caused by this Contractor in the performance of his contract shall be repaired or replaced under the separate heading for the type material required in a manner satisfactory to the Engineer/Owner.
 - 2. Any unnecessary damage caused by this Contractor, due to installation of the electrical work, brought about through carelessness or lack of coordination, shall be corrected under the heading for the type of materials involved, and shall be paid for by this Contractor.
- F. Access Panels
 - 1. The Contractor's attention is called to access panels. It is a requirement of these specifications that all access panels required in architectural finishes or surfaces to provide access to junction boxes, smoke detectors, strip heaters, ballasts or other devices be provided and installed by this Contractor. Advise Consultant of locations and size of all panels.

3.5 FIRESTOPPING

- A. Where conduits, wireway, bus duct and other electrical raceways pass through fire partitions, fire walls or floors, install a firestop that provides an effective barrier against the spread of fire, smoke and gases. Fire-stop material shall be packed tight, and completely fill clearances between raceways and openings. Fire-stop material shall conform to the following:
 - 1. Fire-stopping material shall maintain its dimension and integrity while preventing the passage of flame, smoke and gases under conditions of installation and use when exposed to the ASTM #119 time-temperature curve for a time period equivalent to the rating of the assembly penetrated. Cotton waste shall not ignite when placed in contact with the non-fire side during the test. Fire-stopping material shall be non-combustible as defined by ASTM E136, and, in addition, for insulation materials, melt point shall be a minimum of 1700° F for 2-hour protection.
 - 2. Unused, spare sleeves in electrical closets shall be sealed with threaded steel caps on each end.
- B. Fire stopping materials shall be installed in accordance with manufacturers written instructions.

3.6 PROTECTION OF WORK

- A. Protect work from injury by keeping all conduit and boxes capped and plugged or otherwise protected. This includes damage by water and/or stoppage from building materials, sand, dirt, or concrete.
- B. Protect all equipment and fixtures from damages during the project, provide all tarpaulins, drop cloths, barricades, or auxiliary equipment.
- C. All materials or equipment damaged during construction shall be repaired or replaced with new items to the satisfaction of the Engineer.

3.7 IDENTIFICATION

- A. Electrical Identification shall be in accordance with Section 26 05 53.

3.8 PAINTING

- A. Finish painting shall be as specified in Division 9.
- B. Provide touch-up painting of all electrical equipment marred in any way during shipment or installation.

3.9 CONNECTIONS TO EQUIPMENT

- A. Equipment: The Contractor shall make final electrical connections to all items of equipment. All power wiring from power source through starters, disconnects and control panels to equipment shall be provided.

3.10 SAMPLES

- A. Physical samples of material and equipment proposed for installation in this project shall be submitted to the Consultant upon request.
- B. Samples shall be submitted through the General Contractor with all shipping and handling charges prepaid. Any expense incurred in securing, delivery and return of samples, is the responsibility of Contractor. Samples shall be delivered to location designated by Consultant.
- C. Samples shall remain the possession of the Contractor except as follows:
 - 1. Approved samples, without physical damage, may be installed on the project.
 - 2. Samples not called for within 14 days after notification will be disposed of by the Consultant.

3.11 SPARE PARTS AND TOOLS

- A. Furnish to Owner and obtain receipt for same, the following:
 - 1. One spare set of fuses for each size and type installed on project; including overload relays for magnetic starters.
 - 2. One set of special tools required for equipment furnished, spare keys, etc.
 - 3. See other sections for spare parts relative to specific systems.

3.12 FINAL INSPECTION AND TESTS

- A. As precedent to final inspection and acceptance, the Contractor shall have all previously listed defects corrected, complete all work, test all systems and submit results of such tests to the Engineer, install all directories, and labels and post all instructions and comply with applicable paragraphs of this section. Refer to Section 26 05 70 for additional information.

3.13 PERFORMANCE

- A. The Contractor shall employ a competent foreman on the job throughout the entire period of construction to see that his work will not conflict with other trades and that it is properly performed/

- B. The foreman shall have a thorough knowledge of the work to be installed under this contract, be a skilled mechanic who has had a minimum of four (4) years previous successful experience on projects of comparable sizes and complexity. Foreman shall be present at all times that work under this Division is being installed or affected. Foreman shall be a State of Florida licensed Journeyman and shall have a valid Palm Beach County Electrical Journeyman Certificate of Competency.

END OF SECTION

SECTION 26 05 01
WORK INCLUDED

PART 1 GENERAL

1.1 DESCRIPTION OF SYSTEMS

- A. The work required under this Division shall include all materials, labor and auxiliaries required to install, start up and test a complete and properly operating electrical system. The electrical systems required under this Division consist basically of, but are not limited to, the following:
1. Complete distribution system for power including service entrance, main switchboards and distribution panels, feeders, branch circuits, convenience outlets and connections to motors and other power loads.
 - a. The Contractor shall submit at the shop drawing submittal stage, 2-inch scale, dimensioned drawings of actual electrical equipment layouts in all electrical and mechanical rooms, based on the equipment being provided. Any conflicts shall be resolved between the General Contractor and the respective subcontractors to provide for the equipment location and required working clearances.
 - b. Conduit routing is not shown on the documents. It shall be the Contractor's responsibility to field route all raceways and coordinate such routing with all disciplines to resolve any conflicts, as necessary to provide the intended connections. It shall be assumed that the design was based on the shortest possible route. Where conduit or duct routing follows other than direct paths, the conductors and raceways shall be adjusted accordingly to account for voltage drop.
 2. Complete distribution system for lighting including the necessary feeders, branch circuits, lighting fixtures, control switches and receptacles.
 3. Complete system of empty raceways (with pull lines) and cabinets for telephones and data network structured cabling.
 4. Complete fire alarm system.
 5. Complete power distribution system for HVAC equipment including wiring, conduits, and disconnect switches.
 6. Complete system of empty raceways (with pull lines) and terminal cabinets and power requirements for EMCS (Energy Management and Control System), security systems, and cable TV.
 7. Furnishing and installing all necessary access panels.
 8. Concrete work for equipment pads or encased raceways.
 9. Painting (of special equipment).
 10. Temporary power.
 11. Contractor shall check site and existing conditions thoroughly before bidding. Advise Architect of discrepancies or questions note.
 12. Whether indicated on the drawings or not, if a requirement is listed, mentioned, or described in this specification, the cost for its provision and complete installation and connection, shall be included in the Contractor's bid.

13. The Contractor is cautioned to consult drawings of all disciplines to ascertain electrical requirements for systems that may not be on the electrical plans. Specific attention is directed to special systems such as fire alarm, security, EMCS, etc. The Contractor shall include in his bid, the cost for providing and installing all electrical provisions for a complete, operating system.

END OF SECTION

SECTION 26 05 13
BUILDING WIRE AND CABLE

PART 1: GENERAL

1.1 SECTION INCLUDES

- A. Building wire and cable.
- B. Wiring connectors and connections.

1.2 REFERENCES

- A. ANSI/NFPA 70 - National Electrical Code.

1.3 SUBMITTALS

- A. Submit under provisions of Division One.
- B. Product Data: Provide for each cable assembly type.
- C. Test Reports: Indicate procedures and values obtained.
- D. Manufacturer's Installation Instructions: Indicate application conditions and limitations of use stipulated by product testing agency specified under Regulatory Requirements.

1.4 QUALIFICATIONS

- A. Manufacturer: Company specializing in manufacturing products specified in this Section with minimum three years documented experience.

1.5 REGULATORY REQUIREMENTS

- A. Conform to requirements of ANSI/NFPA 70.
- B. Furnish products listed and classified by Underwriters Laboratories, Inc., as suitable for purpose specified and shown.

1.6 FIELD SAMPLES

Where required, provide as per the following:

- A. Provide under provisions of Division One.
- B. Submit one length, each 18 inches of cable assembly from each reel.
- C. Select each length to include complete set of manufacturer markings.
- D. Attach tag indicating cable size and application information.

1.7 PROJECT CONDITIONS

- A. Verify that field measurements are as shown on Drawings.
- B. Conductor sizes are based on copper.
- C. Wire and cable routing shown on Drawings is approximate unless dimensioned. Route wire and cable as required to meet Project Conditions.
- D. Where wire and cable routing is not shown, and destination only is indicated, determine exact routing and lengths required.

1.8 COORDINATION

- A. Coordinate Work under provisions of Division One.
- B. Determine required separation between cable and other work.
- C. Determine cable routing to avoid interference with other work.

PART 2: PRODUCTS

2.1 BUILDING WIRE AND CABLE

- A. Description: Solid or stranded insulated wire.
- B. Conductor: Copper.
- C. Insulation Voltage Rating: 600 volts.
- D. Insulation: ANSI/NFPA 70, Type THW, THWN.

2.2 WIRING CONNECTORS

- A. Solderless Pressure Connectors:
 - 1. IlSCO Model PDB.
 - 2. Substitutions: Under provisions of Division One.
- B. Spring Wire Connectors:
 - 1. Ideal
 - 2. Scotchloc
 - 3. Holub
 - 4. Substitutions: Under provisions of Division One.
- C. Compression Connectors:
 - 1. Panduit
 - 2. Burndy
 - 3. 3M
 - 4. Substitutions: Under provisions of Division One.
- D. Split-bolt, insulation piercing or push-in type connectors shall not be used.

PART 3: EXECUTION

3.1 EXAMINATION

- A. Verify that mechanical work likely to damage wire and cable has been completed.

3.2 PREPARATION

- A. Completely and thoroughly swab raceway before installing wire.

3.3 INSTALLATION

- A. Install products in accordance with manufacturer's instructions.
- B. All wire shall be installed in conduit unless specifically noted otherwise.
- C. Use stranded conductors for control circuits.

- D. Use conductor not smaller than 12 AWG for power and lighting circuits.
- E. Use conductor not smaller than 12 AWG to supply a single fixture.
- F. Use conductor not smaller than 16 AWG for control circuits.
- G. Conductors of the essential electrical system shall be run in separate raceways and be isolated from conductors of the normal power system.
- H. Use 10 AWG conductors for 20 ampere, 120 volt branch circuits longer than 75 feet.
- I. Pull all conductors into raceway at same time.
- J. Use suitable wire pulling lubricant for installing all building wire.
- K. Protect exposed cable from damage.
- L. Use suitable cable fittings and connectors.
- M. Neatly train and lace wiring inside boxes, equipment, and panelboards.
- N. Clean conductor surfaces before installing lugs and connectors.
- O. Make splices, taps, and terminations to carry full ampacity of conductors with no perceptible temperature rise.
- P. Use antioxidant compound on splices and termination of 2 AWG and larger.
- Q. Use sealed weatherproofing kits for underground splices.
- R. Provide 8 inches of free conductor at outlet, switch, pull and junction boxes.
- S. Use insulated spring wire connectors with plastic caps for copper conductor splices and taps, 8 AWG and smaller.
- T. Use IlSCO or Polaris type bolted lugs with covers for copper conductor taps, and hy-press type sleeves with shrink-sleeve insulation, 6 AWG and larger. Do not splice in underground hand holes.
- U. In new conduit installation, do not install more than five wires in the same conduit unless specifically noted otherwise. Conduits containing control wires or switch legs may contain more than 5 wires to a maximum fill of 40%.
- V. All bushings shall be installed prior to pulling wire. Any wire pulled-in prior to installation of bushings will be required to be removed and replaced at the Contractor's expense.
- W. Each current carrying phase conductor of 120v branch circuits and 277V lighting circuits shall have a dedicated neutral conductor paired with it. Do not "share" neutral conductors among alternate phase conductors.

3.4 INTERFACE WITH OTHER PRODUCTS

- A. Identify wire and cable under provisions of Division One.
- B. Identify each conductor with its circuit number or other designation indicated on Drawings.

3.5 FIELD QUALITY CONTROL

- A. Perform field inspection and testing under provisions of Division One.
- B. Inspect wire and cable for physical damage and proper connection.
- C. Measure tightness of bolted connections and compare torque measurements with manufacturer's recommended values.
- D. Verify continuity of each branch circuit conductor.
- E. Megger all feeders and all branch circuits larger than 200 amp. Coordinate all testing with Section 26 05 70.

END OF SECTION

SECTION 26 05 26
GROUNDING

PART 1 - GENERAL

1.1 WORK INCLUDES

- A. Base Bid:
 - 1. Electrical Contractor provide:
 - a. Grounding for Separately Derived Systems
 - b. Grounding for equipment.

1.2 SYSTEM DESCRIPTION

- A. Ground each separately derived system neutral to structural member of building.
- B. Ground raceways and electrical equipment; use double locknuts at all panels; use bonding jumpers where conduits are installed in concentric knockouts. Ground panels, switches, motor frames, motor starters fixtures, and outlets with separate ground conductor in conduit system.
- C. Bond together system neutrals, service entrance enclosures, exposed non-current carrying metal parts of electrical equipment, metal raceway systems, grounding conductor in raceways and cables, receptacle ground terminals.

1.3 QUALITY ASSURANCE

- A. Regulatory Requirements:
 - 1. Comply with NFPA 70, National Electric Code.
 - 2. UL 467: Grounding and Bonding Equipment.

1.4 SUBMITTALS

- A. In accord with Division One.
- B. Test data in accord with 26 05 70.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Materials used for grounding conductors shall be in accordance with N.E.C. Article 250-91.
- B. Ground Rods: Steel, copper-encased, 3/4 inch O.D. x 10'-0".
- C. Connections: Exothermic weld type for inaccessible locations, mechanical clamp type for accessible locations.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Use driven ground rod where shown on drawings.
- B. Bond all grounding systems together.

- C. Separately Derived Systems: Provide connection to building steel bonded to neutral of transformer.
- D. Provide green equipment grounding conductor sized in accordance with Table 250-95 of the N.E.C., in all raceways including conduits, wireways, ducts, and boxes. Bond equipment grounding conductor to each section of ducts and wireways using a continuous conductor and lay-in type grounding lugs bolted to the housing.
- E. The equipment grounding busses of the normal and essential branch - circuit panelboards serving the same patient care areas, shall be bonded together using a No. 10 insulated (green) copper conductor in accordance with Article 517-14, N.E.C.
- F. In all patient rooms, prep/recovery areas, O.R.'s, or other patient care areas, bond outlet boxes of each switch, receptacle, TV outlet, telecom outlet, telemetry outlet, med gas outlet, nurse call outlet, code blue outlet, etc., together using a #10 AWG (min.) green equipment grounding conductor. Bond to med gas faceplates using a tapped cap-screw or similar connection. This requirement is intended to enhance equipotential grounding in these spaces.

3.2 FIELD QUALITY CONTROL

- A. Measure ground resistance in accord with 26 05 70.

END OF SECTION

SECTION 26 05 29
SUPPORTING DEVICES

PART 1: GENERAL

1.1 WORK INCLUDED

- A. Conduit and equipment supports.
- B. Fastening hardware.

1.2 COORDINATION

- A. Coordinate size, shape, and location of concrete pads with Division 3.

1.3 QUALITY ASSURANCE

- A. Support systems shall be adequate for weight of equipment and conduit, including wiring, which they carry.

PART 2: PRODUCTS

2.1 MATERIAL

- A. Support Channel: Galvanized steel.
- B. Hardware: Corrosion resistant.

PART 3: EXECUTION

3.1 INSTALLATION

- A. Fasten hanger rods, conduit clamps, and outlet and junction boxes to building concrete structure using expansion anchors.
- B. Use toggle bolts or hollow wall fasteners in hollow masonry, plaster, or gypsum board partitions and walls; expansion anchors or preset inserts in solid masonry walls; self-drilling anchors or expansion anchor on concrete surfaces; sheet metal screws in sheet metal studs; and wood screws in wood construction.
- C. Do not fasten supports to piping, ductwork, mechanical equipment, or conduit.
- D. Do not use powder-actuated anchors.
- E. Do not drill structural steel members.
- F. Fabricate supports from structural steel or steel channel, rigidly welded or bolted to present a neat appearance. Use hexagon head bolts with spring lock washers under all nuts.
- G. In wet locations install free-standing electrical equipment on concrete pads.
- H. Install surface-mounted cabinets and panelboards with minimum of four anchors. Provide steel channel supports to stand cabinet 3/4 inch off wall.

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- I. Bridge studs top and bottom with channels to support flush-mounted cabinets and panelboards in stud walls.

END OF SECTION

SECTION 26 05 33
RACEWAYS

PART 1: GENERAL

1.1 SECTION INCLUDES

- A. Metal conduit.
- B. Flexible metal conduit.
- C. Liquidtight flexible metal conduit.
- D. Electrical metallic tubing.
- E. Fittings and conduit bodies.

1.2 REFERENCES

- A. ANSI C80.1 - Rigid Steel Conduit, Zinc Coated.
- B. ANSI C80.3 - Electrical Metallic Tubing, Zinc Coated.
- C. ANSI/NEMA FB 1 - Fittings, Cast Metal Boxes, and Conduit Bodies for Conduit and Cable Assemblies.
- D. ANSI/NFPA 70 - National Electrical Code.
- E. NECA "Standard of Installation."
- F. NEMA RN 1 - Polyvinyl Chloride (PVC) Externally Coated Galvanized Rigid Steel Conduit.

1.3 DESIGN REQUIREMENTS

- A. Conduit Size: ANSI/NFPA 70.

1.4 SUBMITTALS

- A. Submit under provisions of Division One.

1.5 PROJECT RECORD DOCUMENTS

- A. Submit under provisions of Division One.
- B. Accurately record actual routing of empty conduits, exterior underground.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Deliver, store, protect, and handle Products to site under provisions of Division One.
- B. Accept conduit on site. Inspect for damage.
- C. Protect conduit from corrosion and entrance of debris by storing above grade. Provide appropriate covering.

1.7 PROJECT CONDITIONS

- A. Verify that field measurements are as shown on Drawings.
- B. Verify routing and termination locations of conduit prior to rough-in.
- C. Conduit routing is shown on Drawings in approximate locations unless dimensioned. Route as required to complete wiring system.

PART 2: PRODUCTS

2.1 RIGID METAL CONDUIT

- A. Description: Rigid Galvanized Steel Conduit: ANSI C80.1.
- B. Fittings and Conduit Bodies: ANSI/NEMA FB 1; material to match conduit; all steel fittings.

2.2 NON-METALLIC CONDUIT

- A. Description: Schedule 40 PVC.
- B. Fittings and Conduit Bodies: Same manufacturer as conduit.

2.3 FLEXIBLE METAL CONDUIT

- A. Description: Interlocked steel construction.
- B. Fittings: ANSI/NEMA FB 1. Steel or malleable iron type.

2.4 LIQUIDTIGHT FLEXIBLE METAL CONDUIT

- A. Description: Interlocked steel construction with PVC jacket.
- B. Fittings: ANSI/NEMA FB 1. Steel or malleable iron type.

2.5 ELECTRICAL METALLIC TUBING (EMT)

- A. Description: ANSI C80.3; galvanized tubing.
- B. Fittings and Conduit Bodies: ANSI/NEMA FB 1; steel, set screw or compression type with insulated throat.

PART 3: EXECUTION

3.1 CONDUIT REQUIREMENTS

- A. Minimum Size: 3/4 inch unless otherwise specified.
- B. Underground Installations:
 - 1. Use rigid galvanized steel (RGS) conduit or Schedule 40 PVC outside building footprint. Paint all RGS conduit, to be installed underground, with two coats of bitumastic paint.
 - 2. Minimum Size: 3/4 inch.
 - 3. Install conduits a minimum of 30 inches below finished grade, unless inside the building line.
 - 4. Terminate conduits with bell ends or bushings at manholes.
 - 5. Duct seal all outdoor conduit terminations, and underground conduits entering a building.
 - 6. PVC conduit shall not be used in any patient care areas.
- C. Outdoor Locations, Above Grade: Use rigid steel conduit where exposed to possible physical damage. All other areas, use Schedule 40 PVC.
- D. In Slab Above Grade:
 - 1. Use rigid steel conduit or electrical metallic tubing.

2. Maximum Size Conduit in Slab: 3/4 inch.
- E. Wet Locations: Use rigid steel conduit.
- F. Damp Locations: Rigid steel conduit.
- G. Indoor Locations:
 1. Concealed: Use rigid steel conduit or use electrical metallic tubing.
 2. Exposed: Below 4'-0" AFF, use rigid steel conduit. Above 4'-0" AFF, use electrical metallic tubing.
- H. Subject to Physical Damage: Galvanized rigid steel conduit.
- I. Flexible conduit: 3/8 inch steel (min.), maximum 6 feet long.
- J. Electrical Metallic Tubing: 1/2 inch, not exceeding 10 feet long at the following conditions:
 1. Junction box above ceiling to a single box in furred wall.
 2. All other locations, use 3/4" EMT minimum.
- K. Steel flexible conduit or liquid tight conduit, 1/2 inch (maximum 3 feet long), to connect equipment where subject to vibration or frequent changing.

3.2 INSTALLATION

- A. Install conduit in accordance with NECA "Standard of Installation."
- B. All wiring shall be in conduit unless specifically noted otherwise.
- C. Arrange supports to prevent misalignment during wiring installation.
- D. Secure and/or support conduit using coated steel or malleable iron straps, lay-in adjustable hangers, clevis hangers, and split hangers.
- E. Multiple parallel runs of suspended conduits shall be supported by steel channel and straps.
- F. Group related conduits; support using conduit rack. Construct rack using steel channel; provide space on each for 25 percent additional conduits.
- G. Fasten conduit supports to building structure and surfaces under provisions of Section 26 05 29.
- H. Do not support and/or secure conduit with perforated pipe straps. Remove wire used for temporary supports.
- I. Do not attach conduit to ceiling support wires. Install additional support wires to support conduits. Conduit must be securely fastened in place.
- J. Arrange conduit to maintain headroom and present neat appearance.
- K. Route exposed conduit parallel and perpendicular to walls. Exposed conduit below 10 ft above floor in occupied areas, shall have 2 hole straps spaced a maximum of 5 ft.
- L. Do not route conduits on floors in areas used for access to any equipment.
- M. Route conduit installed above accessible ceilings parallel and perpendicular to walls.
- N. Route conduit in and under slab from point-to-point.
- O. Do not cross conduits in slab.
- P. Maintain adequate clearance between conduit and piping.
- Q. Maintain 12 inch clearance between conduit and surfaces with temperatures exceeding 104 degrees F.
- R. Cut conduit square using saw or pipe cutter; de-burr cut ends.
- S. Bring conduit to shoulder of fittings; fasten securely.
- T. Use conduit hubs or sealing locknuts to fasten conduit to sheet metal boxes in damp and wet locations and to cast boxes.

- U. Install no more than equivalent of four 90-degree bends between boxes. Use conduit bodies to make sharp changes in direction, as around beams. Use factory elbows for bends in metal conduit larger than 2 inch size.
- V. Avoid moisture traps; provide junction box with drain fitting at low points in conduit system.
- W. Provide suitable fittings to accommodate expansion and deflection where conduit crosses expansion joints.
- X. Provide a 200 lb test pull string in each empty conduit except sleeves and nipples.
- Y. Use suitable caps to protect installed conduit against entrance of dirt and moisture immediately after installation.
- Z. Ground and bond conduit under provisions of Section 26 05 26.
- AA. Identify conduit under provisions of Section 26 05 53.
- BB. New Construction: Conduits run in finished areas shall be concealed.
- CC. No conduits shall be installed on roof surface.
- DD. Do not use threadless connector or couplings on rigid conduit installed above grade.
- EE. Do not use "all-thread" conduit nipples.
- FF. Terminate all empty conduits in approved type boxes.
- GG. Disconnect switches, magnetic starters, contactors, control cabinets and panel boards shall not be used as raceways.
- HH. Flexible metal conduit and liquidtight flexible metal conduit shall not exceed 6 feet in length.
- II. Flexible metal conduit and liquid-tight flexible metal conduit shall not penetrate walls or ceilings.
- JJ. All metallic conduits and fittings below grade or in slabs shall be coated with two (2) coats of bitumastic paint prior to installation.
- KK. All conduit terminations shall have insulated throat or appropriate plastic bushing.
- LL. All raceway systems shall be complete, and each system shall be totally separate.
- MM. Non-metallic conduit shall not be used in patient care areas.

3.2 INTERFACE WITH OTHER PRODUCTS

- A. Install conduit to preserve fire resistance rating of partitions and other elements, using materials and methods under the provisions of Division Seven.
- B. Route conduit through roof openings for piping and ductwork or through suitable roof jack with pitch pocket. Coordinate location with roofing installation.

END OF SECTION

SECTION 26 05 34
BOXES

PART 1: GENERAL

1.1 SECTION INCLUDES

- A. Wall and ceiling outlet boxes.
- B. Floor boxes.
- C. Pull and junction boxes.

1.2 REFERENCES

- A. ANSI/NEMA FB 1 - Fittings and Supports for Conduit and Cable Assemblies.
- B. ANSI/NEMA OS 1 - Sheet-steel Outlet Boxes, Device Boxes, Covers, and Box Supports.
- C. ANSI/NFPA 70 - National Electrical Code.
- D. NEMA 250 - Enclosures for Electrical Equipment (1000 Volts Maximum).

1.3 PROJECT RECORD DOCUMENTS

- A. Submit under provisions of Division One.
- B. Accurately record actual locations and mounting heights of outlet, pull, and junction boxes.

1.4 REGULATORY REQUIREMENTS

- A. Conform to requirements of ANSI/NFPA 70.
- B. Furnish products listed and classified by Underwriters Laboratories, Inc., as suitable for purpose specified and shown.

1.5 PROJECT CONDITIONS

- A. Verify field measurements are as shown on Drawings.
- B. Electrical boxes are shown on Drawings in approximate locations unless dimensioned. Install at location required for box to serve intended purpose.

PART 2: PRODUCTS

2.1 OUTLET BOXES

- A. Sheet Metal Outlet Boxes: ANSI/NEMA OS 1, galvanized steel one piece construction, 4 inches x 4 inches x 1.5 inches deep, minimum.
- B. Cast Boxes: NEMA FB 1, Type FD cast ferralloy. Provide gasketed cover by box manufacturer. Provide threaded hubs, 4 inches x 4 inches x 1.5 inches deep, minimum.

2.2 PULL AND JUNCTION BOXES

- A. Sheet Metal Boxes: NEMA OS 1, galvanized steel one piece construction.
 - 1. Minimum Size Box: 4 x 4 x 1-1/2 inches deep.

- B. Surface-Mounted Cast Metal Box: NEMA 250, Type 4; flat-flanged, surface-mounted junction box.
 - 1. Material: Galvanized cast iron.
 - 2. Cover: Furnish with ground flange, neoprene gasket, and stainless steel cover screws.

PART 3: EXECUTION

3.1 INSTALLATION

- A. Install electrical boxes as shown on Drawings, and as required for splices, taps, wire pulling, equipment connections and compliance with regulatory requirements.
- B. Install electrical boxes to maintain a 6'-3" headroom and to present neat mechanical appearance.
- C. Install pull boxes and junction boxes above accessible ceilings and in unfinished areas only.
- D. Inaccessible Ceiling Areas: Install outlet and junction boxes no more than 6 inches from ceiling access panel or from removable recessed luminaire.
- E. Accessible Ceiling Areas: Install outlets and junction boxes no more than 3'-0" above removable ceiling.
- F. Install boxes to preserve fire resistance rating of partitions and other elements, using materials and methods under the provisions of Division One.
- G. Align adjacent wall-mounted outlet boxes for switches, thermostats, and similar devices with each other.
- H. Use flush mounting outlet boxes in finished areas.
- I. Do not install flush mounting boxes back-to-back in walls; provide minimum 6 inch separation. Provide minimum 24 inches separation in acoustic rated and fire rated walls.
- J. Secure flush mounting box to interior wall and partition studs. Accurately position to allow for surface finish thickness.
- K. Use stamped steel bridges to fasten flush mounting outlet box between studs.
- L. Install flush mounting box without damaging wall insulation or reducing its effectiveness.
- M. Do not fasten boxes to ceiling support wires.
- N. Support boxes from building structure or structural member.
- O. Use gang box where more than one device is mounted together. Do not use sectional box.
- P. Use 2-gang box with plaster ring for single device outlets.
- Q. Use cast outlet box in exterior locations exposed to the weather and wet locations.
- R. Use cast floor boxes for installations in slab on grade; formed steel boxes are acceptable for other installations.
- S. Set floor boxes level.
- T. Large Pull Boxes: Boxes larger than 100 cubic inches in volume or 12 inches in any dimension.
 - 1. Interior Dry Locations: Use hinged enclosure.
 - 2. Other Locations: Use surface-mounted cast metal box.
- U. Floor boxes shall not be used for feed through wiring except to another floor box.
- V. Cast boxes at the end of a run shall have one additional conduit into slab for support.
- W. Pull boxes shall be added, as necessary, to eliminate conduit runs from exceeding 200 feet in length.

- X. Box mounting height, unless indicated on drawings:
(All mounting heights shall comply with ADA)
 - 1. Refer to Section 26 27 26, Paragraph 3.4.
- Y. A maximum of one extension ring shall be used on a box.
- Z. System pull and junction boxes shall be color-coded as specified in Section 26 05 53.

3.2 INTERFACE WITH OTHER PRODUCTS

- A. Coordinate locations and sizes of required access doors with Division 8.
- B. Locate flush mounting box in masonry wall to require cutting of masonry unit corner only. Coordinate masonry cutting to achieve neat opening.
- C. Coordinate mounting heights and locations of outlets mounted above counters, benches and backsplashes.
- D. Position outlet boxes to locate luminaries as shown on reflected ceiling plan.

3.3 ADJUSTING

- A. Adjust floor box flush with finish flooring material.
- B. Adjust flush-mounting outlets to make front flush with finished wall material.
- C. Install knockout closure in unused box opening.

END OF SECTION

SECTION 26 05 53
ELECTRICAL SYSTEMS IDENTIFICATION

PART 1: GENERAL

1.1 WORK INCLUDED

- A. Nameplates.
- B. Wire markers.
- C. Box color coding.
- D. Lighting and power junction boxes.
- E. Panel directories.

1.2 SUBMITTALS

- A. Submit shop drawings under provisions of Division One.
- B. Include schedule for nameplates.

PART 2: PRODUCTS

2.1 MATERIALS

- A. Nameplates: Engraved three-layer laminated plastic, white letters on a black background. Equipment and devices on 'critical branch' (emergency) shall have labels with white letters on red background.
- B. Underground-Type Plastic Line Marker: Manufacturer's standard permanent, bright-colored, continuous-printed plastic tape with mylar backing, intended for direct-burial service; not less than 6 inches wide x 4 mils thick. Provide tape with printing which most accurately indicates the type of the buried conduit.
- C. Wire and Cable Markers: Cloth markers, split sleeve or tubing type.

PART 3: EXECUTION

3.1 INSTALLATION

- A. Degrease and clean surfaces to receive nameplates.
- B. Install nameplates parallel to equipment lines.
- C. Secure nameplates to equipment fronts using stainless steel screws. Secure nameplate to outside face of recessed panelboard doors in finished locations.
- D. Embossed tape will not be permitted for any application.
- E. Provide underground-type plastic line marker above exterior underground conduits. Bury 6 to 8 inches below finish grade. Provide line markers on each side of trench if wider than 16 inches.

3.2 WIRE IDENTIFICATION

- A. Phase Color Coding:
 - 1. 120/208 volt system, "A" phase - black, "B" phase - red, "C" phase - blue, neutral - white, and ground green.
 - 2. 277/480 volt system, "A" phase - brown, "B" phase - orange, "C" phase - yellow, neutral - gray, and ground - green.
- B. Maintain A, B, C, phase relation left to right or top to bottom when viewed from front. Maintain color coding throughout entire project.
- C. Phase conductors, size #10 and smaller, and neutral and ground conductors, shall have continuous outer finish color as indicated above. Size #8 and larger conductors shall have black insulation and be color coded with a six inch band of colored tape at all junctions and terminators.

3.3 NAMEPLATE ENGRAVING SCHEDULE

- A. Provide nameplates of minimum letter height as scheduled below.
 - 1. Panelboards: 1/2 inch-identify panelboard name. 1/4 inch-identify voltage rating.
 - 2. Individual Circuit Breakers and Switches: 3/8 inch-identify circuit and load served, including location.
 - 3. Safety Switches and Enclosed Switches: 1/2 inch - identify switch name; 1/4-inch - identify load served.
 - 4. Transformers: 3/8 inch-identify transformer name. 1/4 inch-identify primary and secondary voltages.
 - 5. Electrical Cabinets and Enclosures: 3/8 inch- identify equipment name.
 - 6. System Terminal Cabinets: 3/8 inch-identify equipment or system name.
- B. Headwall: 1/8 inch-identify panel and circuit number serving outlet (ex. 'LINA - 2') located above each outlet on headwall.
- C. Provide panelboard and circuit number on engraved trim plate, on each receptacle and switch. Engraving shall be deep enough to be visible and legible from a distance of 5'-0". Fasten nameplate to switch coverplate.

3.4 BOX COLOR CODING SCHEDULE

- A. Paint junction box and cover, and 6" of all conduits entering/leaving, in the following manner:
 - Life-Safety - Yellow
 - Critical - Orange
 - Equipment - Green
 - Fire alarm - Red
 - Nurse Call/Code Blue - blue.
 - Patient Monitor - purple.
 - Telephone system - brown.
 - CATV - white.

3.5 LIGHTING AND POWER JUNCTION BOX IDENTIFICATION

- A. Identify lighting and power junction box covers with circuit and panelboard number on the outside, using permanent marker.

3.6 PANEL DIRECTORY

- A. Shall be typewritten, indicating specific and clear area of control, regardless of the listing in the panel schedules on the drawings. Indicate by room name, equipment, system, etc.
- B. Provide to the Engineer corrected panel directories so the panel schedules on the record drawings can be updated to match the directories in the panels in the field.

END OF SECTION

SECTION 26 05 70
TESTING

PART 1 – GENERAL

1.1 WORK INCLUDES

- A. Testing of electrical components and equipment as herein specified.

1.2 SYSTEM DESCRIPTION

- A. Testing includes:
 1. Resistance tests.
 2. Continuity tests.
 3. Phase relationship verification.
 4. Voltage tests.
 5. Ground fault protection tests.

1.3 QUALITY ASSURANCE

- A. Regulatory Requirement
 1. Comply with National Electrical Code, (NEC).
- B. Reference Publications

1.4 SUBMITTALS

- A. Test Reports: All test reports shall be submitted in triplicate, assembled and bound to Architect/Engineer prior to final acceptance.

PART 2 – PRODUCTS

2.1 MATERIALS

- A. Furnish all test equipment to perform specified testing.

PART 3 – EXECUTION

3.1 TESTS

- A. Conduct such tests and adjustment of equipment as necessary to verify performance requirements.
- B. Test Reports: Typewritten, listing testing equipment used, person or persons performing the tests, date tested, circuits tested, motor or equipment nameplate data, and results of tests.
- C. Insulation resistance tests general:
 1. Perform insulation resistance tests on equipment and cables listed herein.
 2. Test equipment: Furnished by Contractor.
 3. Resistance measured: line-to-ground.
 4. Disconnect, prior to testing, any device that could be damaged by application of voltage.
 5. Insulation resistance tests shall be conducted per following schedule:

Item Tested	Voltage of Test	Min. Acceptance Resistance in Megohms
Transformers	500v	5
No. 2 and larger cables (600 V)	1000V	50
Panelboards	1000V	25

D. Ground Resistance

1. Measure and record ground resistance from system neutral connection at separately derived system, to convenient ground reference point using suitable ground testing equipment. Minimum acceptable resistance: 10 ohms. When resistance exceeds 10 ohms, modify ground connection and/or increase grounding electrode conductor size and repeat test.
2. Measure equipotential difference and ground resistance between the metallic raceway, and the equipment grounding conductor at each outlet mounted in the walls, of the Operating and Procedure rooms, and prep and recovery areas. Maximum allowable potential difference is 20 millivolts, (.020 volts), and maximum ground resistance shall be 0.1 ohms.
3. Random testing shall be performed at the time of the AHCA Final Survey. Test equipment shall be provided with current calibration data indicating date of calibration, and length of test leads used during calibration. Calibration shall have been within the last twelve (12) months.

E. Continuity Test

1. Test branch circuits and control circuits to determine continuity of wiring and connection. Submit written statement that this has been performed.

F. Voltage test shall be made and recorded at the following listed points. Tests shall be conducted under normal load conditions.

1. Distribution feeders at panelboards.
2. Outlets in the headrail system.

G. Phase Relationship: Check connections to equipment for proper A-B-C phase relationships.

1. Disconnect, prior to check, any device which could be damaged by application of voltage of reversed phase sequence.

3.2 CORRECTIONS OF DEFECTS

- A. If tests disclose any unsatisfactory workmanship or equipment furnished under this contract, Contractor shall repair or replace such defects.
- B. If any wiring or equipment is damaged by tests, Contractor shall repair or replace such wiring or equipment.

END OF SECTION

SECTION 26 24 16
CIRCUIT BREAKER PANELBOARDS

PART 1 - GENERAL

1.1 WORK INCLUDES

- A. Panelboards herein specified and shown on the drawings.

1.2 SUBMITTALS

- A. In accord with Division One:
1. Shop Drawings: Panelboards and Dimensional Data.
2. Product Data: Circuit breakers.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Panelboards rated 208/120 volt shall have copper bus structure braced for 10,000 RMS amps fault current minimum, and panelboards rated 277/480 volt shall have copper bus braced for 25,000 RMS amps fault current minimum, or as indicated on the drawings, whichever is greater. All copper parts shall be plated to prevent corrosion.
1. All panelboards shall be Dead-Front Safety Type, equipped with thermal-magnetic molded case breakers, and solid neutral bus.
 2. Bus bar connections to the branch circuit breakers shall be the "Distributed Phase" or "Phase Sequence" type. Bussing shall be such that adjacent single pole breakers will be on different phases or polarities, and that two or three pole breakers can be installed at any location.
 3. Panelboard numbering shall be such that starting at the top, odd numbers shall be used in sequence down the left hand side and even numbers shall be used in sequence down the right hand side.
- B. Cabinets shall be fabricated of code gauge galvanized steel with gutters per National Electrical Code. Fronts shall have doors with matching one piece trim, be code gauge and be finished with rust inhibiting primer and baked enamel. Fronts shall have adjustable indicating trim clamps completely concealed when door is closed. Provide a circuit directory frame and card with a clear plastic covering on the inside of the doors. Fronts shall have flush locks and be furnished with two keys per lock.
- C. Provide circuit breakers, quick-make, quick-break, thermal-magnetic, trip indicating, and common trip on all multi-pole breakers. Branch circuit breakers feeding convenience outlets shall have sensitive instantaneous trip settings of not more than 10 times the trip rating of the breaker. Circuit breakers shall have bolt-on connections to the bus. Ratings are shown on the panelboard schedule.
- D. Main circuit breaker: Circuit breaker ampere rating as shown on drawings, voltage as required, 3-pole, single-throw, front connected. Molded case, thermal-magnetic, common trip, quick-make, quick-break, adjustable magnetic trip elements, with RMS interrupting rating as required to meet the panel's integrated rating. Provide where indicated on drawings.
- E. Breakers intended to switch fluorescent lighting loads on a regular basis shall be rated for switching duty.

- F. Provide ground fault circuit interrupter circuit breakers rated to trip at 30 milliamperes for circuits as shown on drawings.
- G. Panelboards shall be furnished with ground bus and separate insulated neutral bus.
- H. Circuit Breaker Panelboards:
 - 1. Acceptable Products:
 - a. Square D (Basis of Design)
 - b. G.E.
 - c. Eaton
 - d. Siemens

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Locate as shown on drawings. Maximum distance from floor to highest breaker: 6 feet - 6 inches.
- B. Provide mounting materials required; make connections specified or shown. Use collars around mounting bolts, or equivalent means to provide 1/4" minimum air space between panel and wall for surface mounted panel.
- C. Provide nameplate for each panel in accord 26 05 53.
- D. Provide typed circuit directory for each panel indicating load served. Leave spare circuit breakers and circuit breaker space blank on directory.
- E. Where double-panels are indicated, provide single common trim or allow for two individual covers when mounting cabinets.

END OF SECTION

SECTION 26 27 16
CABINETS AND ENCLOSURES

PART 1 GENERAL

1.1 SECTION INCLUDES:

- A. Hinged cover enclosures.
- B. Cabinets.
- C. Terminal blocks and accessories.

1.2 REFERENCES

- A. NEMA 250 - Enclosures for Electrical Equipment (1000 Volts Maximum).
- B. ANSI/NEMA ICS 1 - Industrial Control and Systems.
- C. ANSI/NEMA ICS 4 - Terminal Blocks for Industrial Control Equipment and Systems.
- D. ANSI/NEMA ICS 6 - Enclosures for Industrial Control Equipment and Systems.

1.3 SUBMITTALS

- A. Submit product data under provisions of Division 1.
- B. Shop Drawings for Equipment Panels: Include wiring schematic diagram, wiring diagram, outline drawing and construction diagram as described in ANSI/NEMA ICS 1.

PART 2 PRODUCTS

2.1 HINGED COVER ENCLOSURES

- A. Construction: NEMA 250; steel; type as required to meet conditions of installation unless indicated on the Drawings. Where installed outdoors, enclosure shall be NEMA-4X stainless steel.
- B. Finish: Manufacturer's standard enamel finish.
- C. Covers: Continuous hinge, held closed by flush latch operable by key.
- D. Panel for Mounting Terminal Blocks or Electrical Components: 14 gage steel, enamel finish.

2.2 CABINETS

- A. Cabinet Boxes: Galvanized steel with removable end walls. Provide 3/4 inch thick plywood backboard (exterior fir, type A/C, 7 ply) painted gray on all sides, for mounting terminal blocks.
- B. Cabinet Fronts: Screw cover front, concealed hinge and flush lock keyed to match branch circuit panelboard; finish in baked enamel.

2.3 TERMINAL BLOCKS AND ACCESSORIES

- A. Terminal Blocks: ANSI/NEMA ICS 4; UL listed.
- B. Power Terminals: Unit construction type, closed-back type, with tubular pressure screw connectors, rated 600 volts.

- C. Signal and Control Terminals: Modular construction type, channel mounted; tubular pressure screw connectors, rated 300 volts.

2.4 FABRICATION

- A. Shop assemble enclosures and cabinets housing terminal blocks or electrical components in accordance with ANSI/NEMA ICS 6.
- B. Provide knockouts on enclosures.
- C. Provide protective pocket inside front cover with schematic diagram, connection diagram, and layout drawing of control wiring and components within enclosure.

PART 3 EXECUTION

3.1 INSTALLATION

- A. Install cabinets and enclosures plumb; anchor securely to wall and structural supports at each corner, minimum.
- B. Provide accessory feet for free-standing equipment enclosures.
- C. Install trim plumb.

END OF SECTION

SECTION 26 27 26
WIRING DEVICES

PART 1: GENERAL

1.1 SECTION INCLUDES

- A. Wall switches.
- B. Receptacles.
- C. Device plates and decorative box covers.

1.2 REFERENCES

- A. NEMA WD 1 - General Purpose Wiring Devices.
- B. NEMA WD 6 - Wiring Device Configurations.

1.3 SUBMITTALS

- A. Submit under provisions of Division One.
- B. Product Data: Provide manufacturer's catalog information showing dimensions, colors, and configurations.
- C. Manufacturer's Instructions:
 - 1. Indicate application conditions and limitations of use stipulated by product testing agency specified under regulatory requirements.
 - 2. Include instructions for storage, handling, protection, examination, preparation, operation and installation of product.

1.4 QUALIFICATIONS

- A. Manufacturer: Company specializing in manufacturing products specified in this Section with minimum three (3) years experience.

PART 2: PRODUCTS

2.1 WALL SWITCHES - Specification Grade - 20A, 125V/277V, grounding type. Switches on the critical branch and life safety branch shall be red.

- A. Single Pole Switch:
 - 1. Legrand
 - 2. Leviton
 - 3. Arrow-Hart
- B. Three-way Switch:
 - 1. Legrand
 - 2. Leviton
 - 3. Arrow-Hart
- C. Four-way Switch:
 - 1. Legrand
 - 2. Leviton
 - 3. Arrow-Hart

2.2 RECEPTACLES - Hospital Grade - 20A, 125V, 3W, Grounding type. Receptacles on the critical and life-safety branch shall be red.

- A. Single Convenience Receptacle:
 - 1. Legrand
 - 2. Leviton.
 - 3. Arrow-Hart
- B. Duplex Convenience Receptacle:
 - 1. Legrand
 - 2. Leviton
 - 3. Arrow-Hart
- C. GFCI Receptacle:
 - 1. Legrand
 - 2. Leviton
 - 3. Arrow-Hart
- D. Surge Protected Receptacle:
 - 1. Legrand
 - 2. Leviton

2.3 WALL PLATES

- A. Decorative Cover Plate: Stainless steel type 302/304 satin finished, non-magnetic.
- B. Weatherproof Cover Plate: Gasketed stainless steel with lockable hinged gasketed device cover, equal to Sierra Model WP-26L.

PART 3: EXECUTION

3.1 EXAMINATION

- A. Verify existing conditions.
- B. Verify outlet boxes are installed at proper height.
- C. Verify wall openings are neatly cut and will be completely covered by wall plates.
- D. Verify branch circuit wiring installation is completed, tested, and ready for connection to wiring devices.

3.2 PREPARATION

- A. Provide extension rings to bring outlet boxes flush with finished surface.
- B. Clean debris from outlet boxes.

3.3 INSTALLATION

- A. Install products in accordance with manufacturer's instructions.
- B. Install devices plumb and level.
- C. Install switches with OFF position down.
- E. Install receptacles with grounding pole on bottom, or to the left when mounted horizontally.
- F. Connect wiring device grounding terminal to branch circuit equipment grounding conductor.

- G. Install decorative plates on switch, receptacle, and blank outlets in finished areas.
- H. Connect wiring devices by wrapping conductor around screw terminal. Do not “back-wire” any devices.
- I. Install galvanized steel plates on outlet boxes and junction boxes in unfinished areas, above accessible ceilings, and on surface mounted outlets.
- J. Any receptacle within six feet of a sink shall be a GFCI type.
- K. Devices on 'emergency' circuits shall be red in color. Devices on normal power circuits shall be the color as specified by the Architect.
- L. When GFCI is specified, use only GFCI receptacles. Do not protect "down stream" receptacles with GFCI receptacles.
- M. Do not use push-in connections on any device.
- N. All devices, receptacles, and switches shall have separate grounding terminal.
- O. Identify each outlet and switch in accordance with Section 26 05 53.

3.4 MOUNTING HEIGHTS

- A. Coordinate locations of outlet boxes provided under Section 26 05 34 to obtain mounting heights specified herein or indicated on Drawings.
- B. Install wall switch 42-inches, to center, above finished floor, or as dimensioned on the drawings.
- C. Install convenience receptacle 18-inches, to center, above finished floor.
- D. Install convenience receptacle 6-inches to center, above backsplash of counter.
- E. Install telecommunications outlet 18-inches, to center, above finished floor, or as dimensioned on the drawings.

3.5 FIELD QUALITY CONTROL

- A. Inspect each wiring device for defects.
- B. Operate each wall switch with circuit energized and verify proper operation.
- C. Verify that each receptacle device is energized.
- D. Test each receptacle device for proper polarity.
- E. Test each GFCI receptacle device for proper operation.

3.6 ADJUSTING

- A. Adjust devices and wall plates to be flush, plumb, and level.

END OF SECTION

SECTION 26 28 17
OVERCURRENT PROTECTIVE DEVICES

PART 1 – GENERAL

1.1 WORK INCLUDES

- A. Fuses for all fusible equipment installed on the project regardless of which contractor has provided the equipment.
- B. Enclosed circuit breakers as indicated on the drawings and herein specified.
- C. Circuit breakers for existing panelboards for new branch circuit overcurrent protection.

1.2 SUBMITTALS

- A. In accord with Division One.
 - 1. Shop Drawings: All enclosed circuit breakers with dimensional data.
 - 2. Product Data
 - a. Fuses
 - b. Enclosed circuit breakers
 - c. Circuit breakers for installation into existing panelboards.

PART 2 – PRODUCTS

2.1 MATERIALS

- A. Fuses rated 15 to 600 ampere (except for motor branch circuit protection), 600 volt and below, U.L. listed Class RK-1 current limiting type, 200,000 amperes RMS interrupting.
 - 1. Acceptable Products
 - a. Bussman Limitron - Type KTS-R
 - b. Little Fuse - Type KLSR
 - c. Gould Shawmut - Type A2K (250 vac)/A6K (600 vac)
- B. Fuses for motor branch circuit and transformer protection U.L. listed Class RK-5 dual element type, 200,000 amperes RMS interrupting.
 - 1. Acceptable Products
 - a. Bussman Fusetron - Type FRS-R
 - b. Little Fuse - Slo-Bl0, Type FLS-R
 - c. Gould Shawmut - Type TR (250 vac)/TRS (600 vac)
- C. Furnish and install individually enclosed circuit breakers as indicated on the plans. All circuit breakers shall meet Federal Specification W-C-375B, and both the circuit breaker and the enclosure shall be UL listed.
- D. Circuit breakers shall have overcenter toggle type mechanisms, providing quick-make, quick-break action. Breakers shall have current and interrupting rating as indicated on the plans. Each circuit breaker shall have trip indication by handle position and shall be trip-free. Two and three pole breakers shall be common trip. Each breaker shall have a permanent trip unit containing individual thermal and magnetic trip elements in each pole.
- E. Enclosures shall be of the NEMA type indicated on the plans.
- F. NEMA 1 enclosures shall be furnished with knockouts where practical and shall be fabricated from sheet steel which conforms to UL 50. The enclosure shall be given an electrodeposited, gray baked enamel finish. Padlocking provisions shall be provided to allow locking the circuit breaker in the "OFF" position. Enclosures shall be UL listed.

- G. NEMA 3RSS enclosures for circuit breakers rated thru the 225 ampere frame size shall be furnished with provisions for interchangeable, bolt-on hubs. Enclosures shall be fabricated from stainless steel and shall be given an electrodeposited, gray baked enamel finish. Enclosure covers shall be securable in the open position. Padlocking provisions shall be provided to allow locking the enclosure cover closed. Enclosures shall be UL listed.

PART 3 – EXECUTION

3.1 INSTALLATION

- A. Distribution system is designed to provide selectivity, coordination, and component protection. To guarantee this system, all fuses or circuit breakers shall be from the same manufacturer. Substitution provisions are specified in Division One.
- B. Place a fuse identification label showing size and type of fuses installed inside the cover of each switch.
- C. Furnish Owner at completion of project, one spare set (3) of each size of fuse rated over 100 amperes. Obtain a written receipt for same from the Owner.
- D. Provide a nameplate for each enclosed circuit breaker in accordance with Section 26 05 53.

END OF SECTION

SECTION 26 29 10
ELECTRIC CONTROLS AND RELAYS

PART 1 GENERAL

1.1 SECTION INCLUDES:

- A. Pushbutton and selector switches.
- B. Control stations.
- C. Relays.
- D. Time-delay relays.
- E. Control power transformers.
- F. Control panels.

1.2 REFERENCES

- A. NEMA ICS 1 - General Standards for Industrial Control Systems.
- B. NEMA ICS 2 - Standards for Industrial Control Devices, Controllers and Assemblies.
- C. NEMA ICS 6 - Enclosures for Industrial Controls and Systems.
- D. NEMA ST 1 - Standard for Specialty Transformers (Except General Purpose Type).

1.3 SUBMITTALS

- A. Submit shop drawings under provisions of Division 1.
- B. Submit shop drawings to NEMA ICS 1 indicating control panel layouts, wiring connections and diagrams, dimensions, support points.
- C. Submit product data under provisions of Division 1.
- D. Submit product data for each component specified.

1.4 PROJECT RECORD DOCUMENTS

- A. Submit record documents under provisions of Division 1.
- B. Accurately record actual locations of control equipment. Revise diagrams included in Drawings to reflect actual control device connections.

1.5 OPERATION AND MAINTENANCE DATA

- A. Submit operation data under provisions of Division 1.
- B. Include instructions for adjusting and resetting time-delay relays, timers and counters.
- C. Submit maintenance data under provisions of Division 1.
- D. Include recommended preventive maintenance procedures and materials.

1.6 QUALIFICATIONS

- A. Manufacturer: Company specializing in manufacturing the products specified in this Section with minimum three years documented experience.

PART 2 PRODUCTS

2.1 CONTROL SWITCHES AND STATIONS

- A. Contacts: NEMA ICS 2; Form C.
- B. Contact Ratings: NEMA ICS 2; as scheduled.
- C. Pushbutton Operator: NEMA ICS 2; as scheduled.
- D. Control Stations: NEMA ICS 2; as scheduled.

2.2 CONTROL RELAYS

- A. Contacts: NEMA ICS 2; Form C.
- B. Contact Ratings: NEMA ICS 2; as scheduled.
- C. Coil Voltage: as scheduled.

2.3 TIME-DELAY RELAYS

- A. Contacts: NEMA ICS 2; as scheduled.
- B. Contact Ratings: NEMA ICS 2; Class A150.
- C. Coil Voltage: as scheduled.
- D. Time-Delay Relays: NEMA ICS 2; as scheduled.

2.4 CONTROL POWER TRANSFORMERS

- A. Transformer: NEMA ST 1; machine tool transformer with isolated secondary winding.
- B. Power Rating: 500 va.
- C. Voltage Rating: as required.

2.5 ENCLOSURES

- A. Control Station Enclosure: NEMA ICS 6; Type as required to meet conditions of installation unless indicated on the Drawings.
- B. Relay Enclosure: NEMA ICS 6; Type as required to meet conditions of installation unless indicated on the Drawings.

2.6 FABRICATION

- A. Control Panels: Shop fabricate control panels to NEMA ICS 1, using cabinets and terminal blocks furnished under the provisions of Section 26 27 16.

PART 3 EXECUTION

3.1 INSTALLATION

- A. Install devices and equipment in accordance with manufacturer's instructions.
- B. Install individual relays and time delay relays in enclosures.
- C. Install cabinets under the provisions of Section 26 27 16.
- D. Make electrical wiring interconnections as shown on Drawings.

END OF SECTION

SECTION 26 51 00
LIGHTING FIXTURES

PART 1: GENERAL

1.1 WORK INCLUDED

- A. Interior luminaires and accessories.
- B. Exterior luminaires and accessories.
- C. Lamps.
- D. Ballasts.

1.2 REFERENCES

- A. ANSI C82.1 - Specification for Fluorescent Lamp Ballasts.
- B. ANSI C82.4 - Specifications for High-Intensity-Discharge Lamp Ballasts (Multiple Supply Type.)
- C. FS W-F-414 - Fixture, Lighting (Fluorescent, Alternating-Current, Pendant Mounting.)
- D. NEMA LE 2 - H-I-D Lighting System Noise Criterion (LS-NC) Ratings.

1.3 SUBMITTALS

- A. Submit product data under provisions of Division One.
- B. Include outline drawings, lamp and ballast data, support points, weights, and accessory information for each luminaire type.
- C. Submit manufacturer's installation instructions under provisions of Division One.
- D. Submit index listing all fixtures types and complete model number with submittal. Incomplete submittals will be returned without review.

1.4 SUBSTITUTIONS

- A. The lighting fixtures listed in the first line of each type of fixture in the Lighting Fixture Schedule, are the "basis of design" for the lighting systems. Alternate fixtures from manufacturers listed on the second and third lines of each type of fixture in the fixture schedule, will be considered, if proposed fixtures are equivalent in all respects as to performance, quality of construction, suitability for the application, and appearance, including aesthetic considerations for compatibility with the architecture. The Engineer shall have sole discretion in determining equivalency of fixtures.
- B. Requests for consideration of substitutes (fixtures from manufacturers that are not listed), must be made in advance of bidding. Complete data on each proposed substitute fixture, including catalog cuts and photometric data for both the specified and proposed substitute fixtures, together with an item by item comparison highlighting differences from the specified fixture, must be submitted to and received by the Architect and Engineer ten (10) business days prior to opening of bids.
- C. The Engineer will evaluate the submittal and advise the Proposer within five (5) business days after receipt thereof of the Architect's and Engineer's decision as to the acceptability of the proposed substitute.
- D. The Contractor shall be responsible for all changes and modifications to the work required to accommodate the substitute fixtures if accepted, including costs of additional design engineering work if any.

- E. Final review for fixtures will be when shop drawings are submitted. The Architect and Engineer reserve the right to reject any fixtures which, in their opinion, do not meet the intent of the overall lighting system design. Upon request, the fixture supplier shall submit sample fixtures.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Deliver products to site under provisions of Division One.
- B. Store and protect products under provision of Division One.
- C. There shall be no payment for products billed as stored material or work in place until respective data is approved by the Engineer. Include delivery slips and invoice with pay requisition for review.

PART 2: PRODUCTS

2.1 INTERIOR LUMINAIRES AND ACCESSORIES

- A. Recessed Fluorescent Luminaires: Provide trim type and accessories required for installation in ceiling system installed. Maximum depth of luminaire, 6 inch, including yokes and bridges.
- B. Exit Signs: LED type source. Stencil face; 6 inch high red letters on white background, directional arrows as indicated, mounting type as indicated.
- C. Provide in-line fuses in all fluorescent fixtures on emergency power.
- D. Recessed fixture housings shall be die-formed of cold rolled steel of not less than 22 gauge. Construction shall provide an approved method of locking lens or shielding in place. Enamel finish for light reflectance shall have a hardness between H and 3H. The metal shall be cleaned and prepared by "Bonderizing" or an equivalent process. All paint shall be applied after fabrication and have a minimum reflectivity of 88%.
- E. Plastic lenses for fluorescent fixtures shall be 100% virgin acrylic, not less than 3/16" nominal thickness, type K-19.
- F. Temperature in fixture housing shall not exceed 90-degrees C with ambient room temperature of 27-degrees C.
- G. All luminaires required to meet National Appliance Energy Conservation Amendments.
- H. All fixtures shall be equipped with a ground screw or lug to ensure mechanical bond.
- I. Recessed fixtures in plaster ceilings shall be furnished with plaster frames.
- J. Prior to placing orders for recessed fixtures, Contractor shall verify the types of ceilings and suspension systems that have been approved for the project and shall order fixtures with flanges as required to fit in the approved ceilings.
- K. All fixtures shall be provided complete with lamps.
- L. All fluorescent ballasts shall be electronic type with less than 10% total harmonic distortion (THD).
- M. Acceptable Manufacturers - Fluorescent Ballasts
 - 1. General Electric.
 - 2. Universal.
 - 3. Advance.

2.2 EXTERIOR POLE MOUNTED FIXTURES

- A. Fixture shall be approved for pole mounting.
- B. Fixture, pole, and base assembly shall be rated to withstand maximum winds in zone of the project location. Provide wind load calculations for the fixture, pole, base assembly (including embedment), performed and signed and sealed by a Florida Licensed Engineer.

PART 3: EXECUTION

3.1 INSTALLATION

- A. Install all lighting fixtures. Install lamps in luminaires and lampholders.
- B. Support surface-mounted luminaires directly from building structure. Fasten to T using screws, or approved ceiling framing member clips. Install fluorescent luminaires independent of ceiling framing.
- C. Install recessed luminaires to permit removal from below. Use plaster frames in drywall ceilings. All lay-in type recessed fixtures shall be fastened to acoustical ceiling main T-bars by screws or approved seismic clips. T-bars shall be supported at all four corners of fixture by #12 gauge tie wire.

3.2 RELAMPING

- A. Relamp luminaires which have failed lamps at completion of work. Obtain lamps from the Owner.

3.3 ADJUSTING AND CLEANING

- A. Align luminaires and clean lenses and diffusers at completion of Work. Clean paint splatters, dirt, and debris from installed luminaires.
- B. Touch up luminaires as necessary at completion of work to provide a clean, fully operational unit.
- C. All cracked or damaged lenses shall be replaced with new undamaged unit.

END OF SECTION

SECTION 26 52 00
EMERGENCY LIGHTING EQUIPMENT

PART 1 GENERAL

1.1 WORK INCLUDED:

- A. Emergency lighting units.
- B. Emergency LED exit signs.
- C. Emergency fluorescent lamp power supplies.

1.2 REFERENCES

- A. FS W-L-305 - Light Set, General Illumination (Emergency or Auxiliary)
- B. NFPA 101 - Code for Safety to Life from Fire in Buildings and Structures
- C. NEMA WD1 - General-Purpose Wiring Devices.

1.3 SUBMITTALS

- A. Submit product data under provisions of Division 1.
- B. Provide product data on emergency lighting units, exit signs, and emergency fluorescent lamp power supply units.

PART 2 PRODUCTS

2.1 INCANDESCENT EMERGENCY LIGHTING UNITS

- A. Emergency Lighting Unit: Self-contained unit with rechargeable storage batteries, charger, and lamps.
- B. Battery: 6-volt, nickel-cadmium type, with 1.5 hour capacity to supply the connected lamp load.
- C. Charger: Dual-rate charger, capable of maintaining the battery in a full-charge state during normal conditions and capable of recharging discharged battery to full charged within 12 hours.
- D. Lamps: 8 Watt minimum, sealed beam type PAR 36.
- E. Remote Lamps: Match lamps on unit.
- F. Unit Housing: Steel with bronze hammer tone finish.
- G. Indicators: Provide lamps to indicate AC ON and RECHARGING.
- H. Provide switch to transfer unit from normal supply to battery supply.
- I. Electrical Connection: Knockout for conduit connection.

2.2 SELF-CONTAINED EMERGENCY POWER LED EXIT SIGNS

- A. Type: Exit signs shall utilize LED's for light source and be provided with integral battery-operated emergency power supply, including power failure relay, test switch, AC ON pilot light, battery, and fully-automatic two-rate charger.
- B. Battery: Sealed lead acid or lead calcium cell, requiring no maintenance or replacement for 10 years under normal conditions.

PART 3 EXECUTION

3.1 INSTALLATION

- A. Install units plumb and level.
- B. Aim directional lampheads as directed.

END OF SECTION

28

DIVISION

ELECTRONIC SAFETY AND SECURITY

SECTION 28 05 28
SECURITY RACEWAY SYSTEM

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract, including, but not limited to, General, Special and Supplementary Conditions and other Division-1 Specification Sections, apply to the work of this section.

1.2 SCOPE

- A. Provide materials, equipment, labor, and supervision necessary to install conduit system only, for installation of complete security system to be provided by Owner. Raceway system is intended to accommodate intrusion detection and video surveillance system (CCTV), as would be provided by the Owner's vendors. Conduit system shall accommodate all wiring, devices, control panel, and interconnections to other systems.

1.3 QUALITY ASSURANCE

- A. Regulatory Requirements:
 - 1. National Electrical Code, (NEC).

1.4 SUBMITTALS

- A. Product Data: N/A
- B. Shop Drawings: N/A

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Raceways:
 - 1. J-Hooks: Static load limit of 75 lbs. galvanized steel construction. Caddy "Cablecat" or equal.
 - 2. Provide #6 AWG insulated copper grounding conductor from each system control panel enclosure/rack, to ground bus in room.
 - 3. Interior conduits concealed in partitions and exposed above 4'-0" aff shall be EMT, ¾-inch minimum. Conduits in or under slab, or exposed below 4'-0" aff, shall be RGS, ¾-inch minimum, painted with two (2) coats of bitumastic paint.
- B. Outlet Boxes:
 - 1. Outlet boxes concealed in partitions shall be 4-11/16" x 2-1/8" DP, galvanized sheet metal. Provide with single-gang drywall ring mounted vertically. Stub ¾-inch conduit from box, up into ceiling space.
 - 2. Provide single-gang blank plate on each unused outlet opening. Color shall match all other device plates.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Provide 200 pound test line in all empty conduits.
- B. Ensure a complete pathway for cabling is possible from each outlet device, back to the respective security system control panel. Provide sleeves through firewalls/partitions as necessary to provide for future cabling.

END OF SECTION

SECTION 28 13 10
ACCESS CONTROL SYSTEM

PART 1 GENERAL

1.1 RELATED DOCUMENTS

- A. The provisions of the General Conditions, Supplementary Conditions, and the Sections included under Division 01, General Requirements, are included as a part of this Section as though bound herein.

1.2 PERFORMANCE REQUIREMENTS

- A. Purpose:
1. Provide electronic card access control system for all new construction and renovation projects.
 2. Electronic card access shall be located at designated perimeter doors leading to each of the program areas with electric re-strike rim exit device, controlled by card access system.
 3. Electronic card access control system shall include all necessary components, wiring for power and control to sensors, card access controls, door hardware devices, uninterruptible power supply system (UPS) and capable of interfacing with existing AMAG software for a complete operable and fully integrated system that is capable of control through the internet.
 4. Raceway system shall consist of conduit, J-hooks, sleeves, boxes and wiring for an automatic card access system.
 5. Electronic card access system shall be independent from Section Intrusion Detection System and shall be an internet-based control system, connected to MCSD main security control center.
 6. The system shall shunt the alarm system to allow passage through the doors when access card is swiped then rearm the alarm system when the door closes. On egress a passive infrared sensor shall shunt the alarm and unlock the door allowing for passage out of the building then resetting the alarm when the door closes.
- B. The System shall include but not be limited to:
1. Main Cabinet shall be surface mounted steel construction, AMAG Panel Model # 2100 installed on a plywood backboard. Main cabinet shall be installed in the MDF Room, including all required power supplies, batteries, integral charger, and the software for a complete fully operational system.
 - a. Backboard: Plywood, 1/2 inch thick, AC Grade, covered with two coats of UL Classified, fire retardant intumescent paint, light gray color, painted front, rear, and all four sides.
 - b. Backboard shall be clearly labeled with the name of the backboard manufacturer, UL classification of the Fire Retardant Coating with the NFPA 255 Coating Flame Index and the APA Grade of the plywood. Backboard shall be securely fastened to the wall in order to support any and all attached equipment.
 2. Each cabinet shall feed a minimum of eight controlled devices (readers).
 3. Surge suppression for the 120 VAC power supply.
 4. Card readers.
 5. The distribution cabinet must be within 300 feet of the controlled devices.

6. Raceway shall not exceed 400 feet without a pull box.
 7. Grounding.
 8. Raceway, fittings, wire and wire fittings.
 9. A 2 inch raceway from the main cabinet to the next building and floor distribution cabinet.
 10. Wire and cable labeling.
 11. Programming Software that is capable of interfacing with AMAG system.
 12. Electrical power required to comply with all functions and operations required for the system.
- C. Access Card Locations: Provide a card reader/controlled device at the following locations:
1. All designated perimeter doors at the discretion of MCSD Site Security and/or Electrical Engineer.
 2. Other doors may be installed to include:
 - a. Principal's Office
 - b. Bookkeeper's Office
 - c. AV Storage
 - d. CCTV Studio Area
 - e. Custodial Receiving
 - f. MDF Room
 - g. Other areas as defined in the plans specific review process

1.3 QUALITY ASSURANCE

- A. Installer Qualifications:
1. The Contractor shall use personnel who are manufacturer-certified, thoroughly trained and experienced with the specified requirements and methods needed for the proper performance of the work.
- B. Manufacturer Qualifications:
1. Manufacturer shall have completed a minimum of five projects of equal scope to systems described herein and shall have been in the business of supplying and installing specified type of systems for a minimum of five years.
- C. Fabricator Qualifications Mockups:
1. Fabricator shall have completed a minimum of five projects of equal scope to systems described herein and shall have been in the business of supplying and installing specified type of systems for a minimum of five years.

1.4 SUBMITTALS

- A. Shop Drawings:
1. Shop Drawings shall be prepared in latest version of AutoCAD 2006 or later format with electronic copies submitted along with full sized Shop Drawings.
 2. Shop Drawings shall indicate typical wire connections and cable types, keypad locations, and all main and remote panels. Provide wiring schematics including point-to-point, terminal strips, connections to batteries, and power supplies, including the estimated anticipated wiring lengths required for all connection points (i.e., zone and system communications bus runs) within the system. Indicate interfaces to equipment furnished by others.

3. Submit dimensioned Shop Drawings indicating mechanical layout of all card access equipment, including cabinets and interconnecting conduit for the main panel, typical remote panel, keypad, and indicator locations, identifying all parts by manufacturer and part number.
 4. Shop Drawings shall be accompanied by engineering documentation including:
 - a. Floor Plans indicating all components, raceways, and terminal boxes and cabling.
 - b. Riser diagram indicating all connections in a manner following the floor plan layout.
 - c. Cabling diagram indicating the Contractor's designed routing and number of cables in specific raceways or conduits, from the main panel connecting to other sub-panels, modules or devices. Diagram shall include length, in wire feet, and capacitance calculation charts for all cables.
- B. Warranty Requirements:
1. Contractor shall warranty that all materials furnished shall be free from defects of material for a period of one year excluding specific items of work that require a warranty of a greater period that may be set forth in this Specification. Contractor shall warranty that workmanship for a period of one year from date of Final Completion, excluding specific items of work that require a warranty of a greater period that may be set forth in this Specification. Immediately upon receipt of written notice from the Owner, the Contractor shall repair or replace at no expense to the Owner, any defective material or work that may be discovered before final acceptance of work or within the warranty period; any material or work damaged thereby; and adjacent material or work that may be displaced in repair or replacement. Examination of or failure to examine work by the Owner shall not relieve Contractor from these obligations.

PART 2 PRODUCTS

2.1 MATERIALS, PRODUCTS, EQUIPMENT, MANUFACTURED UNITS

- A. Raceways
1. General:
 - a. Provide raceways (conduits, wireways, pull boxes, J-hooks, outlet boxes, etc.) in compliance with the requirements of the card access manufacturer, Section Conduit for Electrical Systems, and Section Outlet Boxes.
 2. Conduit:
 - a. Provide conduit sized and based on fill in accordance with the NEC. Minimum size of conduit is to be 1 inch.
 - b. Provide pull cords in all raceway installed without cable.
 3. J-Hooks:
 - a. Provide J-hooks in accordance with the NEC, EIA/TIA requirements for structured cabling systems. All cable supports shall be UL listed.
 - i. Design Selection: Enrico Caddy or J-Hook
 4. Boxes:
 - a. Provide boxes sized as required by the system manufacturer and the NEC for cables and/or devices installed.
- B. Conduit and Boxes
1. Provide and install the building and floor distribution cabinets for each building according to the following criteria:
 - a. There must be one of these main cabinets within 300 feet of a door access reader.

- b. Each cabinet shall feed a minimum of eight controlled devices (access readers) and the cabinet can be located on any floor in an MDF or IDF room. It does not have to be located on the same floor as the controlled devices.
 - c. The main cabinet can serve as the distribution cabinet for its area of eight door access readers.
 - d. Minimum conduit size shall be 1 inch. No conduit shall be installed more than 150 feet without a pull box.
 2. Provide 1 inch conduits if needed from the distribution cabinets and distribute to feed the junction and mounting boxes for each device.
 - a. If a separate 120V feed is needed at any device, a separate conduit will be needed.
 - b. Each separate 1 inch feed will supply no more than one Controlled Device/Card Reader Feed locations however if multiple devices are being installed in the same area, conduit sizes will need to be increased.
 3. Provide and extend conduit to feed 2 inch x 4 inch x 2 1/8 inch flush mounted boxes with single gang mud ring and weatherproof covers; mounted with the opening vertical, at all designated card reader locations.
 - a. Locate to the strike side of single doors, and as designated for double doors, and gates.
 - b. Center 42 inches above finished floor/grade.
 - c. Exact location to be determined during plan review.
 4. Provide a 2 inch x 4 inch x 2 1/8 inch card access feed junction box with cover at the interior side of all designated card access door locations.
 - a. If the area location has removable ceiling tiles, the box shall be located above the tile.
 - b. If the location has a structure of fixed ceiling material, then flush-mount the box with a square to round mud ring and cover
 - c. Both boxes from a) and b) above shall be connected. Also if door is a double door an additional single gang box will be installed, connected and centered on the top of the door frame.
 5. Provide a 1 inch conduit from the AMAG control box to the closet network switch if conduit is determined to be needed.
 6. Cable:
 - a. Provide at each card reader location, a single home run cable to the locations to be identified in the drawings. The cable for the Card Access System shall be Belden # 658AFS or manufacturer recommended equivalent.
 - b. Provide between Access Control Panel and Access Control Terminal Cabinet one (1) Belden # 9502 cable or manufacturer recommended equivalent.
 - c. Card Access system cables installed in interior, exterior and/or underground raceways shall comply with the applicable section of the NEC.
 7. Power Feeds:
 - a. Provide a double duplex, dedicated 120-volt clean power receptacle adjacent to the lower portion of the main terminal cabinet and each distribution cabinet.
 8. Surge Suppression:
 - a. Provide surge suppression equipment listed by Underwriters' Laboratories, bearing the UL seal and marked accordingly. Surge suppression equipment is to be UL listed and labeled for the intended use.

PART 3 EXECUTION

3.1 FIELD QUALITY CONTROL

- A. Training of the School's administrative and maintenance personnel is required in cooperation with the District's Representative.
 - 1. Engage a factory-authorized service representative to inspect, test, and adjust components, assemblies, and equipment installations, including connections, and to assist in field testing.
 - 2. Report results in writing.
- B. Startup Service:
 - 1. Engage a factory-authorized service representative to perform startup service in accordance with the manufacturer's requirements.
 - a. Complete installation and startup checks according to manufacturer's written instructions.
 - b. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.
 - c. Report results in writing.
- C. Adjusting
 - 1. When requested within 12 months of date of Substantial Completion, provide on-site assistance in adjusting system to suit actual occupied conditions. Provide up to three visits to site during other-than-normal occupancy hours for this purpose. These visits are not be considered as "warranty calls."

3.2 ERECTION TOLERANCES

- A. Install system in accordance with NECA "Standard of Installation" and Divisions 26 and 28.
- B. Permanently label all conduits as to plan room number destination, at all terminal cabinets.
- C. Install 200 lb strength pull string throughout the conduit system.
- D. The Card Access System shall be independent and shall not interconnect with or be used by any other system.
- E. Mount all junction boxes located above the ceiling with the opening facing down unless mounted to the wall above the ceiling, and with a reasonable immediate access pathway provided.
 - 1. Note: The requiring of removing of a light fixture or other similar ceiling equipment is not a reasonable access pathway.
- F. All conduit runs shall be as direct as possible in order to save on wiring costs and to reduce poor performance due to cable loss.
- G. Refer to Section Door Hardware for Card Access Door preparation.
- H. The Contractor shall be advised that the circuit routing for the card access system may not be shown on the project drawings and that he is responsible to install all raceways, wiring and cabling for a complete and fully functional system.
- I. General:
 - 1. The Contractor shall provide and install the card access system (including raceways, pull and back boxes, and wire) in accordance with the Card Access System manufacturer's requirements.

2. The Contractor shall size and route raceways to accommodate the proper installation of the system cabling. T-tapped cabling is not acceptable.
3. Where raceway and/or conduit is not accessible after completion of the project, conduit shall be routed from device to device or fire rated access panels shall be installed to provide access to junction and pull boxes.
4. Device to device wiring is only to be acceptable where the wiring scheme of the system, as recommended by the manufacturer, requires cable to pass from device to device.
5. Termination of devices is to be in accordance with manufacturer's requirements.
6. Install Card Access System wiring with at least 12 inches of separation from line voltage power wiring on parallel runs. Wiring crossing power circuits shall be at right angles. For metal enclosed electric light or power or Class 1 circuits, separation may be reduced as described in the National Electrical Code. Increase separation if so required to comply with EIA/TIA referenced standards.
7. Each Card Access System outlet shall have splice-free cables homerun to the respective control panel in the associated Main/Intermediate Distribution Frame (MDF/IDF) at the communication equipment room (CER), communication closet (CC), or communication panel (CP) as indicated on the drawings. Each cable shall be tagged at each end.
8. Provide a minimum of three-hundred (300) access cards in addition to the original compliment required by the owner.

3.3 DEMONSTRATION

- A. Training of the School's Administrative and Maintenance Personnel is required in cooperation with the District's Representative:
- B. Engage a factory-authorized service representative to train school administrative and maintenance personnel to adjust, operate, and maintain Card Access System. Refer to Division 01 Section Closeout Procedures for information regarding Demonstration and Training.

END OF SECTION

SECTION 28 31 00
FIRE ALARM AND SMOKE DETECTION SYSTEMS

PART 1: GENERAL

1.1 SCOPE

- A. The work covered under this section of the specification includes the provision of all labor, materials, and supervision necessary to install and test a Fire Alarm System, associated devices, and components in the project. This shall include, but not be limited to provision of the following:
- Control Panel
 - Voice Alarm Panel
 - Terminal Cabinet
 - Pull Stations
 - Heat Detectors
 - Area Smoke Sensors
 - Strobe Lights
 - Audible/Strobe Combinations
 - Programming
 - System Start-up, Test
 - Supervisory Switches
 - Remote Annunciators
 - Duct Smoke Detectors and Test Switches
 - Water Flow Switches
 - Magnetic Door Holders

1.2 DESCRIPTION

- A. The system installed under this contract shall be able to communicate with and report to the existing 'Siemens' fire alarm system serving the entire building. Provide all zone modules, power supplies, programming, etc. as required for an approved, fully functional system. All components of the system must be listed by Underwriters Laboratories (U.L.).
- B. All duct detectors shall be equipped with test switches and annunciator light.
- C. Conduit fill shall not exceed 40%.
- D. All fire alarm devices shall be white. All conduit junction boxes and couplings will be painted RED and marked "FA" in white.
- E. All wiring entering and leaving the panel and junction boxes will be permanently labeled in such a manner as to indicate the type of device and its location.
- F. All wires that leave or enter the panel from outside the building must have surge and transient protection at the panel with devices that will limit the voltage to no more than 10% above the peak operating voltage of the devices connected to the wires.
- G. The system shall provide a three-pulse temporal signal to the horns or voice evacuation system. A switch shall be provided on the control panel for silencing the alarm devices. Any additional incoming alarm shall operate normally. Each alarm shall be represented on the control panel by an audio and visual indication.
- H. See attached list of acceptable and pre-approved equipment.

1.3 QUALITY ASSURANCE AND WARRANTY

- A. Perform all work in accord with the following codes and standards:
 - 1. Federal, state, and local codes, regulations, and ordinances.
 - 2. National Electrical Code (NEC), latest edition.
 - 3. Occupational Safety and Health Act (OSHA).
 - 4. All authorities having jurisdiction.
 - 5. Factory Mutual system (FM) requirements.
 - 6. EIA, Electronics Institute of America.
 - 7. UL, Underwriters Laboratories.
 - 8. American Disability Act (ADA).
 - 9. National Fire Alarm Code NFPA 72
 - 10. Life Safety Code (NFPA 101).
- B. System Warranty: All components, parts, assemblies, and software shall be guaranteed against defects in material and workmanship for a period of at least 12 months, beginning on the date of acceptance by the local Fire Marshall and the Owner's designated representative. Warranty service shall be provided by a manufacturer's authorized representative 24 hours per day, 7 days per week. The representative shall be based in a fully staffed branch office located within one (1) hour travel time of the installation site and respond within this time. All repairs performed during the warranty period must be non-chargeable for labor, material, and travel time. All repairs performed during the warranty period shall be completed within the time limitations imposed by NFPA rules. The initial fire alarm call will be handled by the Owner who will assess the problem and notify the vendor of corrective actions required.

1.4 SUBMITTALS

- A. At completion of project, prior to final payment provide to Owner copies of the following:
 - 1. Manufacturer's installation diagrams, written product specifications, and instructions for installation, operation, and maintenance.
 - 2. Manufacturer's published product warranties and warranty instructions.
 - 3. Point to point wiring diagrams for devices/circuits added under this contract. (2 sets)
 - 4. Data sheets on each item of equipment.
 - 5. List of device location indicating specific zone designation. (2 sets)
 - 6. List of all programming and access codes associated with the panel. (2 sets)
 - 7. Supply all software required to program/re-program fire alarm panel/components, dialers and any other device required for operation of the system.
- B. At the Fire Alarm Panel(s), install the following:
 - 1. Plan drawings (1/16" = 1'-0" or larger as required for clarity), modified to include new equipment, showing location of automatic detectors and manual pull stations. Drawings shall be professionally drawn on suitable drafting medium 8.5" x 11" and shall reflect the system as installed. Devices shall be numbered in a manner that reflects the ZONE/DEVICE location.
 - 2. A Certificate of Completion as required by NFPA.
 - 3. A Certificate of Inspection, showing a completed 100% test, as required by NFPA.

1.5 SYSTEM OPERATION

- A. System Supervision:
1. Initiation Circuits: The occurrence of an open circuit in the initiation circuit shall cause a trouble indication. The occurrence of a ground condition in the initiation circuit shall cause a trouble and a panel ground fault indication. A single open circuit or a single ground condition, or both at the same time on the same initiation circuit, shall not inhibit the panel from recognizing an alarm condition from any other initiation device on that same circuit or any other circuit.
 2. Signal Circuits: The occurrence of an open circuit in a signal circuit cause a signal zone trouble indication. The occurrence of a ground condition in a signal circuit shall cause a signal zone trouble indication and a panel ground fault indication. A single ground in a signal circuit shall not inhibit the signals from working properly.
 3. Remote Annunciator: Shall be supervised as required for signal circuits, and be of LCD design, with alpha-numeric display.
 4. The system shall detect the following conditions:
 - a. Loss of primary and/or secondary operating power.
 - b. A single ground, open, or short on any installation wiring to supervisory or alarm initiating devices.
 - c. A single ground, open or short on any installation wiring to the system speakers, remote supervised annunciator, and remote telephone station.
 - d. Failure of a tone generator, pre-amplifier, or power amplifier in the audio subsystem.
 5. If any of the above faults develop, the system shall produce both an audible and visual trouble signal at the Fire Alarm Control Panel (FACP) and/or the remote annunciator.
 6. If the switch of a supervisory device is operated, the system shall product audible and visible supervisory signals at the Fire Alarm Control Panel and Remote Annunciator.
- B. Alarm Initiating Devices: If an alarm initiating device is activated, the following responses shall automatically occur:
1. Visual indications shall identify the specific device in alarm, and common audible and visual alarm signals shall be generated by the Fire Alarm Control Panel.
 2. An audio indication shall produce a message to the speakers sufficient to product an audio signal 15db over ambient noise.
 3. Auxiliary relays shall be installed to accommodate accessories such as: air-handler shutdown, vent fans (etcetera), to match the design of the system, as required by NFPA standards and rules.
 4. Each device shall be a measured device having the capability to send measured and intelligent signals back to the panel stating the condition of the device (e.g. measured level of obscuration, measure particles of dirt/dust and measured temperature levels).
- C. Alarm/Trouble Silencing:
1. The general alarm devices may be silenced only by entering a locked control cabinet and operating the proper silencing switch. However, a subsequent alarm shall reactive the signals. Operation of the silencing switch shall be indicated by a trouble light and an audible signal.

2. Power failure, opens, grounds, or an interruption of the system wiring or components, shall be indicated by a visual and audible trouble signal. The audible trouble signal may be silenced, however, the visual trouble indications shall remain illuminated until the system has been returned to a normal operating condition.

1.6 OPERATION AND MAINTENANCE DATA

- A. Submit data under provision of Division One.
- B. Include operating instructions, and maintenance and repair procedures.
- C. Include manufacturer representative's letter stating that system is operational.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Deliver products to site under provisions of Division One.
- B. Store and protect products under provisions of Division One.

PART 2 PRODUCTS

2.1 FIRE ALARM AND SMOKE DETECTION CONTROL PANEL

- A. Control Panel: The control panel shall provide power, annunciation, supervision, and control for the detection and alarm system and shall be modular in construction and contain all modules necessary to operate according with this section.
 1. The detection system shall remain 100% operational and capable of responding to an alarm condition while in the routine maintenance mode.
 - a. The system shall be capable of having the entire total number of detection devices in alarm at the same time, without any loss of function.
 - b. The control panel shall be capable of supporting non-addressable as well as addressable detection devices.
 - c. The panel annunciator shall be a minimum, 32-character alphanumeric display, providing an optional user definable message associated with each detection device or zone.
 2. The control system shall provide the supervision of system electronics, wiring, devices, and software.
 - a. Monitor for the failure of system hardware or wiring with an independent hardware watchdog, which will indicate their failure.
 - b. The system shall provide failsafe operation, i.e. incoming alarms shall automatically override all other modes of operation, and the panel shall automatically return to normal operating mode from any operator initiated mode.
 - c. Provide ground fault detection for all initiating and audible circuits.
 3. Provide lamp test capability to test all visual panel indicators and associated software.
 - a. Make provisions for remote trouble and remote alarm silencing switches.
 - b. The control panel shall be equipped with a silence before reset feature, designed to prevent accidental system reset during an alarm condition.
 4. The system alarm lamp shall flash upon receipt of any alarm condition.
 - a. Acknowledgement of the alarm by operation of the silence switch shall silence the audible alarm and cause the alarm lamp to light steadily.
 - b. Receipt of subsequent alarms shall cause the audible devices to resound and the alarm lamp to flash.

5. The system trouble lamp shall flash and an integral trouble buzzer shall sound upon the occurrence of any trouble condition.
 - a. Acknowledgement of the trouble condition by operation of the silence switch shall silence the audible alarm and cause the trouble lamp to light steadily.
 - b. Receipt of subsequent troubles shall cause the trouble buzzer to resound and the trouble lamp to flash.
6. Use the same pair of wires to perform the individual input and output device addressability.
 - a. The system shall be capable of having all addressable devices in alarm simultaneously.
7. The service mode shall permit the arming and disarming of individual input or output devices as well as manually operating output devices.
 - a. Provide one-step function switches to allow the disarming & arming of groups of inputs or outputs.
 - b. The control panel shall display the status of these devices upon command.
 - c. The panel shall automatically return to normal mode in the event the panel remains unattended in the service mode for more than 4-hours.
 - d. The panel shall be capable of receiving and processing alarms even when in the service mode.
8. The control shall operate from a three-wire 120 VA supply and internal 24V back-up battery.
 - a. Separately fuse all power connections whether AC or DC within the control unit.
 - b. Include light emitting diodes (LED's) to indicate (green) system power, (yellow) trouble, and (red) alarm; with trouble and alarm annunciated on an alphanumeric display, giving device number and location plus diagnosis of trouble.
 - c. Momentary contact switches shall provide for Locate, Next Alarm, Next Trouble, Acknowledge/Silence, and Reset.
 - d. An audible device shall sound within the control for alarm or trouble.
 - e. This device shall have two distinct sounds and shall be silenceable by the acknowledge/silence switch.
 - f. Alarms shall override any trouble condition.
9. The control CPU and power supply shall be capable of powering up to 960 addressable early warning detectors and up to 960 addressable auxiliary relays.
 - a. All system expansion modules shall interconnect through a card edge connector and shall require no inter-module wiring.
 - b. The control shall be capable of measuring and adjusting the sensitivity of detectors.
 - c. Provide an alphanumeric display, to display custom messages and give readings of detector sensitivity, detector by detector.
 - d. The system shall check each device on an addressable initiating circuit continuously for the following: sensitivity, response, open shorts, ground faults, functionality, and status.
 - e. The control CPU shall report the failure of a device's transmitting component(s) for open or shorts on an addressable initiating circuit.
 - f. Recognize and identify the device by location with the circuit to the specific device, and all other devices shall continue to function properly.
10. The control shall report, by specific device number, any device removed from an addressable initiating circuit and all other devices shall continue to function.
11. The control shall allow changing the status of configured circuits (arming or disarming and changing status of relays).

- a. If any change in status degrades system operation as configured, a trouble condition shall be reported and remain until system operation again meets configured status.
12. FACP shall include the necessary hardware to provide remote access via an Internet/Intranet Interface.
 - a. The Internet Interface shall provide an alternative access to system information using the familiar interface of a standard Internet browser.
 - b. Remotely located authorized personnel can use this access to analyze control panel status during non-alarm conditions and to assist responder during alarm conditions.
 - c. The Internet Interface shall provide single user access for multi-user accounts each with separate password.
 - i) Provide programmable lockout to prevent excessive login attempts by unauthorized users.
 - ii) Provide a built-in email feature that will automatically notify user accounts of individually selected status changes
 - iii) (i.e.: Alarm, Trouble, Supervisory, Sensor Sensitivity Status, and Historical Logs, for the same, on demand or via a selectable schedule-weekly, bi-weekly, or monthly).
13. The control panel shall allow for expansion and shall be configurable without system inter-wiring.
 - a. Leave 20% of points or addresses on each mapnet loop available for future additions on fire alarm system.
14. The manufacturer shall provide all system software, configuration software, licensing and required certification that is necessary.
15. The system shall have capability to provide a level III access to view all past trouble and alarm events on site.
16. The system shall be capable of providing a hardcopy written record of all alarms, troubles, and system activity by means of full carriage width terminal to print detection device designations and location messages on a single line of up to 128 characters wherein 32 are reserved for device or zone custom identification. Printer is not required.
17. New unacknowledged alarms and troubles shall be distinctively displayed on the visual display and differentiated from previous alarm and troubles.
18. The system shall automatically indicate the total quantity of alarms and of troubles, which have occurred prior to reset at the control unit.
19. No alarm or trouble indication shall be re-settable until acknowledged.
20. It shall not be possible to reset the system without acknowledging all alarms It shall be possible to display up to 250 alarms and up to 250 trouble indications, one at a time, on the digital annunciator, which shall be capable of listing, upon request:
 - a. Alarms with time, date, and location
 - b. Troubles with time, date, and location
 - c. Status of output functions, "on" or "off"
 - d. Sensitivity of addressable smoke detectors
 - e. Device number, type and location
 - f. Status of remote relays, "on" or "off"
21. The fire alarm system's programmed database of initiation devices shall be "hard burned" (stored in permanent memory) not reliant on a power source of any form.
- B. Voice Alarm Panel: Provide and install a new voice alarm panel. System shall be capable of distributing voice messages throughout the building via an audio amplifier and fire alarm speakers. Provide the following features:
 1. Multiplexed audio wiring.
 2. Distributed audio.

3. Pre-recorded evacuation message using solid-state electronics. May provide different message or tones based on events.
 4. Remote All-Call page option.
 5. Medium system capacity.
 6. Multiple channel capability for up to 4 audio channels.
 7. Style Y or Style Z speaker circuit operation.
 8. Speaker and telephone on/off manual switches with custom labels.
 9. 30 watt and 120 watt audio amplifiers with switch-mode power supplies.
 10. All-call switch and indicator.
 11. Field configurable and programmable.
 12. Field recorded message option.
 13. Zone-coded voice options.
- C. Audio Amplifier: Provides up to 120 watts of 25 VRMS audio power, low-power standby mode for low battery drain, high-efficiency switched regulation, plug-in terminal strips and cable connectors, and 10-position level adjust and indicator LED's, and includes a built-in automatic tone generator (slow whoop on high/low).
- D. Include a digital communicator in the control panel capable of automatically transmitting alarm and trouble information, annunciated by device, via a Cat 6 cable, to the dispatcher located in PBX room.
- E. Power Supply: Adequate to serve control panel modules, remote detectors, remote annunciator(s), door holders, smoke dampers, relays, and alarm signaling devices and 20% spare capacity.
- F. Connect the system to the life safety branch of emergency generator.
1. The system shall have battery back up.
 2. Size the batteries to provide 24-hours of standby operation followed by five-minutes of alarm.
 3. Provide a dual rate battery charger, which is capable of recharging the batteries to 80% capacity in 12-hours.
 4. Loss of commercial power shall annunciate as a system trouble.
 5. System trouble shall indicate for over or under voltage conditions, blown fuse or disconnected batteries.
 6. The system shall indicate visually and audibly when operating from standby power.
 7. The system shall automatically restart upon the return of power.
- G. Detection Circuits:
1. Addressable device input supervisory modules capable of Class A or Class B supervision, Class B is allowed with the following conditions:
 - a. No more than 25 devices on one circuit
 - b. The end line resistors shall be located in the fire alarm terminal cabinets.
 - c. Any construction on an active campus requires hand excavation in locations within 10' of any known or suspected location of utility or wiring.
 2. Addressable devices shall be monitored, each device uniquely identifiable.
 3. Capable of supporting non-addressable initiating devices through installation of additional modules.
 4. Sized and programmed, suitable for all initiating devices connected to the system and an additional 100 possible future expansion devices.
- H. Signal Circuits:
1. Supervised march time signal modules, sufficient for signal devices connected to system and two additional unused circuits, tested, installed, and programmed for future expansion.

- I. Remote Station Outputs: Provide a self-restoring relay to output common trouble conditions and a re-settable relay to output common alarm conditions to the Owner's security interface equipment.
- J. Auxiliary Relays: Provide sufficient SPDT auxiliary relay contacts to provide accessory functions specified.
- K. Supervised booster panels, or remote power supplies may be used to power and supervise the notification appliance circuits.
 - 1. Install Manufacturer recommended transient absorption devices at booster panels.
 - 2. Install remote booster panels or remote power supplies in electrical or mechanical rooms.
 - 3. Do not install fire alarm system equipment in locations that are not readily accessible.
 - 4. Connect booster panels and remote power supplies to the life safety branch of generator.

2.2 INITIATING DEVICES

- A. Manual Station: Semi-flush mounted, double action manual station equipped with an addressable interface module that interfaces the manual station and the addressable initiating circuit. It shall be field programmable. The double action product shall be self restoring and not a disposable component.
- B. Heat Detectors: NFPA 72; Combination rate-of-rise and fixed temperature, rated 135 degrees F and temperature rate of rise of 15 degrees F or (fixed only) 190 degree F as specified. Addressable and controlled by the system control panel. Each detector to be uniquely identifiable and be field programmed. Calibration and device identification monitored by the system control panel.
- C. Ceiling Mounted Smoke Detector: NFPA 72; Addressable detector that is controlled by the system control panel. Photoelectric type with adjustable sensitivity, plug-in base, auxiliary relay contact, integral thermal element rated 135 degrees F, and visual indication of detector actuation, suitable for mounting on 4 inch (100 mm) outlet box. Each detector shall be uniquely identifiable and can be field programmed. Calibration, device identification and sensitivity shall be monitored by the system control panel. The sensitivity controlled by the system control panel.
- D. Duct Mounted Smoke Detector: NFPA 72; photoelectric type with auxiliary SPDT relay contact, duct sampling tubes extending width of duct, and visual indication of detector actuation, in duct-mounted housing.

2.3 SIGNALING DEVICES

- A. Alarm Lights: NFPA 72; strobe lamp and flasher with red lettered FIRE on white lens. 2-3 (flash rate) per second. Strobes shall comply with ADA requirements and NFPA 72 placement requirements. If any one room or area contains more than 3 visual devices, flashing shall be synchronized.
- B. Alarm Speaker: NFPA 72; flush type with wall or ceiling trim plate (interior), surface type (exterior), fire alarm speaker. Sound Rating: 87 dB at 10 feet (3 m). As designated, provide additional integral strobe lamp and flasher with red lettered FIRE on white lens. (Strobes cannot be mounted on ceiling.)
- C. Remote Annunciator: Remote annunciator shall be 32 character LCD display type, similar to the annunciator in the FACP.
- D. Duct detector remote test switch: flush mounted with red L.E.D. to indicate remote (above ceiling or obscured from normal view) duct detectors alarm status. Normal - off, Alarm - on. Provide with magnetic test switch.

2.4 AUXILIARY DEVICES

- A. Waterflow Detector: Shall be suitable for installation into Schedule 10 and Schedule 40 Steel or Black Iron Pipe. Unit shall be sealed in metal enclosure, be provided with two SPDT switches, each with N.O. and N.C. contacts, have aluminum saddles, and steel U-bolts.
- B. Supervisory (tamper) Switch: Shall be suitable for installation on OSY, butterfly, and post-indicating valves with rising or falling flags. Unit shall be sealed in metal, weatherproof enclosure, be provided with two SPDT switches each with N.O. and N.C. contacts, and be suitable for use on 1" through 12" valves.
- C. Magnetic Door Hold Devices: Devices shall be suitable for flush mounting on walls, have 25 pounds holding force, and have an adjustable swivel contact plate.

2.5 SYSTEM RACEWAY

- A. Install all raceway necessary to provide specified equipment function and per print sheets as under the provisions of Sections 26 05 33, 26 05 34, and 26 05 53.
- B. All raceway for fire alarm system shall be rigid galvanized steel underground, painted with two (2) coats of bitumsatic paint RGS exposed below 4'-0" AFF, and EMT exposed above 4'-0" AFF. Flexible liquidtight conduit to duct detectors.
- C. Install ground rod and provide grounding bar and bond to the ground rod with solid #8 minimum wire. Grounding bar buss is to be used as earth potential for the installed transient protection devices.
- D. All fire alarm terminal boxes, panels and relay enclosures shall be permanently labeled in accordance with Section 26 05 53. (Fire Alarm)

2.6 FIRE ALARM WIRE AND CABLE

Note: Approved cabling not installed in conduit, may be used for fire alarm wiring as long as it complies with NEC Article 760, AHCA, and the local building authority.

- A. Fire Alarm Power Branch Circuits: Building wire as specified in Section 26 05 13.
- B. Initiating Circuits and Auxiliary Control: Building wire as specified in Section 26 05 13. Non-power limited fire-protective signaling cable, copper conductor, Class 1, 600 volt insulation and Article 760 of NEC Power limited circuits, Constructed in accordance with articles 318, 340, 500 & 501 of NEC. Passing VW-1 Vertical Flame Test. If stranded, (maximum of seven strands).
- C. Signal Circuits, and Annunciator point wiring: Building wire as specified in Section 26 05 13. 600 volt insulation, Type THWN stranded (maximum of 19 strands), and in accordance with NEC 310.
- D. Each separate circuit, initiation, signal and auxiliary shall have a specific number. Label each conductor by this circuit number at the control connections and at each terminal connection in the terminal boxes.
- E. A grounding conductor shall be installed through the entire conduit system and bonded to each device, junction box, terminal box, and control panel.

2.7 APPROVED EQUIPMENT

- A. Manufacturers listed below are acceptable under this contract, contingent upon their compatibility with the main fire alarm control panel. It shall be the Contractor's responsibility to coordinate and verify this compatibility.

1. Simplex
2. Notifier
3. EST

PART 3 EXECUTION

3.1 INSTALLATION

- A. Install system in accordance with manufacturer's instructions.
- B. Install manual station with operating handle 48 inches above finished floor. Install audible and visual signal devices 90 inches above finished floor.
- C. Waterflow switches and tamper switches shall be provided by the Division 26 Contractor, installed by the Division 23 Contractor, and wired by the Division 26 Contractor. Contractors shall coordinate as required.
- D. Make conduit and wiring connections to door release devices, sprinkler flow switches, sprinkler valve tamper switches, fire suppression system control panels, duct smoke detectors, and all other specified peripherals.
- E. Automatic Detector Installation shall be in compliance with NFPA-72.
- F. Fire Alarm equipment mounting boxes shall house only the wiring pertinent to the equipment mounted on the box and are not to be used as junction points or run through pathways.
- G. All exterior equipment, mounting boxes and junction boxes shall be installed with all precautions necessary to insure the wiring and equipment being "weatherproof".
- H. Install Manufacturer recommended transient absorption MOV's from field wiring to ground plane for all circuit conductors, (NOT just those circuits that exit the building).
- I. All wiring shall be in conduit (see note in paragraph 2.6).
- J. There shall be no splices made in any wiring.
- K. All terminations, other than at devices, shall be made in terminal cabinets, wall mounted in electrical rooms or equipment spaces. (No terminations shall be made in boxes above the ceiling.)
- L. All visual indicating circuits shall be wired on a separate circuit independent of horn/speaker circuits. All strobe circuits, during an alarm condition, shall have the option of remaining active after a signal silence and only turn off on a panel reset or turning off after the signal silence is activated.
- M. All fire alarm junction/pull/device boxes shall be red.

3.2 FIELD QUALITY CONTROL

- A. Field inspection and testing will be performed under provisions of Division One.
- B. Test in accordance with NFPA 72 and additional owner requirements.

3.3 MANUFACTURER'S FIELD SERVICES

- A. Provide manufacturer's field services under provisions of Division One.
- B. Include services of certified technician to supervise installation, adjustments, final connections, and system testing and field service certification per NFPA 72A. Services shall also include on-site presence of a trained factory technician during the final inspection.

3.4 SYSTEM TESTING & ACCEPTANCE

- A. It is the responsibility of the vendor to meet with the appropriate Owner's representative to compare the placement and installation of proper devices with the drawings and specifications (as-built prints must be furnished to the Owner). A 100% device by device test shall be conducted by the vendor under the supervision of the Owner. Punch lists will be developed at this time by Owner's representative and furnished to the vendor. All punch list items must be corrected and verified as such by the Owner, prior to acceptance of the system.
- B. Vendor shall have manufacturer's trained technician present for final AHCA survey. Coordinate time and date with Contractor. At the survey, provide sensitivity test reports with the required range for all smoke and duct detectors installed in the project area. Also provide an approved 'Record of Completion' for the fire alarm system at the final AHCA survey.

3.5 TRAINING

- A. The Contractor and/or manufacturer's representative shall instruct the Owner's representative in the operation, maintenance, and repair of the system to the sub-assembly level, including familiarization with the operation, maintenance, and parts manual.

3.6 SPARE PARTS

- A. A spare parts inventory equal to ten (10) percent of the total number of each of the smoke detectors, heat detectors, speakers, pull stations, and strobes shall be supplied to the Owner, prior to acceptance.

END OF SECTION

32

DIVISION

EXTERIOR IMPROVEMENTS

SECTION 32 00 00
SITE CLEARING / VEGETATION REMOVAL

PART 1 – GENERAL

- 1.1 SCOPE: Work shall include performing all clearing of site as necessary to complete work indicated on drawings and specified under this section. The work shall consist of furnishing all labor, supplies, equipment and materials necessary to complete the planning of all trees, palms, shrubs and ground covers in the locations shown on the drawings, and all other work associated with and incidental to the landscape planting work as shown on the drawings and specified under this section.
- A. All plant materials and references in this section are not necessarily required on this project; however, when indicated or required by drawings and/or specifications set forth in this section, they shall be applicable.
 - B. All plant material shall be of the specific size and quality indicated on the drawings; shall be installed, maintained and watered in strict accordance with sound nursery practices.
 - C. The Architect reserves the right to adjust the number and location of designated types and species to be used.
 - D. The Contractor shall remove all existing plant material necessary to implement the construction plans.
 - E. The Contractor shall provide for the contract growing of all plant materials that cannot be guaranteed to be available from standard nursery operations at the time of the planting.
- 1.2 WORK INCLUDED: Without restricting the volume or generality of the above “Scope” work to be performed under this section shall include, but is not limited to, the following:
- A. Removal of all shrubs, stumps, vegetation, trash, etc. as described below.
 - B. Removal of all trees as described below.
 - C. Disposal of shrubs, stumps, vegetation, trash, timber, branches, etc. as specified.
 - D. Contractor shall accept site as he finds it and it shall be his responsibility to remove all trash, rubbish and debris as required.
 - E. The Contractor shall prune all existing shrub materials (including all Brazilian Pepper) that are overhanging the property line, back to the property line.
- 1.3 WORK NOT INCLUDED: If required, the following items of work are specified in other sections:
- A. Earthwork.

- 1.4 **BIDDING:** Each bidder submitting a proposal for this contract shall be responsible to inspect the site to acquaint himself with the nature of conditions which will be encountered during construction. Bidder shall make himself aware of all existing and/or proposed utilities in area of work.
- 1.5 **SUPERVISION:** The Contractor shall provide a competent superintendent and any necessary assistants on the project when work is in progress. The superintendent shall not be changed during the project without the consent of the Owner's representative unless the superintendent ceases his status as an employee of the Contractor. The superintendent shall represent the Contractor in the Contractor's absence, and all directions given to him by the Owner's representative shall be binding as if they were given to the Contractor. The Contractor's superintendent shall supervise the Contractor's employees on the job site and be responsible for their actions and conduct on the job site.
- 1.6 **PROTECTION OF WORK AND PROPERTY:** The Contractor shall continuously maintain adequate protection of all his work from damage and shall protect the Owner's property from injury or loss arising in connection with his work. The Contractor shall be responsible for contacting the necessary entities to determine the locations of all underground utilities on the site. The Contractor shall take care to avoid damage to any existing buildings, equipment, piping, pipe coverings, electrical systems, sewers, sidewalks, landscaping, grounds, aboveground or underground installations or structures of any kind, and shall be responsible for any damage that occurs as a result of his work. Contractor shall adequately protect his work and all adjacent property as provided and required by law.

PART 2 – PRODUCTS

2.1 HERBICIDES:

- A. **Post-emergence Herbicide:** The post-emergence herbicide shall be a foliar applied herbicide which will control a broad range of annual and perennial grass and broad-leafed weeds plus applicable woody brush and tree species. Herbicide shall kill the entire weeds species, including the below the ground root or rhizome system. The herbicide shall have no residual soil activity. All herbicide is to be applied according to the manufacturer's recommendations.
- B. **Pre-emergence Herbicide:** The pre-emergence herbicide shall be a selective pre-emergence herbicide used for the control of annual grasses and broad-leafed weeds in ornamental planting beds. Herbicide shall control weeds by killing the young weed seedlings as they come into contact with the herbicide during germination. The herbicide shall be in granular form.

- 2.2 **WATER:** All water is to be supplied and applied by the Contractor.

PART 3 – EXECUTION

- 3.1 **REMOVAL OF SHRUBS, STUMPS, VEGETATION, TRASH, ETC:** Remove all shrubs, vegetation, trash, etc. in all areas indicated on the drawings.

- 3.2 REMOVAL OF TREES: Where indicated on the drawings, remove all trees. Tree removal shall be complete, including stumps and root systems below grade. The Contractor shall remove all existing vegetation necessary to implement the project construction plans. Planting material intended to remain shall be protected as specified below. Plant material required to be relocated by the Contractor shall be relocated as specified below.
- 3.3 DISPOSAL: All accumulation of shrubs, stumps, vegetation, trash, timber, branches, etc. resulting from work under this section shall be removed to approved disposal areas off site or burned. Disposal by burning is not acceptable.
- 3.4 PROTECTION OF EXISTING VEGETATION INDICATED TO REMAIN:
- A. Protect individual trees indicated to remain by the installation of 5' long, 2" x 4" stakes (install with 3' remaining above ground) no more than 10' o.c. around the dripline of all trees designated to be preserved. Place 1" x 4" or 2" x 4" rails between all stakes at approximate 3' height. Barricades shall be installed prior to beginning any other construction work on the site, and shall be maintained until the sod installation begins. Barricades shall be constructed in a workmanlike manner. All barricades shall be sturdy. There shall be no exposed nail points.
 - B. No construction activity of any type, including parking or storage of materials, is to take place within any tree protection barricaded areas on the site. All barricades shall be removed by the Contractor prior to final acceptance of the work.
- 3.5 GRADING OF PLANTING AREAS: Unless otherwise specified, all planting areas bordered by pavement, sidewalk or curb shall have a finished grade.

END OF SECTION 32 00 00

SECTION 32 13 13
CONCRETE SIDEWALKS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. The provisions of the General Conditions, Supplementary Conditions, Drawings, Specifications, and the Sections included under Division 1, General Requirements and References are included as a part of this Section as though bound herein.

1.2 SUMMARY

- A. Section Includes:
 - 1. Provide labor, material, services, and equipment necessary to furnish and install work as indicated and as specified herein, which includes, but is not limited to:
 - a. Sidewalks.

1.3 REFERENCES

- A. ACI 117 – Standard Tolerances for Concrete Construction and Materials.
- B. ACI 211.1 – Standard Practice for Selecting Proportions for Normal, Heavyweight, and Mass Concrete.
- C. ACI 304R – Guide for Measuring, Mixing, Transporting, and Placing Concrete.
- D. Concrete Reinforcing Steel Institute, "Manual of Standard Practice.
- E. ACI 308 – Standard Practice for Curing Concrete.
- F. ACI347R – Guide to Formwork for Concrete.
- G. ASTM A185 – Standard Specification for Carbon-Steel Wire and Welded Wire Reinforcement, Plain and Deformed, for Concrete.
- H. ASTM C33/C33M – Standard Specification for Concrete Aggregates.
- I. ASTM C150/C150M – Standard Specification for Portland Cement.
- J. ASTM C494 – Specification for Chemical Admixtures for Concrete.
- K. FBC – Florida Building Code.

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Design Mixtures: For each concrete sidewalk mixture. Include alternate design mixtures when characteristics of materials, Project conditions, weather, test results, or other circumstances warrant adjustments.

1.5 INFORMATIONAL SUBMITTALS

- A. Material Certificates: For the following, from manufacturer:
 - 1. Cementitious materials.
 - 2. Steel reinforcement and reinforcement accessories.
 - 3. Fiber reinforcement.
 - 4. Admixtures.
 - 5. Curing compounds.
 - 6. Joint fillers.

1.6 QUALITY ASSURANCE

- A. Ready-Mix-Concrete Manufacturer Qualifications: A firm experienced in manufacturing ready-mixed concrete products and that complies with ASTM C 94/C 94M requirements for production facilities and equipment.
 - 1. Manufacturer certified according to NRMCA's "Certification of Ready Mixed Concrete Production Facilities" (Quality Control Manual - Section 3, "Plant Certification Checklist").

1.7 FIELD CONDITIONS

- A. Hot-Weather Concrete Placement: Comply with ACI 301 (ACI 301M) and as follows when hot-weather conditions exist:
 - 1. Cool ingredients before mixing to maintain concrete temperature below 90 deg F (32 deg C) at time of placement. Chilled mixing water or chopped ice may be used to control temperature, provided water equivalent of ice is calculated in total amount of mixing water. Using liquid nitrogen to cool concrete is Contractor's option.
 - 2. Cover steel reinforcement with water-soaked burlap, so steel temperature will not exceed ambient air temperature immediately before embedding in concrete.

PART 2 - PRODUCTS

2.1 CONCRETE, GENERAL

- A. ACI Publications: Comply with ACI 301/ 301M unless otherwise indicated.

2.2 FORMS

- A. Form Materials: Plywood or other approved panel-type materials to provide full-depth, continuous, straight, and smooth exposed surfaces.
 - 1. Use flexible or uniformly curved forms for curves with a radius of 100 feet or less.
- B. Form-Release Agent: Commercially formulated form-release agent that will not bond with, stain, or adversely affect concrete surfaces and that will not impair subsequent treatments of concrete surfaces.

2.3 STEEL REINFORCEMENT

- A. Plain-Steel Welded-Wire Reinforcement: ASTM A 1064/A 1064M, fabricated from galvanized-steel wire into flat sheets.

2.4 CONCRETE MATERIALS

- A. Cementitious Materials: Use the following cementitious materials, of same type, brand, and source throughout Project:
 - 1. Portland Cement: ASTM C 150/C 150M
- B. Normal-Weight Aggregates: ASTM C 33/C 33M, uniformly graded. Provide aggregates from a single source.
 - 1. Maximum Coarse-Aggregate Size: 3/4 inch nominal.
 - 2. Fine Aggregate: Free of materials with deleterious reactivity to alkali in cement.
- C. Air-Entraining Admixture: ASTM C 260/C 260M.

- D. Chemical Admixtures: Admixtures certified by manufacturer to be compatible with other admixtures and to contain not more than 0.1 percent water-soluble chloride ions by mass of cementitious material.
 - 1. Water-Reducing Admixture: ASTM C 494/C 494M, Type A.
 - 2. Retarding Admixture: ASTM C 494/C 494M, Type B.
 - 3. Water-Reducing and Retarding Admixture: ASTM C 494/C 494M, Type D.
 - 4. High-Range, Water-Reducing Admixture: ASTM C 494/C 494M, Type F.
 - 5. High-Range, Water-Reducing and Retarding Admixture: ASTM C 494/C 494M, Type G.
 - 6. Plasticizing and Retarding Admixture: ASTM C 1017/C 1017M, Type II.
- E. Water: Potable and complying with ASTM C 94/C 94M.

2.5 FIBER REINFORCEMENT

- A. Synthetic Fiber: Monofilament polypropylene fibers engineered and designed for use in concrete, complying with ASTM C 1116/C 1116M, Type III.

2.6 CURING MATERIALS

- A. Moisture-Retaining Cover: ASTM C 171, polyethylene film or white burlap-polyethylene sheet.
- B. Water: Potable.

2.7 RELATED MATERIALS

- A. Joint Fillers: ASTM D 1751, asphalt-saturated cellulosic fiber in preformed strips.

2.8 CONCRETE MIXTURES

- A. Prepare design mixtures, proportioned according to ACI 301, for each type and strength of normal-weight concrete, and as determined by either laboratory trial mixtures or field experience.
 - 1. When automatic machine placement is used, determine design mixtures and obtain laboratory test results that comply with or exceed requirements.
- B. Cementitious Materials:
 - 1. Fly Ash or Pozzolan: 25 percent.
 - 2. Slag Cement: 50 percent.
 - 3. Combined Fly Ash or Pozzolan, and Slag Cement: 50 percent, with fly ash or pozzolan not exceeding 25 percent.
- C. Add air-entraining admixture at manufacturer's prescribed rate to result in normal-weight concrete at point of placement having an air content as follows:
 - 1. Air Content: 2-1/2 percent plus or minus 1-1/2 percent for 1-1/2-inch nominal maximum aggregate size.
- D. Limit water-soluble, chloride-ion content in hardened concrete to 0.15 percent by weight of cement.
- E. Chemical Admixtures: Use admixtures according to manufacturer's written instructions.
 - 1. Use water-reducing admixture in concrete as required for placement and workability.
 - 2. Use water-reducing and retarding admixture when required by high temperatures, low humidity, or other adverse placement conditions.

- F. Synthetic Fiber: Uniformly disperse in concrete mixture at manufacturer's recommended rate, but not less than 1.0 lb/cu. yd. (0.60 kg/cu. m).
- G. Concrete Mixtures: Normal-weight concrete.
 - 1. Compressive Strength (28 Days): 3500 psi.
 - 2. Maximum W/C Ratio at Point of Placement: 0.45.
 - 3. Slump Limit: 5 inches

2.9 CONCRETE MIXING

- A. Ready-Mixed Concrete: Measure, batch, and mix concrete materials and concrete according to ASTM C 94/C 94M and ASTM C 1116/C 1116M. Furnish batch certificates for each batch discharged and used in the Work.
 - 1. When air temperature is between 85 and 90 deg F, reduce mixing and delivery time from 1-1/2 hours to 75 minutes; when air temperature is above 90 deg F, reduce mixing and delivery time to 60 minutes.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine exposed subgrades and subbase surfaces for compliance with requirements for dimensional, grading, and elevation tolerances.
- B. Proof-roll prepared subbase surface below concrete sidewalks to identify soft pockets and areas of excess yielding.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Remove loose material from compacted subbase surface immediately before placing concrete.

3.3 EDGE FORMS AND SCREED CONSTRUCTION

- A. Set, brace, and secure edge forms, and intermediate screed guides to required lines, grades, and elevations. Install forms to allow continuous progress of work and so forms can remain in place at least 24 hours after concrete placement.
- B. Clean forms after each use and coat with form-release agent to ensure separation from concrete without damage.

3.4 STEEL REINFORCEMENT INSTALLATION

- A. General: Comply with CRSI's "Manual of Standard Practice" for fabricating, placing, and supporting reinforcement.
- B. Install welded-wire reinforcement in lengths as long as practicable. Lap adjoining pieces at least one full mesh, and lace splices with wire. Offset laps of adjoining widths to prevent continuous laps in either direction.

3.5 JOINTS

- A. General: Form construction, isolation, and contraction joints and tool edges true to line, with faces perpendicular to surface plane of concrete. Construct transverse joints at right angles to centerline unless otherwise indicated.
 - 1. When joining existing sidewalks, place transverse joints to align with previously placed joints unless otherwise indicated.
- B. Construction Joints: Set construction joints at locations where sidewalk operations are stopped for more than one-half hour.
 - 1. Continue steel reinforcement across construction joints unless otherwise indicated. Do not continue reinforcement through sides of sidewalk strips unless otherwise indicated.
 - 2. Keyed Joints: Provide preformed keyway-section forms or bulkhead forms with keys unless otherwise indicated. Embed keys at least 1-1/2 inches into concrete.
- C. Isolation Joints: Form isolation joints of preformed joint-filler strips abutting concrete curbs, catch basins, manholes, inlets, structures, other fixed objects, and where indicated.
 - 1. Locate expansion joints at intervals of 50 feet on center unless otherwise indicated.
 - 2. Extend joint fillers full width and depth of joint.
 - 3. Place top of joint filler flush with finished concrete surface.
 - 4. Furnish joint fillers in one-piece lengths.
- D. Contraction Joints: Form weakened-plane contraction joints at 10'-0" on center, sectioning concrete into areas as indicated. Construct contraction joints for a depth equal to at least one-fourth of the concrete thickness with either method, as follows:
 - 1. Grooved Joints: Form contraction joints after initial floating by grooving and finishing each edge of joint with grooving tool to a 3/8-inch radius. Repeat grooving of contraction joints after applying surface finishes.
 - a. Tolerance: Ensure that grooved joints are within 3 inches either way from centers of dowels.
 - 2. Sawed Joints: Form contraction joints with power saws equipped with shatterproof abrasive or diamond-rimmed blades. Cut 1/8-inch wide joints into concrete when cutting action will not tear, abrade, or otherwise damage surface and before developing random contraction cracks.
 - a. Tolerance: Ensure that sawed joints are within 3 inches either way from centers of dowels.
- E. Edging: After initial floating, tool edges of sidewalk, gutters, curbs, and joints in concrete with an edging tool to a 3/8-inch radius. Repeat tooling of edges after applying surface finishes.

3.6 CONCRETE PLACEMENT

- A. Before placing concrete, inspect and complete formwork installation.
- B. Moisten subbase to provide a uniform dampened condition at time concrete is placed. Do not place concrete around manholes or other structures until they are at required finish elevation and alignment.
- C. Comply with ACI 301 (ACI 301M) requirements for measuring, mixing, transporting, and placing concrete.
- D. Do not add water to concrete during delivery or at Project site. Do not add water to fresh concrete after testing.
- E. Deposit and spread concrete in a continuous operation between transverse joints. Do not push or drag concrete into place or use vibrators to move concrete into place.
- F. Consolidate concrete according to ACI 301 (ACI 301M) by hand spading, rodding, or tamping.
- G. Screed sidewalk surface with a straightedge and strike off.

- H. Commence initial floating using bull floats or darbies to impart an open-textured and uniform surface plane before excess moisture or bleedwater appears on the surface. Do not further disturb concrete surfaces before beginning finishing operations or spreading surface treatments.
- I. Curbs and Gutters: Use design mixture for automatic machine placement. Produce curbs and gutters to required cross section, lines, grades, finish, and jointing.

3.7 FLOAT FINISHING

- A. General: Do not add water to concrete surfaces during finishing operations.
- B. Float Finish: Begin the second floating operation when bleedwater sheen has disappeared and concrete surface has stiffened sufficiently to permit operations. Float surface with power-driven floats or by hand floating if area is small or inaccessible to power units. Finish surfaces to true planes. Cut down high spots and fill low spots. Refloat surface immediately to uniform granular texture.
 - 1. Medium-to-Coarse-Textured Broom Finish: Provide a coarse finish by striating float-finished concrete surface 1/16 to 1/8 inch deep with a stiff-bristled broom, perpendicular to line of traffic.

3.8 DETECTABLE WARNING INSTALLATION

- A. Stamped Detectable Warnings: Install stamped detectable warnings as part of a continuous concrete paving placement and according to stamp-mat manufacturer's written instructions.
 - 1. Before using stamp mats, verify that the vent holes are unobstructed.
 - 2. Apply liquid release agent to the concrete surface and the stamp mat.
 - 3. Stamping: While initially finished concrete is plastic, accurately align and place stamp mats in sequence. Uniformly load, gently vibrate, and press mats into concrete to produce imprint pattern on concrete surface. Load and tamp mats directly perpendicular to the stamp-mat surface to prevent distortion in shape of domes. Press and tamp until mortar begins to come through all of the vent holes. Gently remove stamp mats.
 - 4. Remove residual release agent according to manufacturer's written instructions, but no fewer than three days after stamping concrete. High-pressure-wash surface and joint patterns, taking care not to damage stamped concrete. Control, collect, and legally dispose of runoff.

3.9 CONCRETE PROTECTION AND CURING

- A. General: Protect freshly placed concrete from premature drying and excessive cold or hot temperatures.
- B. Comply with ACI 306.1 for cold-weather protection.
- C. Begin curing after finishing concrete but not before free water has disappeared from concrete surface.
- D. Curing Methods: Cure concrete by moisture curing or moisture-retaining-cover curing or a combination of these as follows:
 - 1. Moisture Curing: Keep surfaces continuously moist for not less than seven days with the following materials:
 - a. Water.
 - b. Continuous water-fog spray.
 - c. Absorptive cover, water saturated and kept continuously wet. Cover concrete surfaces and edges with 12-inch lap over adjacent absorptive covers.

2. Moisture-Retaining-Cover Curing: Cover concrete surfaces with moisture-retaining cover, placed in widest practicable width, with sides and ends lapped at least 12 inches and sealed by waterproof tape or adhesive. Immediately repair any holes or tears occurring during installation or curing period, using cover material and waterproof tape.

3.10 SIDEWALK TOLERANCES

- A. Comply with tolerances in ACI 117 (ACI 117M) and as follows:

1. Elevation: 3/4 inch.
2. Thickness: Plus 3/8 inch, minus 1/4 inch.
3. Joint Spacing: 3 inches.
4. Contraction Joint Depth: Plus 1/4 inch, no minus.

3.11 REPAIR AND PROTECTION

- A. Remove and replace concrete sidewalk that is broken, damaged, or defective or that does not comply with requirements in this Section. Remove work in complete sections from joint to joint unless otherwise approved by Architect.
- B. Protect concrete sidewalk from damage. Exclude traffic from sidewalk for at least 14 days after placement. When construction traffic is permitted, maintain sidewalk as clean as possible by removing surface stains and spillage of materials as they occur.
- C. Maintain concrete sidewalk free of stains, discoloration, dirt, and other foreign material. Sweep sidewalk not more than two days before date scheduled for Substantial Completion inspections.

END OF SECTION 32 13 13

J.D. PARKER SCHOOL OF TECHNOLOGY ENHANCED SECURITY PROJECT A2

MARTIN COUNTY SCHOOL DISTRICT PERMIT DOCUMENTS SUBMITTAL

ARCHITECTURAL DESIGN CONSULTANT:

HARVARD JOLLY ARCHITECTURE

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WEST PALM BEACH, FL 33411
PHONE: 561-478-4457

STRUCTURAL ENGINEER:

MASTER CONSULTING ENGINEERS INC.

4101 RAVENSWOOD ROAD - SUITE 307
FORT LAUDERDALE, FLORIDA 33312
PHONE: 954-210-7671

MECHANICAL, PLUMBING & ELECTRICAL ENGINEER:

JLRD INC. ENGINEERS

1450 CENTREPARK BLVD - SUITE 350
WEST PALM BEACH, FLORIDA 33401
PHONE: 561-689-2303

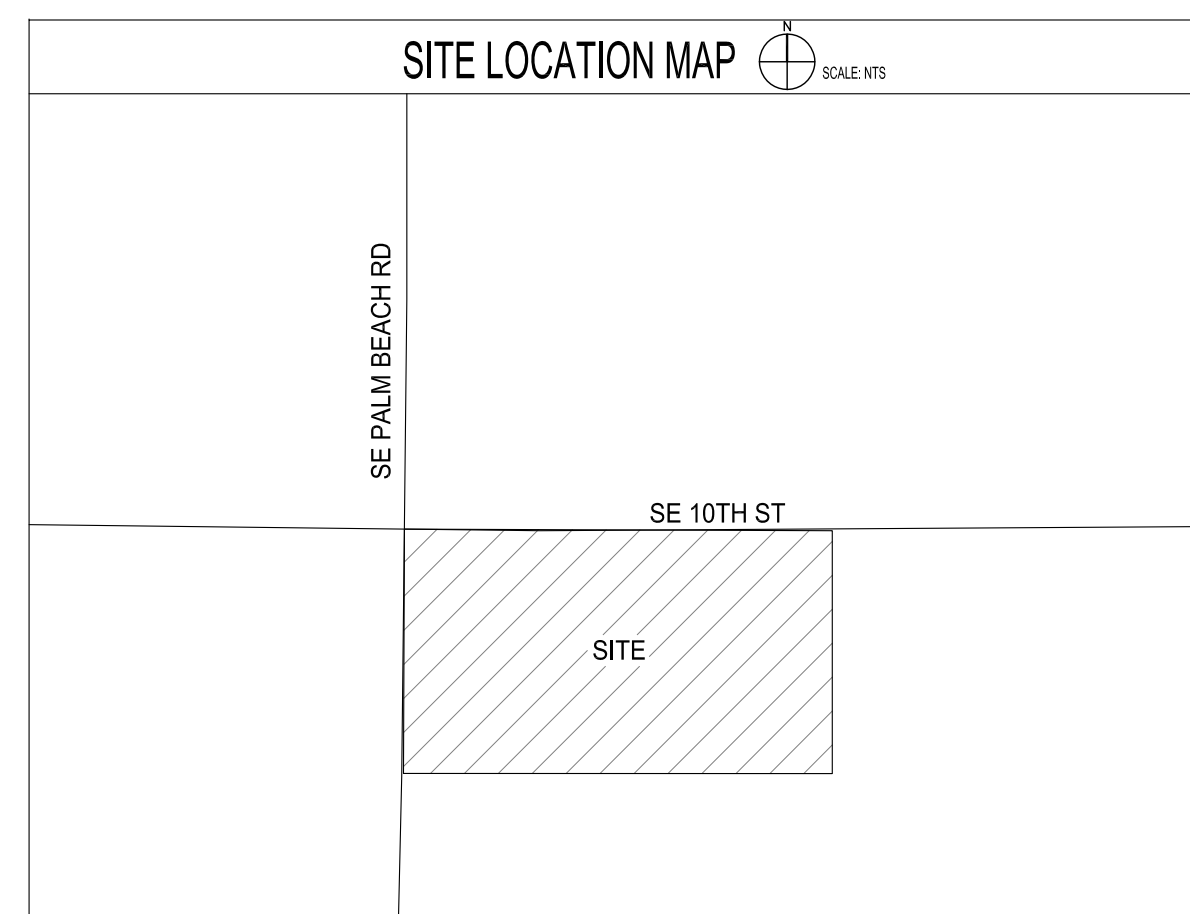
BOARD MEMBERS:

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MICHAEL DITERLIZZI
MARSHA POWERS
VICTORIA DEFENTHALER
TONY ANDERSON**

LAURIE J GAYLORD

**CHAIR
VICE CHAIR
MEMBER
MEMBER
MEMBER**

SUPERINTENDENT



PROJECT NARRATIVE

THIS PROJECT INCLUDES THE SECURITY ENHANCEMENT OF INSTALLING A NEW ENTRY VESTIBULE WITHIN THE EXISTING LOBBY OF THE ADMINISTRATION AREA AT J.D. PARKER ELEMENTARY SCHOOL LOCATED WITHIN THE MARTIN COUNTY SCHOOL DISTRICT. THE INSTALLATION OF THE NEW IMPACT RESISTANT STOREFRONT VESTIBULE WILL CORRESPOND WITH A REMOVAL OF AN EXISTING EXTERIOR WINDOW AND REPLACING IT WITH A NEW STOREFRONT DOOR AND WINDOW ASSEMBLY. NEW CASEWORK, INTERIOR PARTITION WALLS AND DOORS WILL BE INSTALLED AS WELL. NEW CONSTRUCTION SHALL BE IN ACCORDANCE WITH DRAWINGS AND SPECIFICATIONS SET FORTH IN THESE DOCUMENTS, FROM DIRECTION GIVEN FROM THE MARTIN COUNTY SCHOOL DISTRICT AND PER MANUFACTURERS RECOMMENDED INSTALLATION REQUIREMENTS. ALL AREAS, REGARDLESS OF LOCATION, WILL BE REQUIRED TO BE REPAIRED IF DISTURBED BY THE INSTALLATION OF THE SCOPE OF WORK. CONTRACTOR TO REVIEW ALL AS-BUILT DOCUMENTS BEFORE COMMENCING CONSTRUCTION AND VISIT THE SITE TO RECOGNIZE THE AREAS WITHIN THE SCOPE OF WORK. ALL NEW CONSTRUCTION SHALL BE IN CONFORMANCE WITH THE MARTIN COUNTY SCHOOL DISTRICT STANDARDS, APPLICABLE CODES AND AUTHORITY HAVING JURISDICTION. THIS INCLUDES THE REQUIREMENTS OF SREF THE 2017 FLORIDA BUILDING CODE SIXTH EDITION AND THE FLORIDA FIRE PREVENTION CODE.

ARCHITECT'S STATEMENT OF COMPLIANCE:
TO THE BEST OF OUR KNOWLEDGE, THESE DRAWINGS AND THE PROJECT MANUAL ARE COMPLETE AND COMPLY WITH THE MINIMUM REQUIREMENTS OF THE 2017 FLORIDA BUILDING CODE SIXTH EDITION.

SHEET NO.	TITLE	ORIGINAL DATE	REVISION NO.	LATEST REVISION DATE
ARCHITECTURAL				
G-001	COVER SHEET & INDEX	07/23/2020		
A-101	OVERALL PLAN	07/23/2020		
A-102	DEMOLITION FLOOR & RCP PLANS	07/23/2020		
A-103	PROPOSED FLOOR & RCP PLANS	07/23/2020		
A-104	CASEWORK DETAILS	07/23/2020		
A-105	CANOPY SECTIONS & DETAILS	07/23/2020		
A-106	CANOPY SECTIONS, DETAILS SCHEDULES	07/23/2020		
STRUCTURAL				
S-101	GENERAL STRUCTURAL NOTES, WIND DESIGN DATA	07/23/2020		
S-201	FOUNDATION & CANOPY FRAMING PLANS	07/23/2020		
FIRE PROTECTION				
FP0.1	GENERAL NOTES, LEGEND AND DETAILS	07/23/2020		
FP1.1	FIRE PROTECTION PLANS	07/23/2020		
MECHANICAL				
M0.1	MECHANICAL LEGEND AND GENERAL NOTES	07/23/2020		
M0.2	MECHANICAL SCHEDULE	07/23/2020		
M1.1	FIRST FLOOR HVAC PLAN - DEMOLITION	07/23/2020		
ELECTRICAL				
E0.1	ELECTRICAL NOTES AND LEGEND	07/23/2020		
E1.1	ELECTRICAL PLAN - OVERALL	07/23/2020		
E2.1	ELECTRICAL - DEMOLITION PLANS	07/23/2020		
E3.1	ELECTRICAL - NEW WORK PLANS	07/23/2020		
E4.1	ELECTRICAL RISERS AND SCHEDULES	07/23/2020		
E5.1	ELECTRICAL DETAILS	07/23/2020		

Comm. No: 16025.18

Date: 07/23/2020

Drawn: ER

Revisions

No.	Date	Note

TO THE BEST OF MY KNOWLEDGE, THE PLANS AND SPECIFICATIONS COMPLY WITH THE MINIMUM BUILDING CODES.

Daniel T Canavan, AIA
License #10250

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COVER SHEET & INDEX

G-001

Martin County School District
JD Parker ES Enhanced Security Project A2
1010 East 10th Street
Stuart, Florida 34996
Permit Documents Submittal

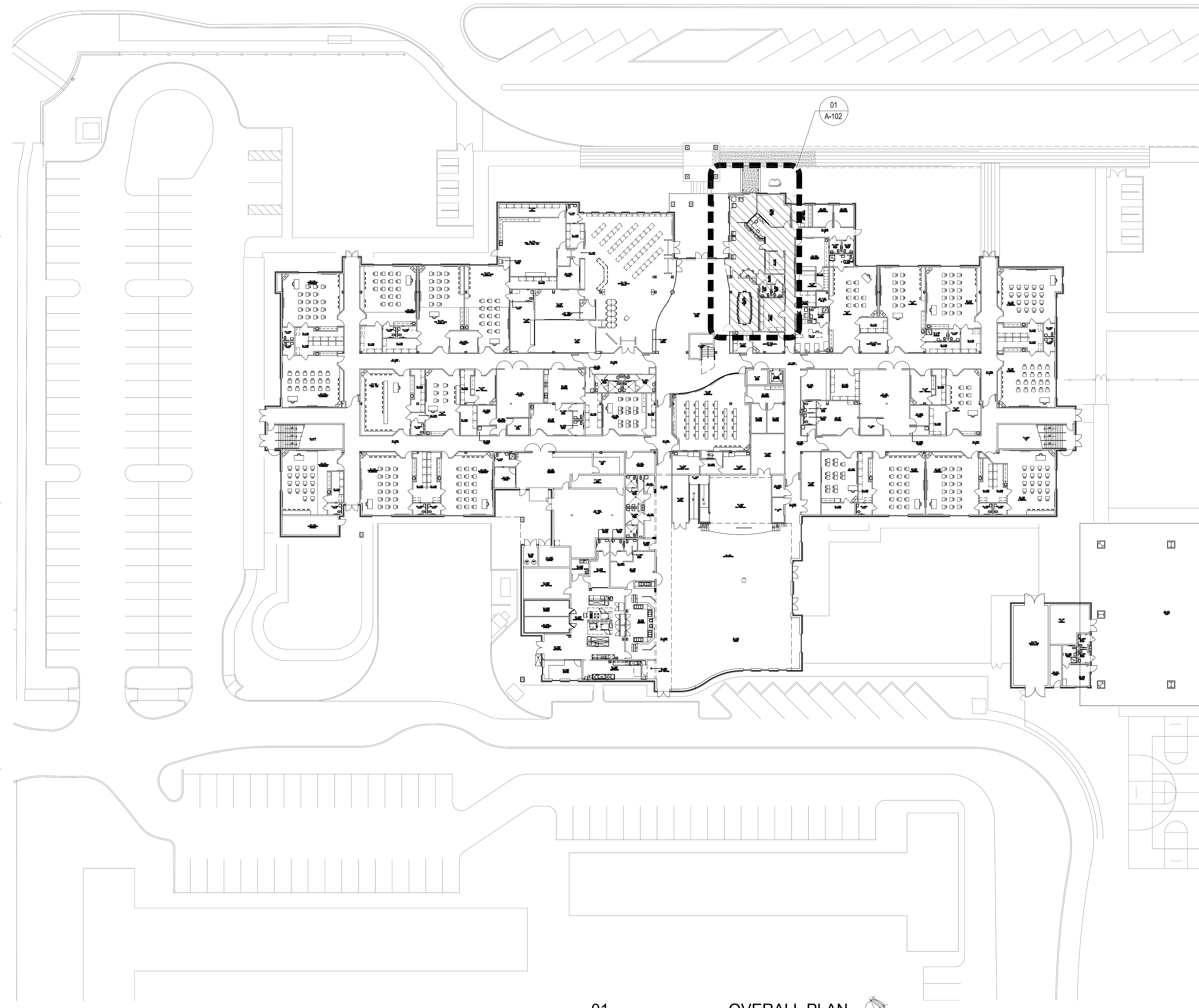
HARVARD JOLLY ARCHITECTURE
2047 Vista Parkway, Suite 100 West Palm Beach, FL 33411 | www.harvardjolly.com | AR0013140

LEGEND



GENERAL NOTES

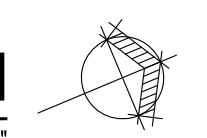
- A. CONTRACTOR(S) ARE RESPONSIBLE FOR FIELD VERIFYING THE EXTENT OF NEW WORK PRIOR TO BIDDING, AND FOR COORDINATING THE EXTENT OF DEMOLITION ASSOCIATED WITH THE INSTALLATION OF NEW SYSTEMS AND FINISHES INDICATED IN THE CONTRACT DOCUMENTS.
- B. ALL WORK, MATERIALS AND EQUIPMENT UTILIZED IN THIS PROJECT SHALL BE NEW AND INSTALLED IN STRICT ACCORDANCE WITH THE MANUFACTURERS RECOMMENDATIONS AND SPECIFICATIONS.
- C. CONTRACTOR SHALL SUBMIT SHOP DRAWINGS FOR APPROVAL BEFORE COMMENCING FABRICATION AND/OR INSTALLATION OF ALL APPLICABLE ITEMS IN CONSTRUCTION. ALL SHOP DRAWINGS SHALL BE FIELD VERIFIED, REVIEWED AND APPROVED BY THE CONTRACTOR BEFORE SUBMITTAL.
- D. PATCH, REPAIR AND RESTORE FINISHES TO MATCH EXISTING TO ALL BUILDING CONSTRUCTION REQUIRING DEMOLITION IN ORDER TO INSTALL ALL NEW ITEMS OF THE SCOPE OF WORK.
- E. NEW ELECTRICAL ITEMS SHALL BE LOCATED BEHIND FINAL FINISH SYSTEMS. EXPOSED/ SURFACE MOUNTED CONDUITS ARE NOT ACCEPTABLE.
- F. AFTER THE INSTALLATION OF NEW WORK, THE RESULTING EXPOSED SURFACE SHALL BE SMOOTH AND FLUSH WITH EXISTING CONDITIONS.
- G. IN ALL AREAS OF NEW WORK, EXISTING FLOORS, WALLS, CEILINGS AND FINISHES SHALL BE PROTECTED FROM DAMAGE. ANY DAMAGES THAT OCCUR SHALL BE RESTORED TO LIKE NEW CONDITION BY THE CONTRACTOR AT NO ADDITIONAL COST TO THE OWNER.
- H. CONTRACTOR SHALL MAINTAIN ALL CONSTRUCTION AREAS AS WELL AS, SURROUNDING AREAS, FREE OF DEBRIS OR HAZARDOUS EQUIPMENT AT ALL TIMES.
- I. MAINTAIN THE EGRESS REQUIRED IN ALL AREAS PER ALL APPLICABLE CODES AND STANDARDS DURING CONSTRUCTION.
- J. TO THE BEST OF OWNER'S KNOWLEDGE THERE ARE NO HAZARDOUS CONTAINING MATERIALS IN THE LIMITS OF CONSTRUCTION. THE CONTRACTOR SHALL NOTIFY THE OWNER IMMEDIATELY IF ANY HAZARDOUS CONTAINING MATERIALS ARE ENCOUNTERED.
- K. GENERAL CONTRACTOR SHALL REMOVE OR RELOCATE ANY EXISTING CEILING COMPONENTS SUCH AS CEILING TILES AND GRID, DIFFUSERS, LIGHT FIXTURES AND CEILING DEVICES AS REQUIRED FOR THE INSTALLATION OF NEW EQUIPMENT. CONTRACTOR SHALL REINSTALL CEILING COMPONENTS UPON COMPLETION OF NEW EQUIPMENT INSTALLATION LOCATING COMPONENTS BACK TO THEIR ORIGINAL LOCATION. CONTRACTOR SHALL REPLACE ANY BROKEN CEILING TILES OR GRID AS REQUIRED FOR COMPLETE INSTALLATION.
- L. CONTRACTOR SHALL FILL VOIDS AROUND PENETRATIONS WITH FIRE RATED CAULK IN FIRE RATED DRYWALL DECKING AND FIRE RATED PARTITIONS. FIRE RATING MUST BE MAINTAINED.
- M. CAMERA MOUNTING DETAILS SHALL VARY BASED ON FIELD CONDITIONS. THE CONTRACTOR SHALL SUBMIT SHOP DRAWINGS INDICATING THE VARIOUS TYPES OF CAMERA MOUNTING METHODS INCLUSIVE FOR THE COMPLETE SYSTEM.
- N. THE SCOPE OF WORK IS TO TAKE PLACE ON AN OCCUPIED AND ACTIVE CAMPUS. ALL PERSONNEL WORKING ON-SITE WITH THIS PROJECT MUST HAVE, WEAR AND DISPLAY A MARTIN COUNTY SCHOOL DISTRICT BADGE. CONTRACTOR/ VENDOR MUST APPLY AT THE MCSD AND PAY FOR ALL BADGE ASSOCIATED COSTS.
- O. CONSTRUCTION PERSONNEL SHALL BE CONFINED TO THE LIMITS OF THE CONSTRUCTION AREA.
- P. CONTRACTOR SHALL BE RESPONSIBLE FOR PROPERLY CLEANING ALL AREAS PRIOR TO FINAL ACCEPTANCE BY THE OWNER INCLUDING BUT NOT LIMITED TO FLOORS, WALLS, WINDOWS, DOORS, EQUIPMENT, ETC.



01

OVERALL PLAN

SCALE: 1/24" = 1'-0"



Martin County School District
 JD Parker ES Enhanced Security Project A2
 1010 East 10th Street
 Stuart, Florida 34996
 Permit Documents Submittal

Comm. No: 16025.18
 Date: 07/23/2020
 Drawn: ER

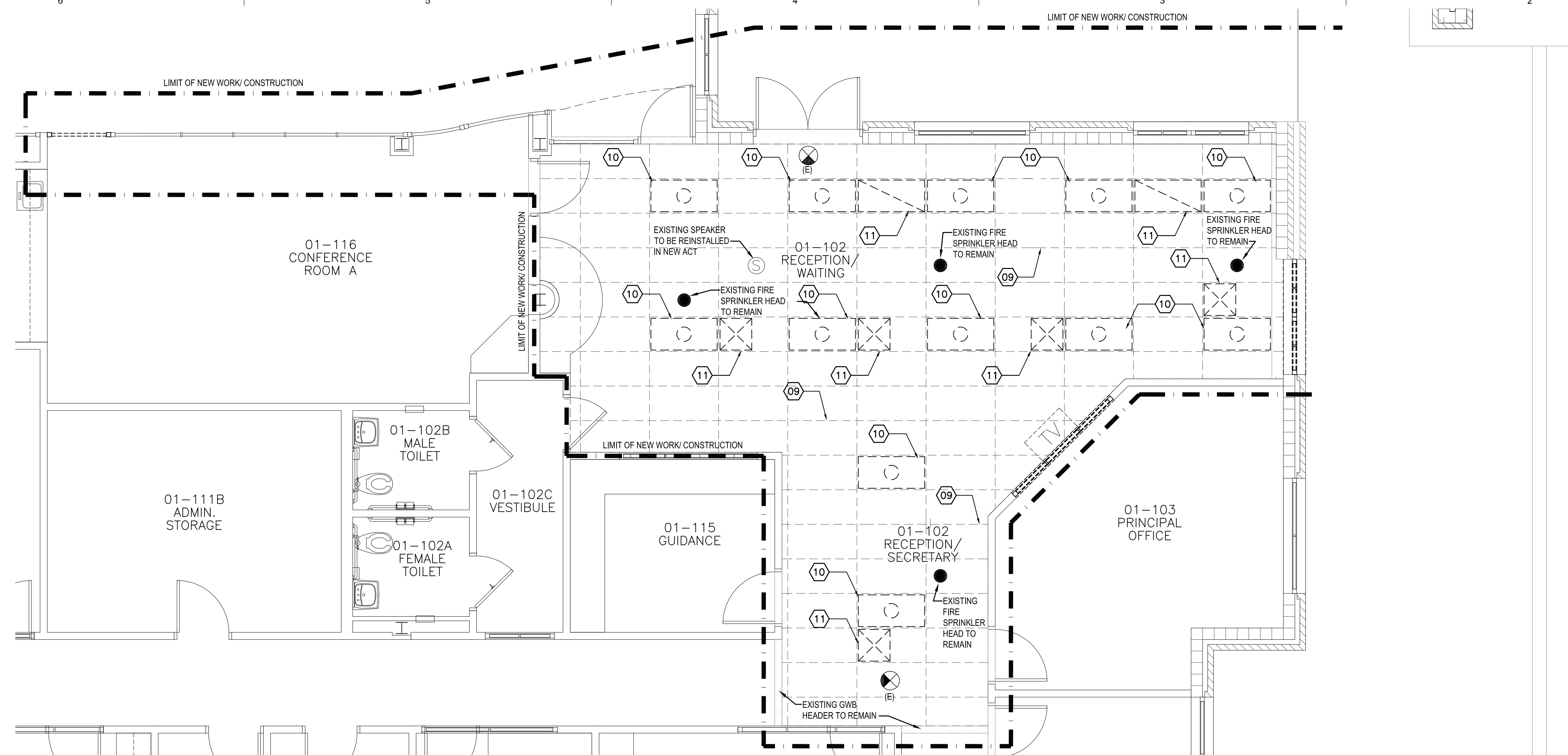
Revisions		
No.	Date	Note

TO THE BEST OF MY KNOWLEDGE, THE PLANS AND SPECIFICATIONS COMPLY WITH THE MINIMUM BUILDING CODES.

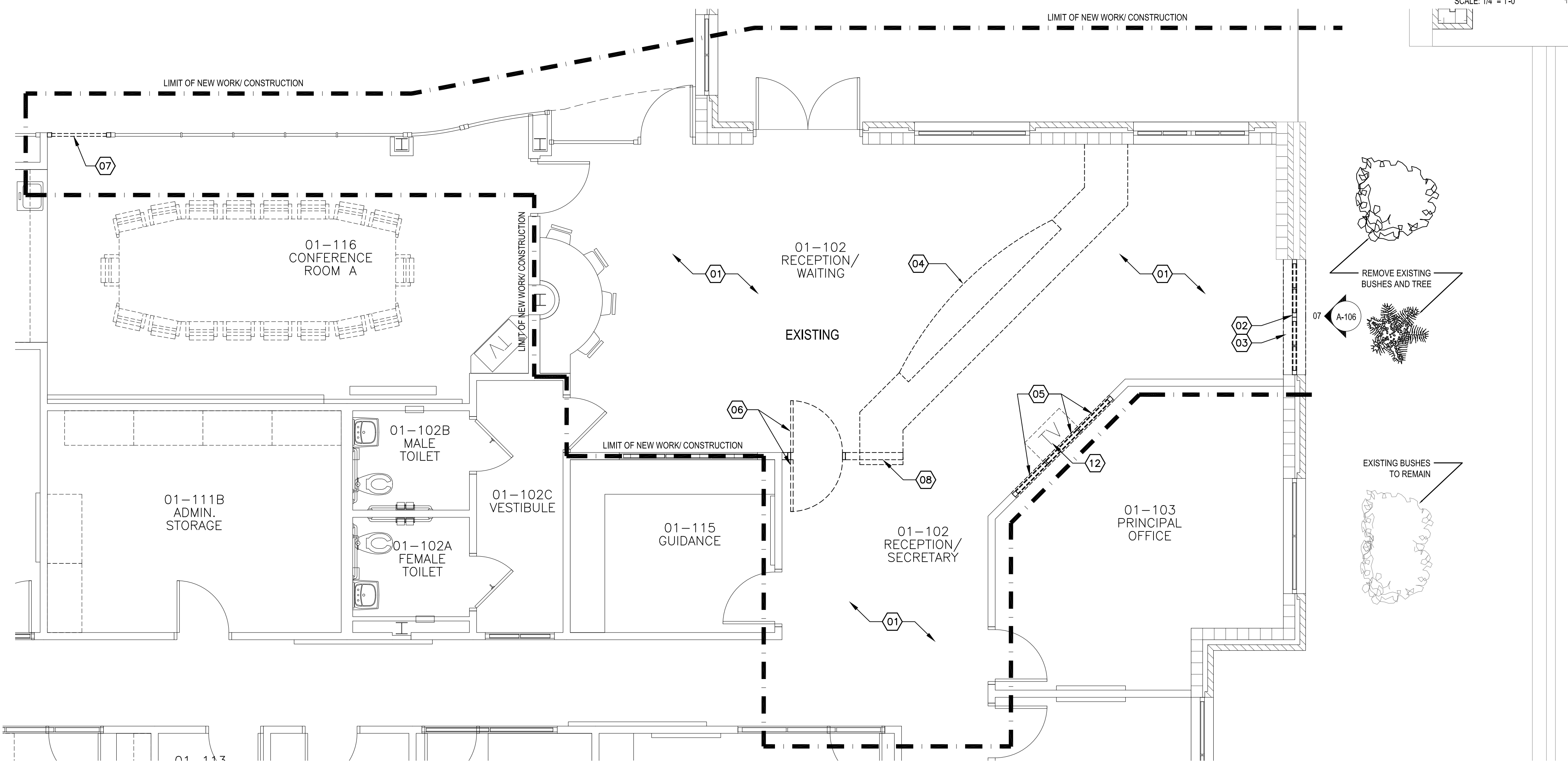
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OVERALL PLAN

A-101



02 REFLECTED CEILING PLAN - DEMOLITION
SCALE: 1/4" = 1'-0"



01 FLOOR PLAN - DEMOLITION
SCALE: 1/4" = 1'-0"

LEGEND

- EXISTING WALL TO REMAIN
- EXISTING WALL TO BE DEMOLISHED
- NEW STUD AND GWB PARTITION
- LIMIT OF NEW WORK/ CONSTRUCTION
- EXISTING SPRINKLER HEAD
- SPEAKER (CEILING MOUNTED)
- EXIT SIGNS
- (E) EXISTING
- DIFFUSER GRILLE. REFER TO MECHANICAL DRAWINGS
- RETURN AIR GRILLE. REFER TO MECHANICAL DRAWINGS

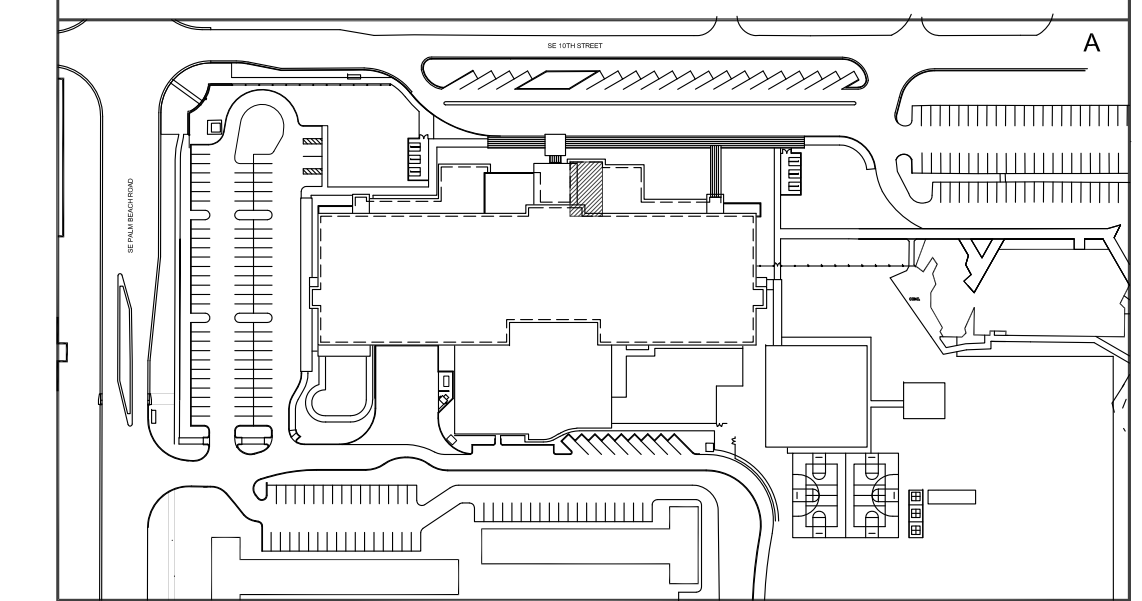
DEMOLITION GENERAL NOTES

- A. CONTRACTOR(S) ARE RESPONSIBLE FOR FIELD VERIFYING THE EXTENT OF DEMOLITION WORK PRIOR TO BIDDING, AND FOR COORDINATING THE EXTENT OF DEMOLITION WITH THE INSTALLATION OF NEW SYSTEMS AND FINISHES INDICATED IN THE CONTRACT DOCUMENTS. REFER TO THE NEW CONSTRUCTION DRAWINGS FOR DEMOLITION REQUIRED, BUT NOT SHOWN ON DEMOLITION PLANS.
- B. REFER TO THE MECHANICAL, PLUMBING AND ELECTRICAL DOCUMENTS FOR ADDITIONAL DEMOLITION ITEMS, PATCH, REPAIR AND RESTORE FINISHES TO MATCH EXISTING TO ALL BUILDING CONSTRUCTION REQUIRING DEMOLITION IN ORDER TO INSTALL ALL NEW ITEMS OF MECHANICAL, ELECTRICAL & PLUMBING WORK.
- C. MECHANICAL, PLUMBING AND ELECTRICAL ITEMS REMOVED SHOULD BE CAPPED AND ABANDONED; THEY SHALL BE LOCATED BEHIND FINAL FINISH SYSTEMS.
- D. "CEILING" DENOTES CEILING MATERIALS INCLUDING SUSPENSION SYSTEMS, ADHESIVE RESIDUES, MOLDINGS, UP TO BUT EXCLUSIVE OF STRUCTURAL SYSTEMS.
- E. REMOVE EACH ITEM SHOWN WITH DASHED LINES ON THIS DRAWING WHETHER OR NOT EACH ITEM IS SPECIFICALLY NOTED TO BE REMOVED.
- F. AFTER THE DEMOLITION OF MATERIALS, THE RESULTING EXPOSED SURFACE SHALL BE SMOOTH AND FLUSH WITH EXISTING CONDITIONS.
- G. MATERIALS OF DEMOLITION SHALL BE DISPOSED OF OFF SITE UNLESS DIRECTED OTHERWISE BY OWNER.
- H. OWNER SHALL HAVE "FIRST RIGHTS OF REFUSAL" PRIOR TO DEMOLITION OPERATIONS AND SHALL SALVAGE ALL EXISTING EQUIPMENT PRIOR TO START OF CONSTRUCTION. ANY REMAINING EQUIPMENT SHALL BE DISPOSED OF OR SALVAGED BY THE CONTRACTOR.
- I. WHERE WALLS ARE SHOWN TO BE REMOVED, REMOVE ALL ITEMS IN THE WALLS; ELECTRICAL, PLUMBING, ETC. PER ALL APPLICABLE CODES AND STANDARDS.
- J. IN ALL AREAS OF DEMOLITION, ALL DUCTWORK, DOORS AND WALLS NOT TO BE DEMOLISHED SHOULD BE PROTECTED SO THAT NO DEBRIS/ DUST CAN FILTER THRU TO OTHER PARTS OF THE BUILDING.
- K. MAINTAIN THE EGRESS REQUIRED IN ALL AREAS PER ALL APPLICABLE CODES AND STANDARDS DURING CONSTRUCTION.
- L. TO THE BEST OF OWNER'S KNOWLEDGE THERE ARE NO HAZARDOUS CONTAINING MATERIALS IN THE LIMITS OF CONSTRUCTION, THE CONTRACTOR SHALL NOTIFY THE OWNER IMMEDIATELY IF ANY HAZARDOUS CONTAINING MATERIALS ARE ENCOUNTERED.
- M. GENERAL CONTRACTOR SHALL REMOVE OR RELOCATE ANY EXISTING CEILING COMPONENTS SUCH AS SPEAKERS, DEVICES, ETC. AS REQUIRED FOR DEMOLITION OF EXISTING AND INSTALLATION OF NEW ACOUSTICAL CEILING TILE AND GRID. CONTRACTOR SHALL REINSTALL CEILING COMPONENTS UPON COMPLETION OF CEILING INSTALLATION LOCATING COMPONENTS BACK TO THEIR ORIGINAL LOCATION. SEE MECHANICAL/ ELECTRICAL DRAWINGS FOR ADDITIONAL INFORMATION.
- N. CONTRACTOR SHALL FILL VOIDS AROUND PENETRATIONS WITH FIRE RATED CAULK IN FIRE RATED DRYWALL DECKING AND FIRE RATED PARTITIONS.

DEMOLITION KEY NOTES

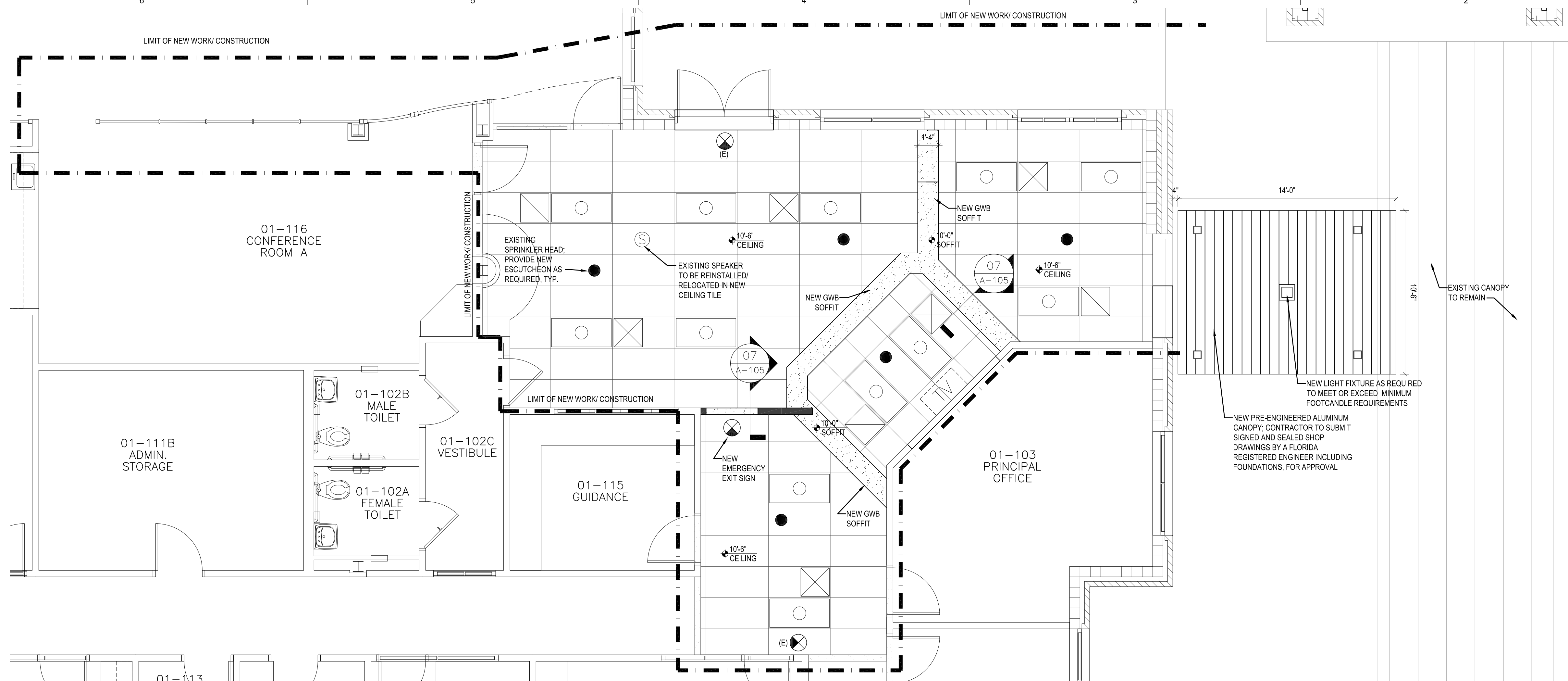
1. EXISTING FLOOR FINISH TO REMAIN; PROTECT AS REQUIRED DURING CONSTRUCTION ACTIVITIES. CONTRACTOR TO STRIP FLOOR AND APPLY TEN (10) COATS OF WAX AFTER NEW CONSTRUCTION IS COMPLETED.
2. REMOVE EXISTING EXTERIOR WINDOW AND WINDOW COVERINGS.
3. REMOVE SECTION OF WALL BELOW WINDOW AND PREPARE FOR THE INSTALLATION OF A NEW STOREFRONT DOOR AND WINDOW.
4. REMOVE EXISTING MILLWORK.
5. REMOVE EXISTING INTERIOR WINDOW & FRAME.
6. REMOVE EXISTING DOOR INCLUDING FRAME AND ALL ACCESSORIES.
7. REMOVE EXISTING STOREFRONT PANEL AND PREPARE FOR THE INSTALLATION OF AN ALUMINUM STOREFRONT DOOR TO MATCH.
8. REMOVE EXISTING WALL PARTITION AND ANY RELATED RELATED ACCESSORIES AND SERVICES.
9. REMOVE EXISTING ACOUSTICAL CEILING TILE, GRID & ALL RELATED ACCESSORIES.
10. REMOVE EXISTING LIGHT FIXTURES; SEE ELECTRICAL DRAWINGS.
11. REMOVE EXISTING MECHANICAL DIFFUSERS & GRILLES; SEE MECHANICAL DRAWINGS.
12. EXISTING TV MONITOR TO REMAIN.

KEYPLAN

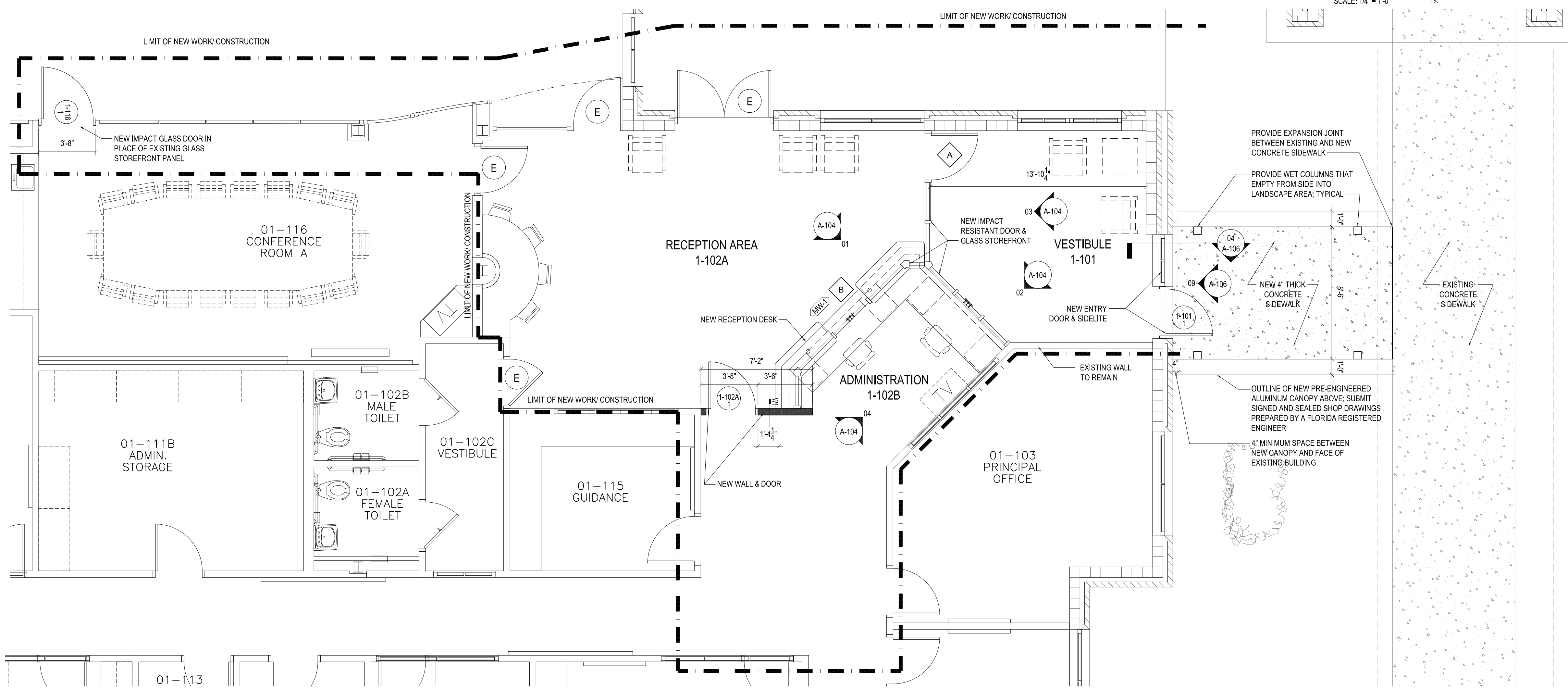


Revisions		
No.	Date	Note

TO THE BEST OF MY KNOWLEDGE, THE PLANS AND SPECIFICATIONS COMPLY WITH THE MINIMUM BUILDING CODES.



02 ENLARGED REFLECTED CEILING PLAN
SCALE: 1/4" = 1'-0"

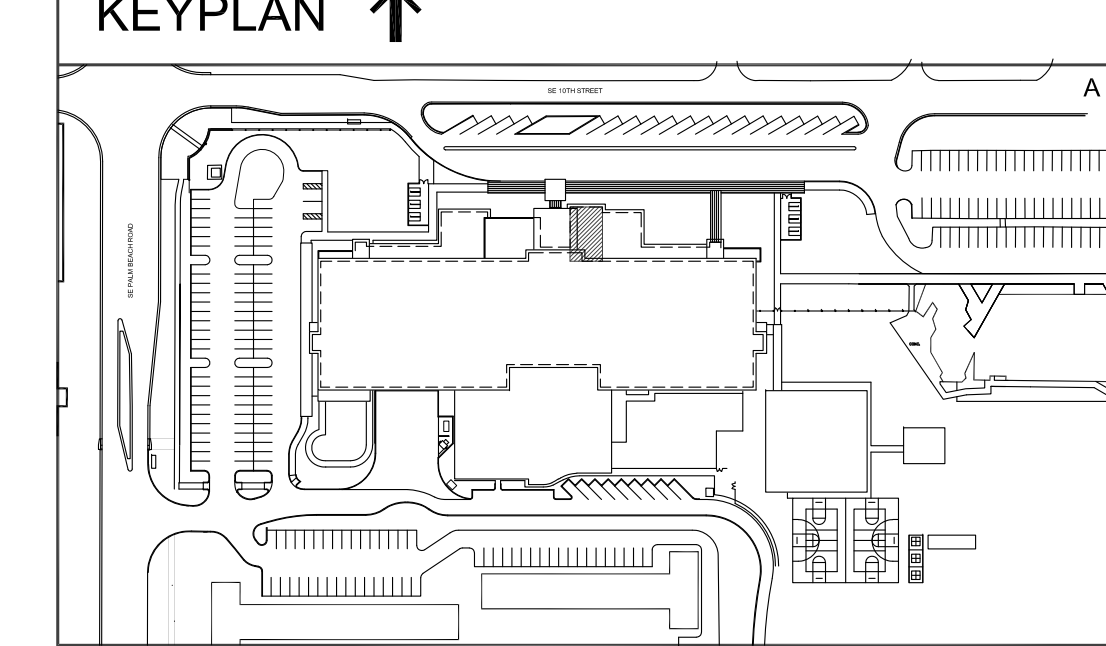


01 ENLARGED FLOOR PLAN
SCALE: 1/4" = 1'-0"

LEGEND

- EXISTING WALL TO REMAIN
- NEW STUD AND GWB PARTITION - BRACE AS REQUIRED
- CR CARD READER - SEE ELECTRICAL DRAWINGS
- FIRE SPRINKLER - SEE FIRE PROTECTION DRAWINGS
- E EMERGENCY EXIT SIGN; (E) DENOTES EXISTING - SEE ELECTRICAL DRAWINGS
- S SPEAKER (CEILING MOUNTED) - SEE ELECTRICAL DRAWINGS
- 2X2 LAY-IN ACOUSTICAL CEILING ON GRID
- DRYWALL SOFFIT, PAINTED
- 2X2 RECESSED LED LIGHT FIXTURE - REFER TO ELECTRICAL DRAWINGS
- DIFFUSER GRILLE REFER TO MECHANICAL DRAWINGS
- RETURN AIR GRILLE REFER TO MECHANICAL DRAWINGS
- NEW DOOR - SEE SCHEDULE
- NEW CONCRETE WALK
- FURNITURE N.I.C.

- ### GENERAL NOTES
1. CONTRACTOR SHALL COMPLY WITH FLORIDA BUILDING CODE SIXTH EDITION (2017) WITH ALL APPLICABLE REVISIONS, FLORIDA FIRE PREVENTION CODE SIXTH EDITION, ALL STATE AND LOCAL ZONING CODES AND THE THE DISTRICT SCHOOL BOARD OF MARTIN COUNTY CRITERIA. PERMITS SHALL BE POSTED IN A VISIBLE PLACE AT ALL TIMES. ALL PERMITS, UTILITY AND METER CONNECTIONS FEES SHALL BE OBTAINED AND PAID FOR BY THE CONTRACTOR.
 2. ALL WORK, MATERIALS AND EQUIPMENT UTILIZED IN THIS PROJECT SHALL BE NEW AND INSTALLED IN STRICT ACCORDANCE WITH THE MANUFACTURERS RECOMMENDATIONS AND SPECIFICATIONS.
 3. ALL WORK FOR THIS PROJECT SHALL CONFORM TO STANDARDS PUBLISHED BY RECOGNIZED PROFESSIONAL AND INDUSTRY ORGANIZATIONS.
 4. CONTRACTOR SHALL BE RESPONSIBLE FOR VISITING THE SITE PRIOR TO BIDDING AND FAMILIARIZING HIMSELF WITH ALL EXISTING CONDITIONS AFFECTING THE WORK INCLUDING BUT NOT LIMITED TO PUBLIC UTILITIES, ON AND OFF SITE ACCESS ROADS AND OTHER SUPPORT FACILITIES.
 5. CONTRACTOR SHALL REMOVE, RELOCATE OR RE-ROUTE, AS NECESSARY, ELECTRICAL, TELEPHONE, WATER, SEWER, GAS OR ANY OTHER UTILITY LINES ENCOUNTERED AND SHALL COORDINATE THIS WORK WITH ALL LOCAL UTILITY COMPANIES.
 6. CONTRACTOR SHALL IMMEDIATELY NOTIFY THE ARCHITECT OF ANY UNEXPECTED OR UNKNOWN FIELD CONDITIONS, ERRORS, OMISSIONS, OR DISCREPANCIES IN THE DRAWINGS, PROJECT MANUAL OR CONTRACT DOCUMENTS PRIOR TO PROCEEDING WITH THE WORK OR SHOP FABRICATIONS.
 7. CONTRACTOR SHALL PREPARE AND MAINTAIN ALL CONSTRUCTION AREAS, AS WELL AS, SURROUNDING AREAS FREE OF DEBRIS OR HAZARDOUS EQUIPMENT AT ALL TIMES.
 8. CONTRACTOR SHALL BE RESPONSIBLE FOR THE REPAIR AND/OR THE REPLACEMENT OF ANY ITEMS DAMAGED DURING CONSTRUCTION OR CLEAN-UP. CONSTRUCTION PERSONNEL SHALL BE CONFINED TO THE LIMITS OF THE CONSTRUCTION AREA. ALL OSHA REGULATIONS FOR CONSTRUCTION AREAS SHALL BE STRICTLY FOLLOWED.
 9. DRAWINGS ARE NOT TO BE SCALED. WRITTEN DIMENSIONS SHALL BE FOLLOWED.
 10. ALL DIMENSIONS ARE BASED ON NOMINAL SIZES OF MEMBERS AND ARE GIVEN TO THE OUTER FACE OF SUCH MEMBERS, NOT TO FACE OF FINISH MATERIALS UNLESS OTHERWISE NOTED ON DRAWINGS. WHERE A DIMENSION IS LABELED "CLEAR" IT IS TAKEN FROM THE FACE OF FINISH MATERIALS TO FACE OF FINISH MATERIALS.
 11. CONTRACTOR SHALL SUBMIT SHOP DRAWINGS FOR APPROVAL BEFORE COMMENCING FABRICATION AND/OR INSTALLATION OF ALL APPLICABLE ITEMS FOR CONSTRUCTION. SHOP DRAWINGS DIMENSIONS SHALL BE FIELD VERIFIED, REVIEWED AND APPROVED BY CONTRACTOR BEFORE SUBMITTAL.
 12. CONTRACTOR SHALL BE RESPONSIBLE FOR REMOVING ALL DEBRIS AND CONSTRUCTION MATERIAL FROM THE SITE. CONTRACTOR SHALL ALSO BE RESPONSIBLE FOR PROPERLY CLEANING ALL AREAS PRIOR TO FINAL ACCEPTANCE BY THE OWNER INCLUDING BUT NOT LIMITED TO WINDOWS, FLOORS, CARPETS, WALLS, DOORS, EQUIPMENT, ETC.
 13. UPON COMPLETION OF THIS PROJECT, THE CONTRACTOR SHALL GIVE TO THE OWNER A COMPLETE SET OF AS-BUILT ARCHITECTURAL, MECHANICAL AND ELECTRICAL DRAWINGS IN CAD FORMAT ALONG WITH THE WRITTEN GUARANTEES, OPERATION AND MAINTENANCE MANUALS OF ALL EQUIPMENT AND FINISHES INSTALLED. THE CONTRACTOR SHALL MAINTAIN A CURRENT SET OF AS-BUILT DRAWINGS AND SPECIFICATIONS. INFORMATION SHALL BE RECORDED BY CONTRACTOR AS CONSTRUCTION PROGRESSES AND REVIEWED FOR COMPLETENESS AT EACH REQUISITION REQUEST. REFER TO PROJECT MANUAL.
 14. CONTRACTOR SHALL INSTALL BARRIERS AS NECESSARY AND REQUIRED AROUND PERIMETER OF CONSTRUCTION LIMITS TO PROTECT THE PUBLIC. EGRESS FROM THE EXISTING BUILDINGS SHALL NOT BE REDUCED OR LIMITED.
 15. CONTRACTOR SHALL FURNISH AND INSTALL ALL METAL AND/OR WOOD BLOCKING REQUIRED FOR WALL MOUNTED OR BRACED FIXTURES, COUNTERTOPS, SHELVES, AND ACCESSORIES OR BY OTHERS' ITEMS DESCRIBED IN INTERIOR DESIGN AND ARCHITECTURAL DRAWINGS. BLOCKING SHALL BE CONSTRUCTED TO SUPPORT THE IMPOSED LOAD AND SHALL COMPLY WITH SCHOOL DISTRICT REQUIREMENTS.
 16. CONTRACTOR SHALL PROVIDE A SAFETY AND STAGING PLAN PRIOR TO START OF CONSTRUCTION TO CLEARLY DELINEATE AREAS FOR CONSTRUCTION, SAFETY BARRIERS, EXITS, CONSTRUCTION TRAFFIC DURING THE VARIOUS PHASES AND WHEN CONDITIONS CHANGE.
 17. CONTRACTOR SHALL SUBMIT SHOP DRAWINGS FOR REVIEW AND APPROVAL BY THE AUTHORITY HAVING JURISDICTION (AHJ) FOR THE FOLLOWING BUT NOT LIMITED TO ALL FINISHES, STOREFRONT ASSEMBLIES, LIGHT FIXTURES, MECHANICAL EQMT, ETC. ABOVE U.S.O.
 18. ALL INTERIOR NON-LOAD BEARING WALLS SHALL EXTEND TO UNDERSIDE OF DECK ABOVE U.S.O.
 19. ALL FIRE-RATED AND SMOKE-RATED NON-LOAD BEARING WALLS SHALL EXTEND TO UNDERSIDE OF DECK ABOVE U.S.O.
 20. ALL STUD WALLS TO HAVE HIGH IMPACT 5/8" G.W.B. TO 4'-0" A.F.F. PROVIDE STANDARD G.W.B. ABOVE 4'-0".
 21. ALL WALL FRAMING STUDS TO BE MIN. 20 GAUGE U.N.O. ON DRAWINGS OR IN SPECIFICATIONS.
 22. CONTRACTOR TO PROVIDE NEW FIRE SPRINKLER ESCUTCHEONS AT EACH FIRE SPRINKLER HEAD WHEN NEW ACOUSTICAL CEILING TILE IS INSTALLED.

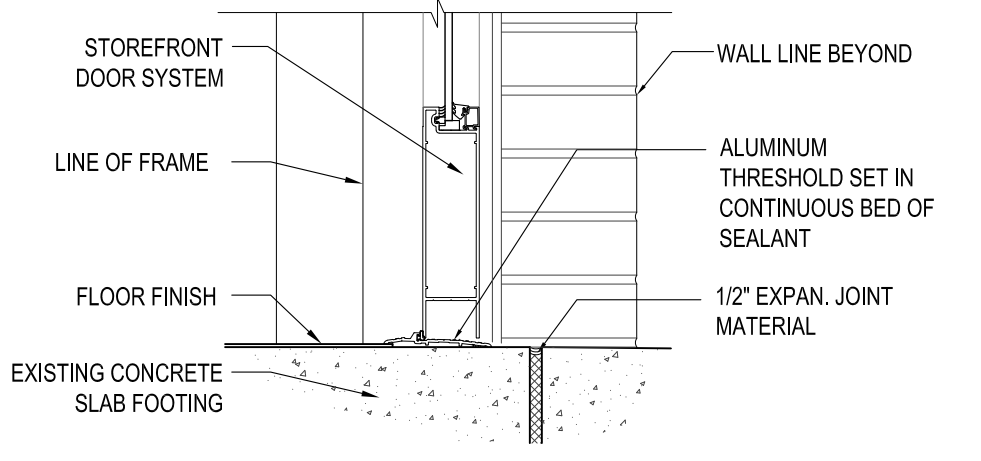


Revisions		
No.	Date	Note

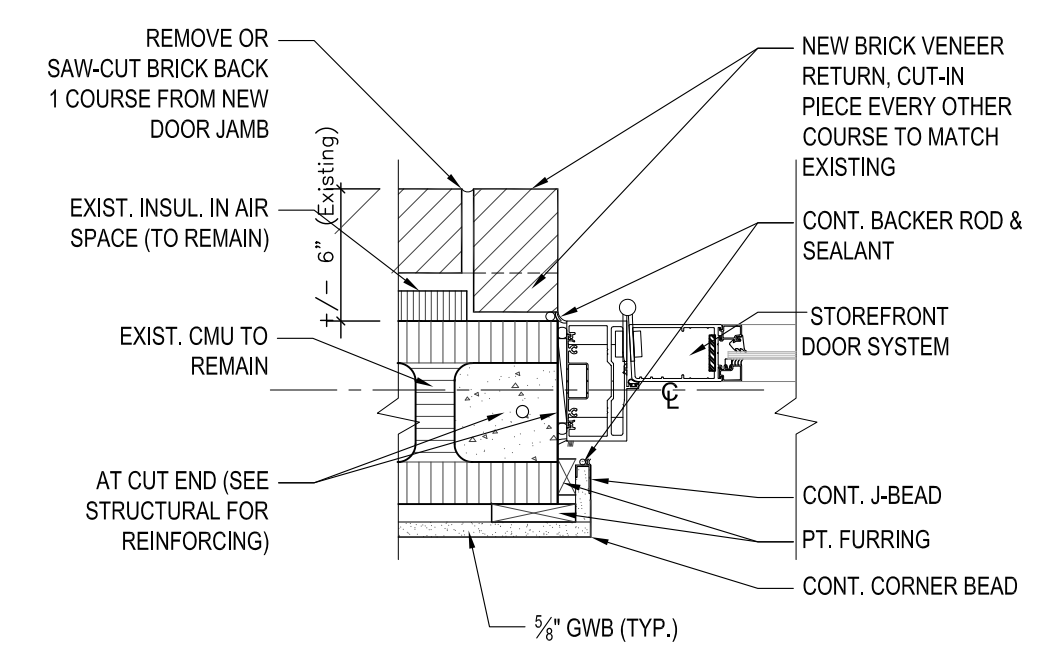
TO THE BEST OF MY KNOWLEDGE, THE PLANS AND SPECIFICATIONS COMPLY WITH THE MINIMUM BUILDING CODES.

STOREFRONT SCHEDULE										NOTES
TYPE	STORE FRONT SIZE			MATL	FRAME	HEAD	JAMB	SILL	HDW GROUP	
	WD	HGT	THK							
A	3'-0"	7'-2"	1 3/4"	ALUM	ALUM	H2	J2	S2	15	PROVIDE ELECTRIC STRIKE RELEASE; PANIC HARDWARE; CARD READER
B	3'-0"	4'-8"	1 3/4"	ALUM	ALUM	H2	J2	S2	15	PROVIDE ELECTRIC STRIKE RELEASE; PANIC HARDWARE; CARD READER

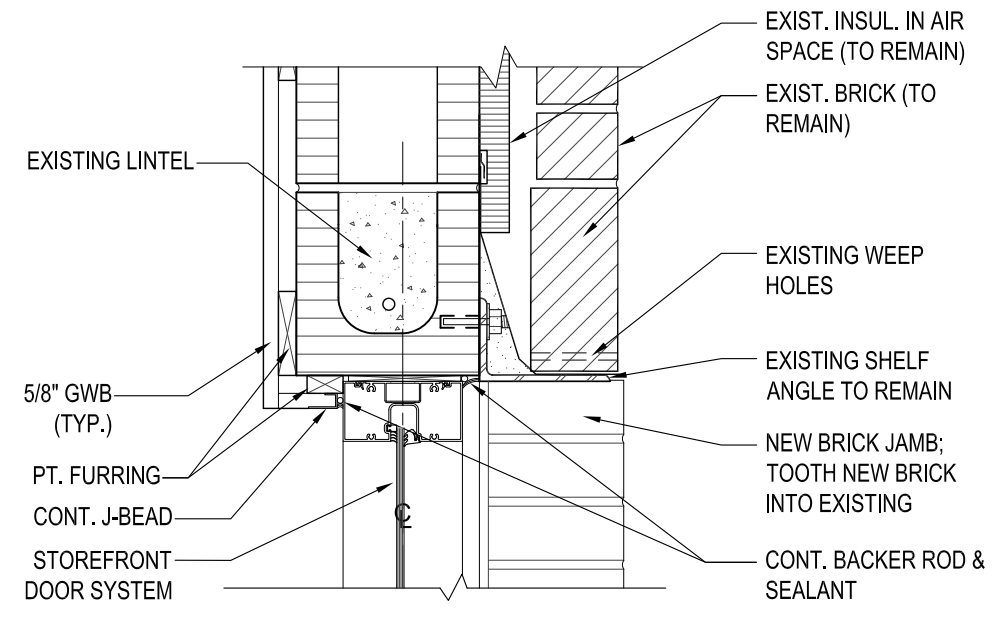
DOOR SCHEDULE										NOTES		
NUMBER	TYPE	DOOR SIZE			MATL	FRAME		HEAD	JAMB		SILL	HDW GROUP
		WD	HGT	THK		TYPE	MATL					
1-101	B	3'-0"	7'-0"	1 3/4"	SC	F1	HM	H1	J1	S1	06.1	FINISH TO MATCH EXISTING DOORS
1-102A	A	3'-0"	7'-0"	1 3/4"	SC	F1	HM	H1	J1	S1	17	FINISH TO MATCH EXISTING DOORS
1-116	B	3'-4"	7'-0"	1 3/4"	SC	F1	HM	H1	J1	S1	15.1	FINISH TO MATCH EXISTING DOORS



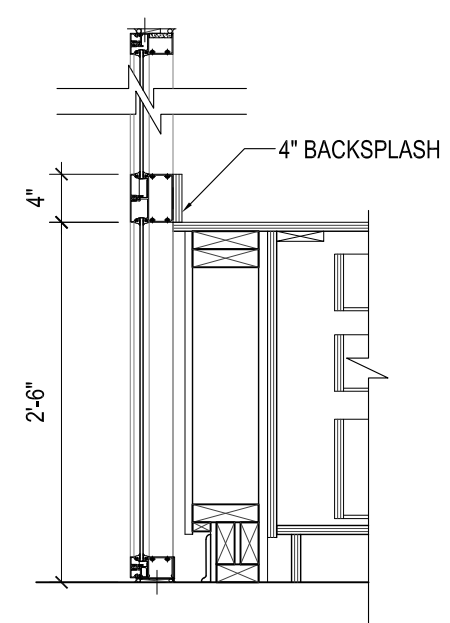
11 DOOR THRESHOLD DETAIL (BRICK) -S5
SCALE: 1/12" = 1'-0"



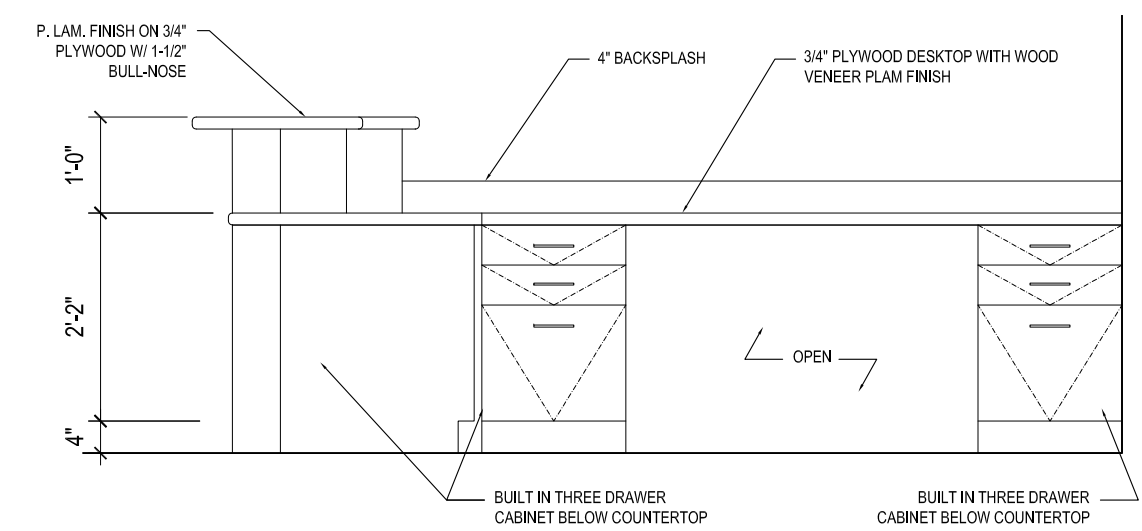
10 STOREFRONT JAMB DETAIL (BRICK) -J5
SCALE: 1/12" = 1'-0"



09 STOREFRONT HEAD DETAIL (BRICK) -H5
SCALE: 1/12" = 1'-0"



08 BACKSPLASH DETAIL
SCALE: 3/4" = 1'-0"



04 FRONT DESK ELEVATION
SCALE: 1/2" = 1'-0"

HARDWARE GROUP NO. 06.1 - EXTERIOR CARD ACCESS
Provide each SGL door(s) with the following:

QTY	DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3EA	HINGE	5BB1 4.5 X 4.5 NRP	630	IVE
1EA	POWER TRANSFER	EPT10	689	VON
1EA	ELEC PANIC HARDWARE	RX-EL-HH-99-L-06	626	VON
1EA	RIM CYLINDER	1E62	626	BES
1EA	SURFACE CLOSER	4040XP SCUSH	689	LCN
1EA	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE
1EA	GASKETING	328AA	AA	ZER
1EA	THRESHOLD	566A-MSLA-10	A	ZER
1EA	POWER SUPPLY	PS914 900-2RS	LGR	VON

HURRICANE CODE COMPLIANT OPENING. SCHLAGE LOCK NOA #20-0310.07.

HARDWARE GROUP NO. 15 - CARD ACCESS
Provide each SGL door(s) with the following:

QTY	DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3EA	HINGE	5BB1 4.5 X 4.5 NRP	652	IVE
1EA	STOREROOM LOCK	T581BDC DANE	626	FAL
1EA	PERMANENT CORE	I C CORE	626	BES
1EA	ELECTRIC STRIKE	6211 FSE	630	VON
1EA	SURFACE CLOSER	4040XP REG OR PA AS REQ	689	LCN

BALANCE OF HARDWARE BY DOOR MANUFACTURER. CARD ACCESS SYSTEM AND CARD READER TO BE SUPPLIED BY DIVISION 28.

HARDWARE GROUP NO. 15.1 - CARD ACCESS
Provide each SGL door(s) with the following:

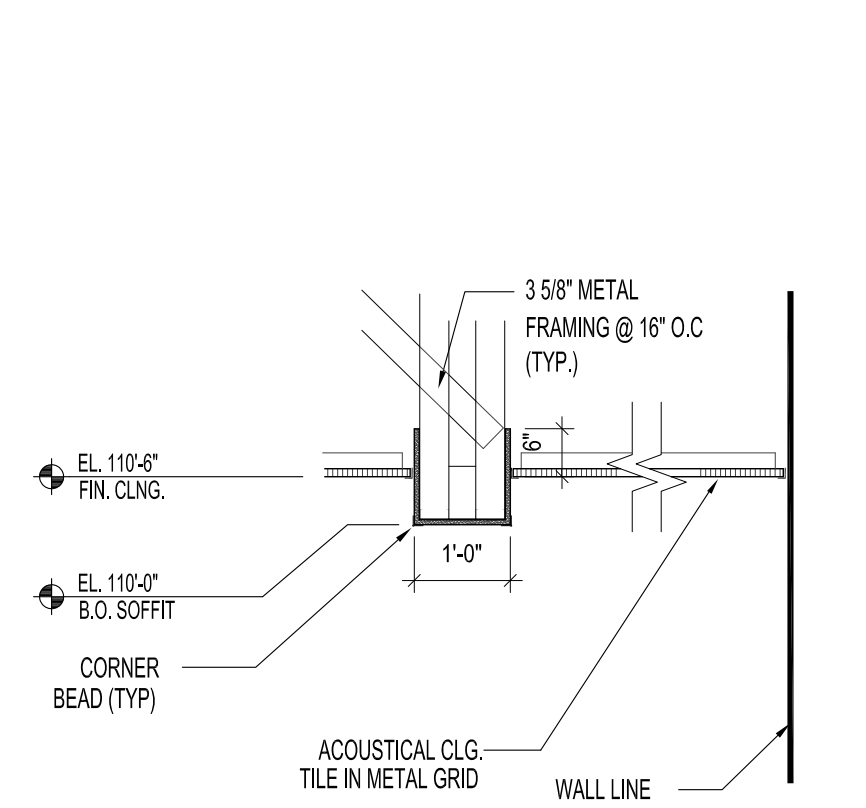
QTY	DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3EA	HINGE	5BB1 4.5 X 4.5 NRP	652	IVE
1EA	STOREROOM LOCK	T581BDC DANE	626	FAL
1EA	PERMANENT CORE	I C CORE	626	BES
1EA	ELECTRIC STRIKE	6211 FSE	630	VON
1EA	SURFACE CLOSER	4040XP REG OR PA AS REQ	689	LCN
1EA	GASKETING	328AA	AA	ZER

BALANCE OF HARDWARE BY DOOR MANUFACTURER. CARD ACCESS SYSTEM AND CARD READER TO BE SUPPLIED BY DIVISION 28.

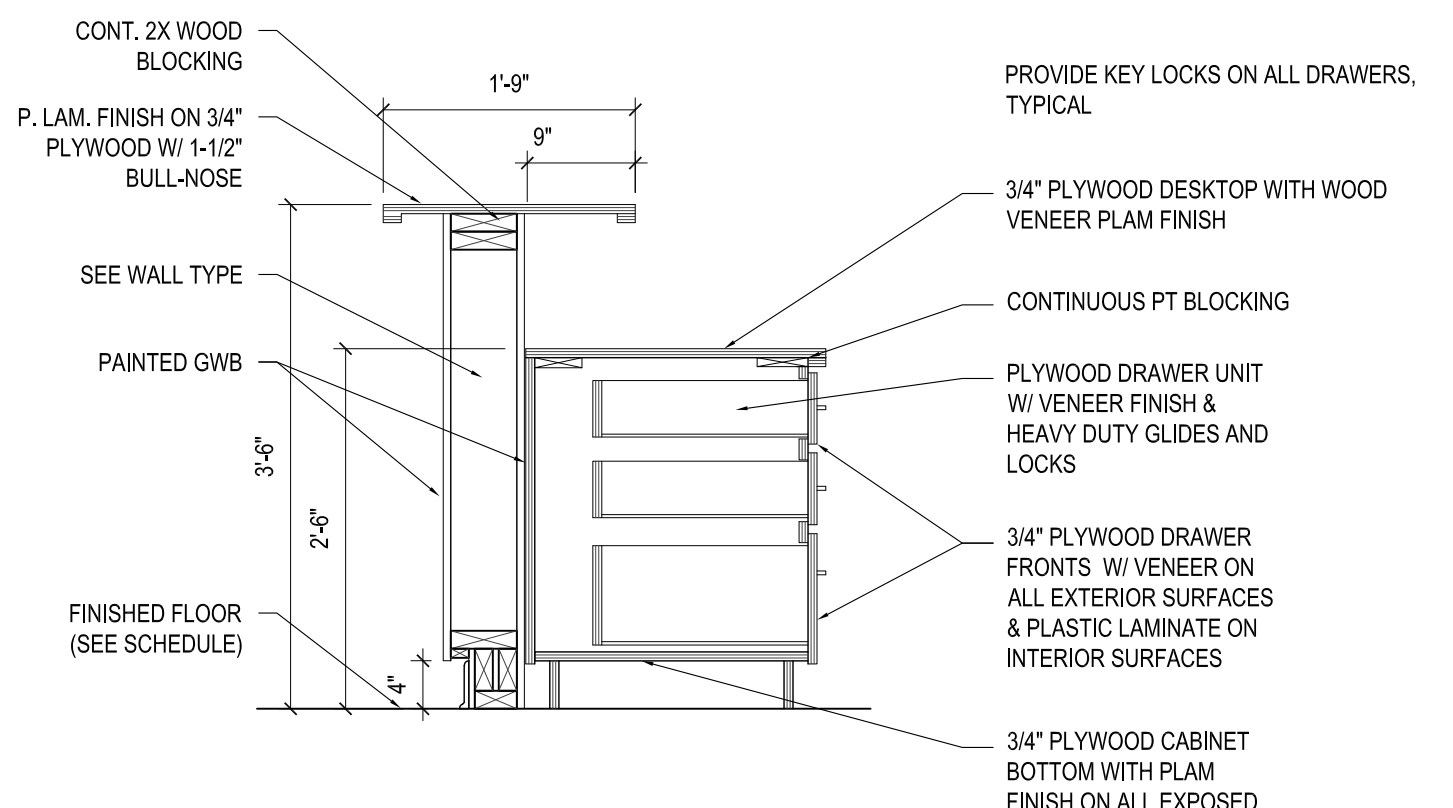
HARDWARE GROUP NO. 17 - CARD ACCESS
Provide each SGL door(s) with the following:

QTY	DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3 EA	HINGE	5BB1 4.5 X 4.5 NRP	652	IVE
1EA	POWER TRANSFER	EPT10	689	VON
1EA	ELEC PANIC HARDWARE	QEL-99-L-06 24 VDC	626	VON
1 EA	SURFACE CLOSER	4040XP EDA	689	LCN
1 EA	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE
1 EA	WALL STOP	WS406/407CVX	630	IVE
1EA	RIM CYLINDER	1E62	626	BES
3EA	SILENCER	SR64	GRY	IVE
1EA	POWER SUPPLY	PS902	LGR	VON

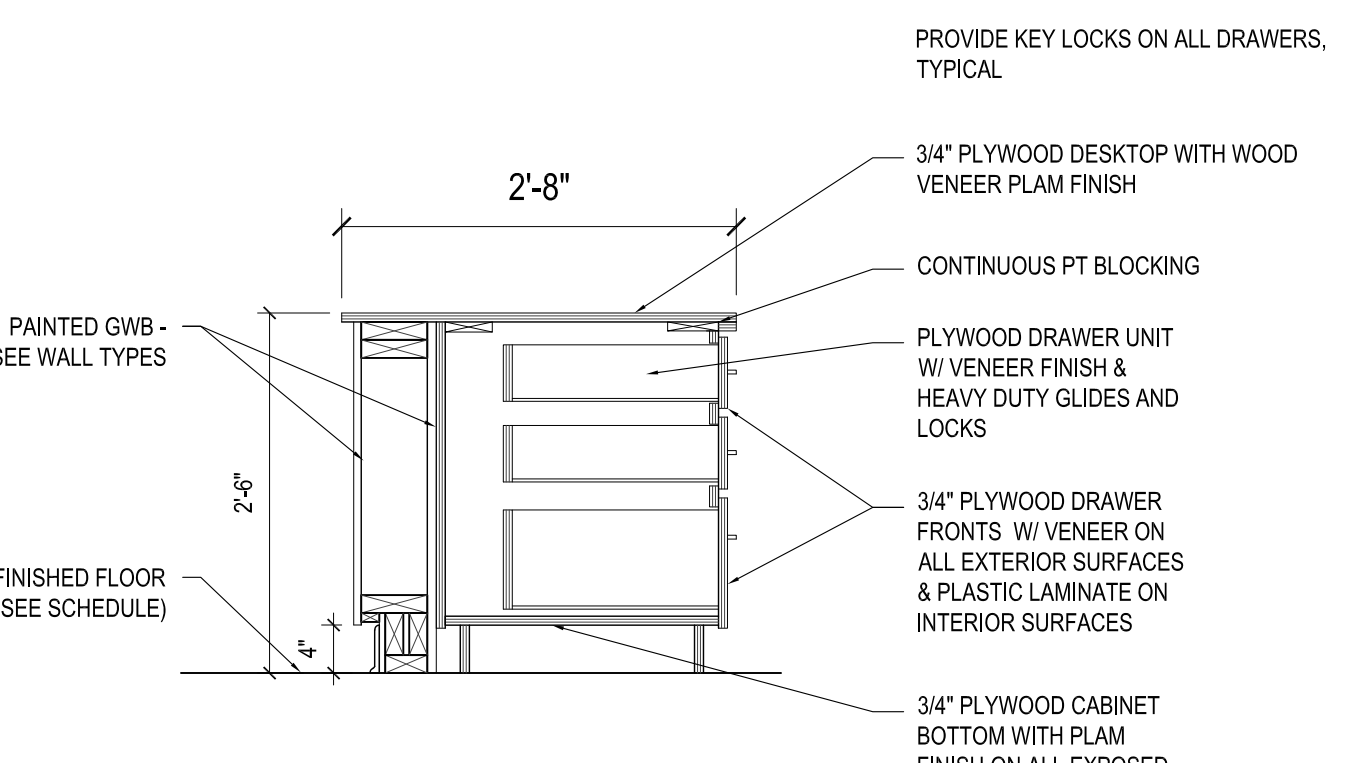
CARD ACCESS SYSTEM AND CARD READER TO BE SUPPLIED BY DIVISION 28.



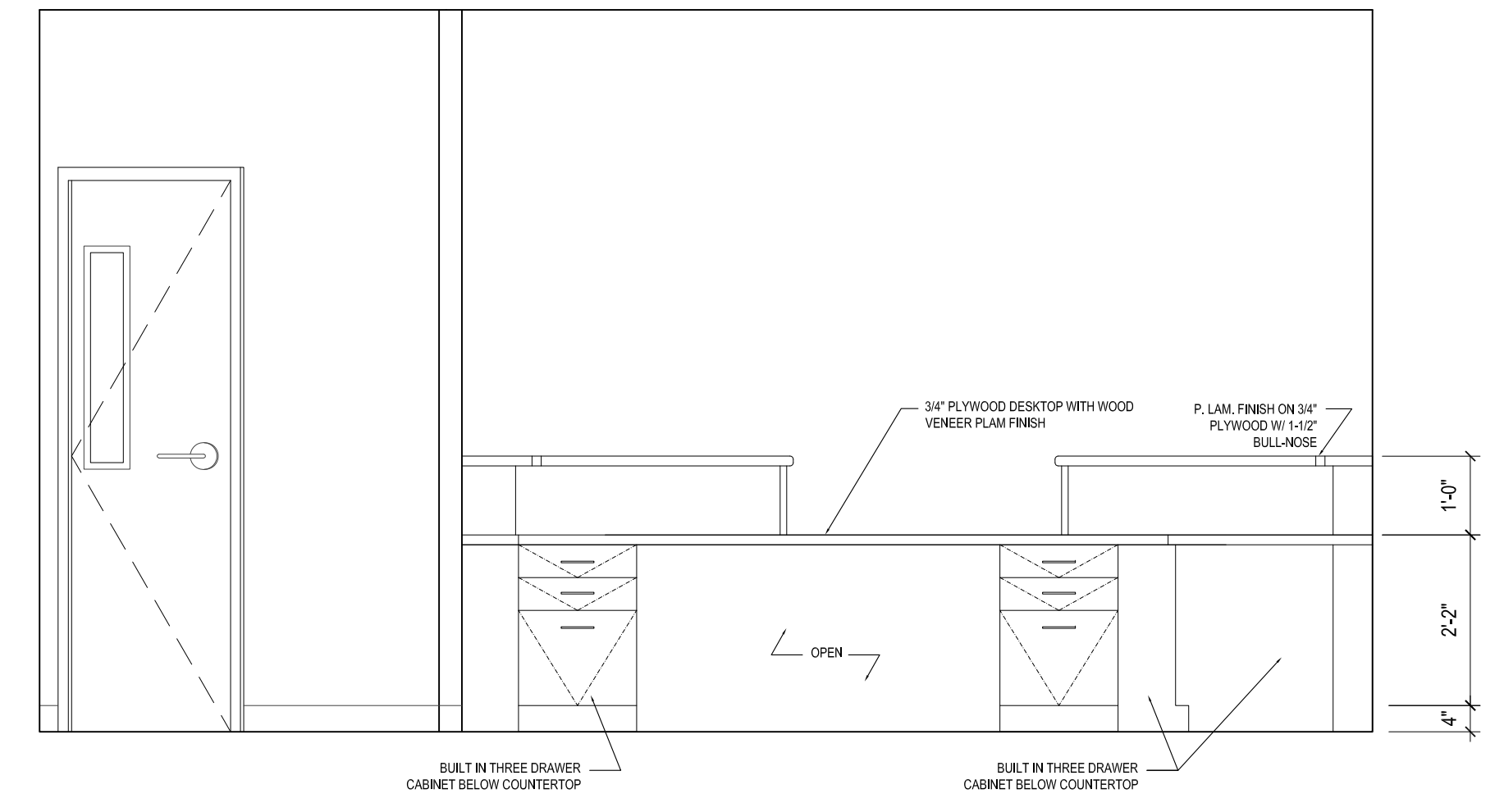
07 SOFFIT DETAIL
SCALE: 1/2" = 1'-0"



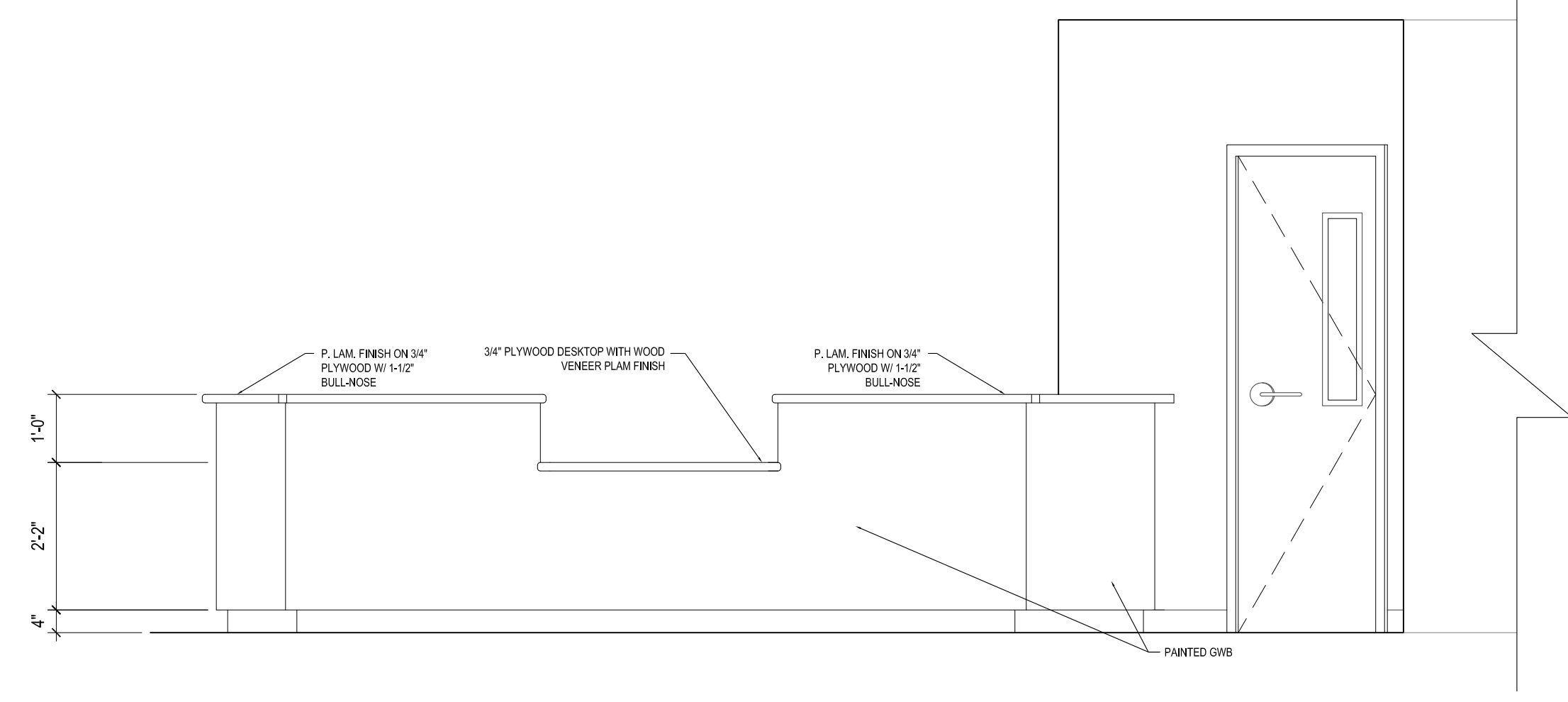
06 FRONT DESK SECTION
SCALE: 3/4" = 1'-0"



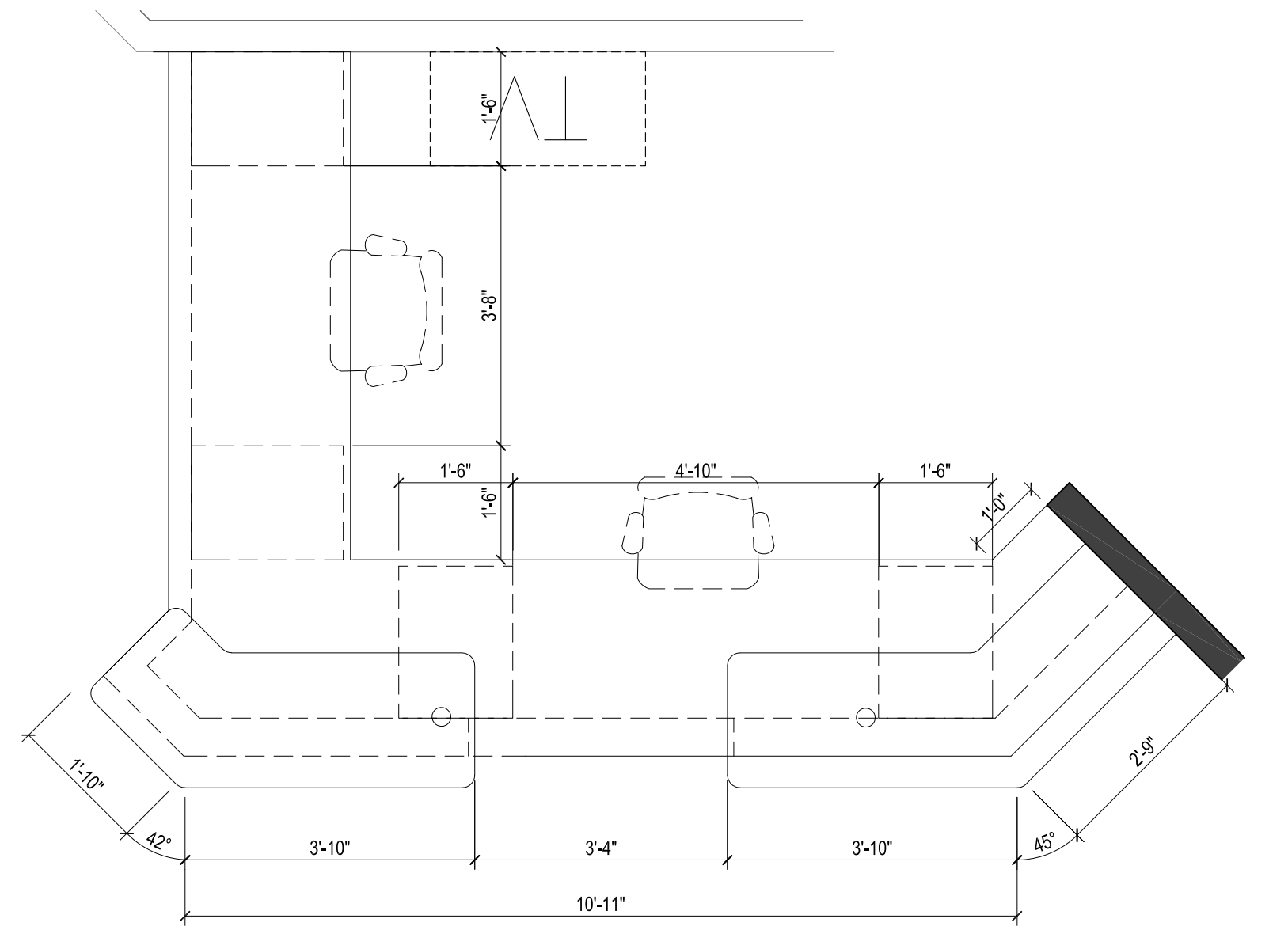
05 FRONT DESK SECTION
SCALE: 3/4" = 1'-0"



03 FRONT DESK ELEVATION
SCALE: 1/2" = 1'-0"



02 FRONT DESK ELEVATION
SCALE: 1/2" = 1'-0"



01 ENLARGED FRONT DESK PLAN
SCALE: 1/2" = 1'-0"

Comm. No: 16025.18
Date: 07/23/2020
Drawn: ER

Revisions		
No.	Date	Note

TO THE BEST OF MY KNOWLEDGE, THE PLANS AND SPECIFICATIONS COMPLY WITH THE MINIMUM BUILDING CODES.

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License #10250
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DETAILS

6

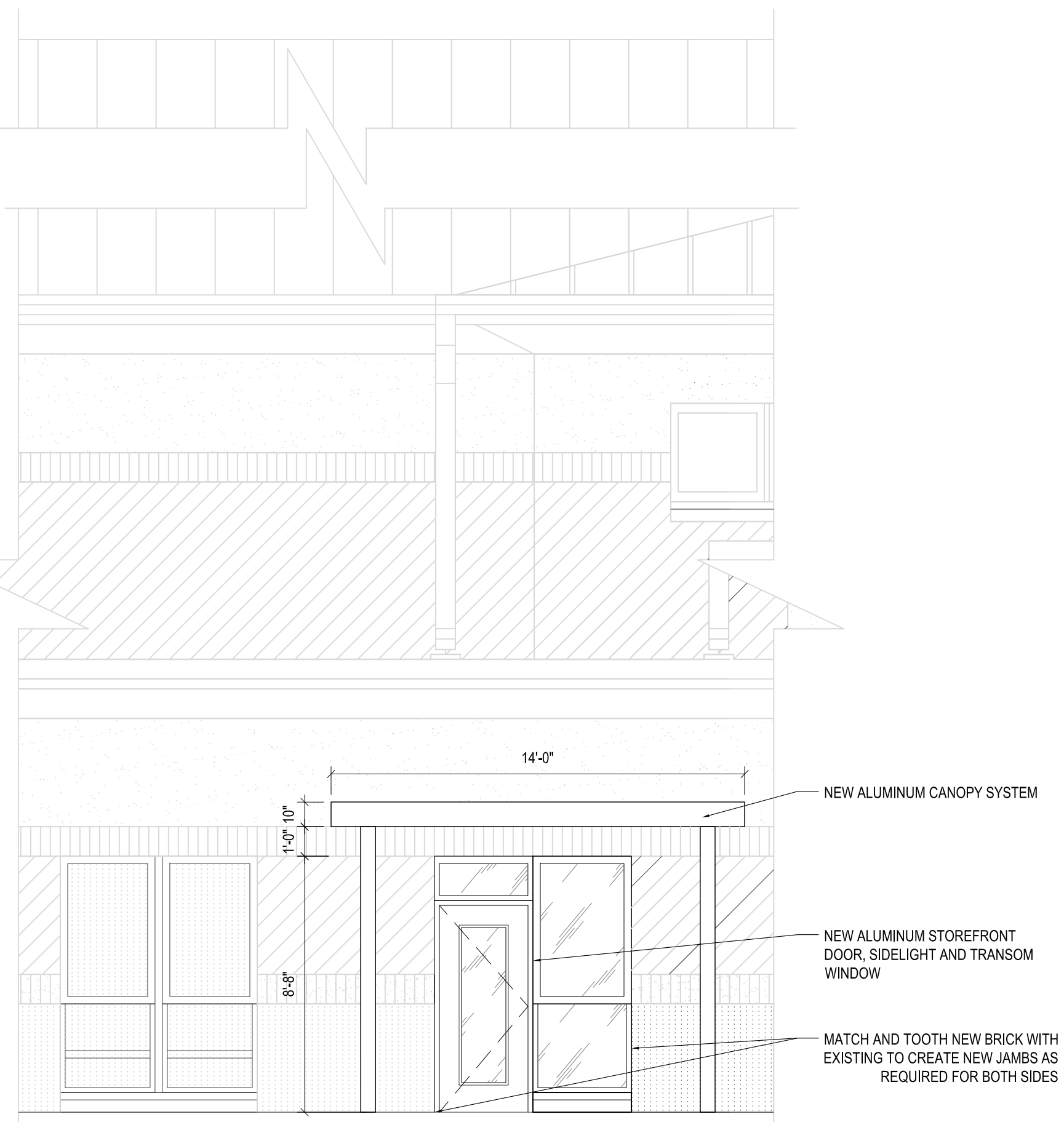
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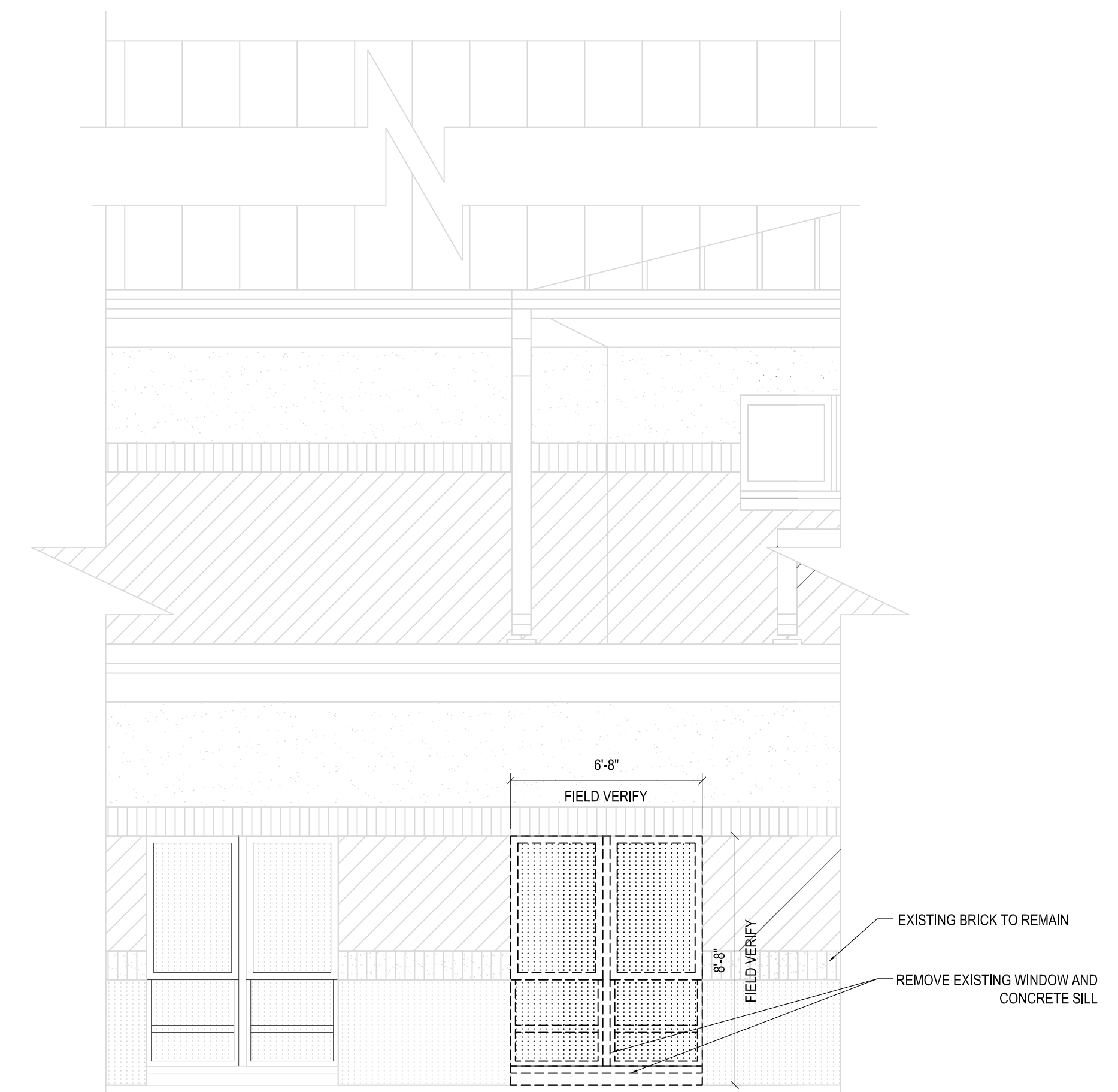
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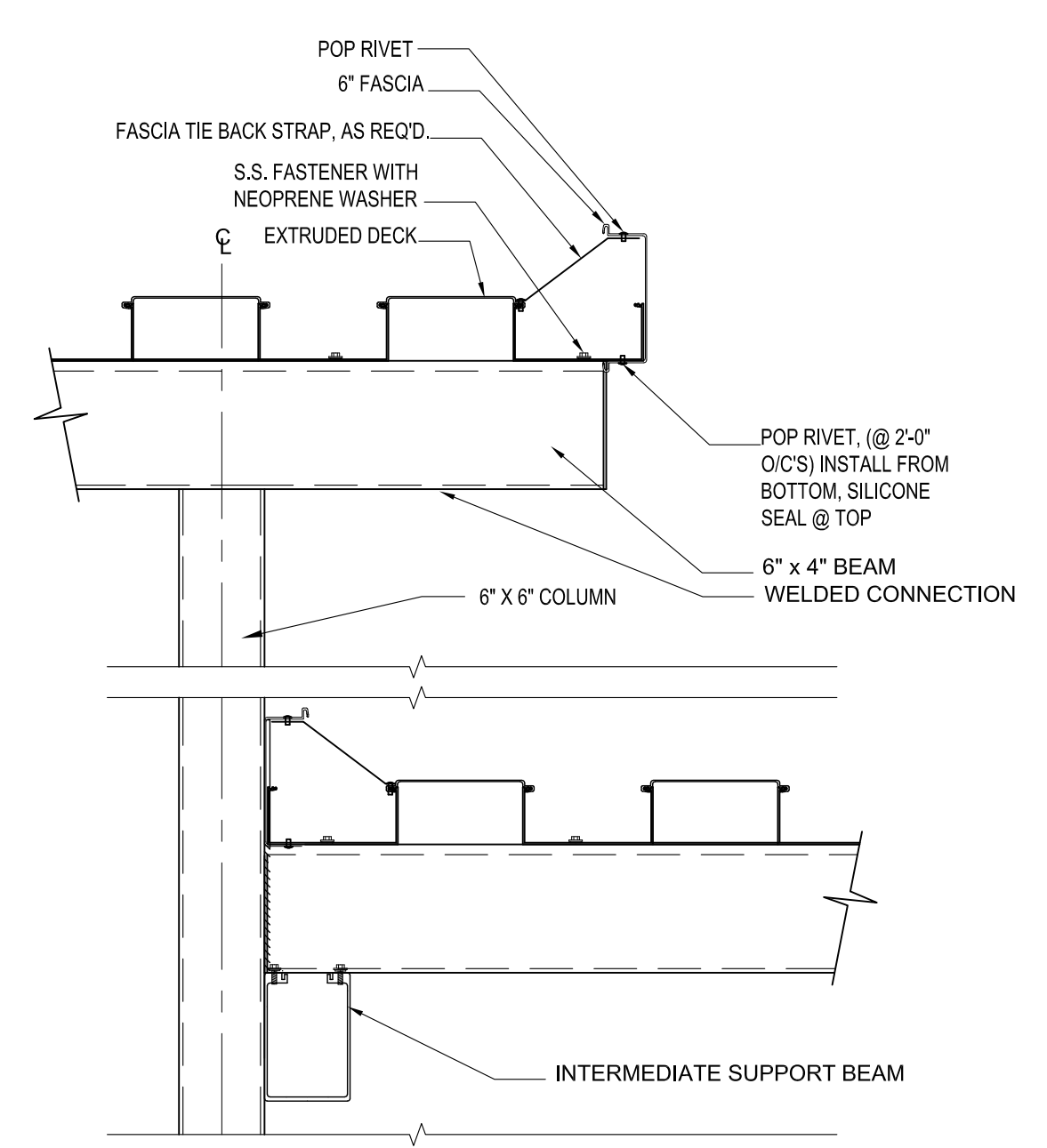
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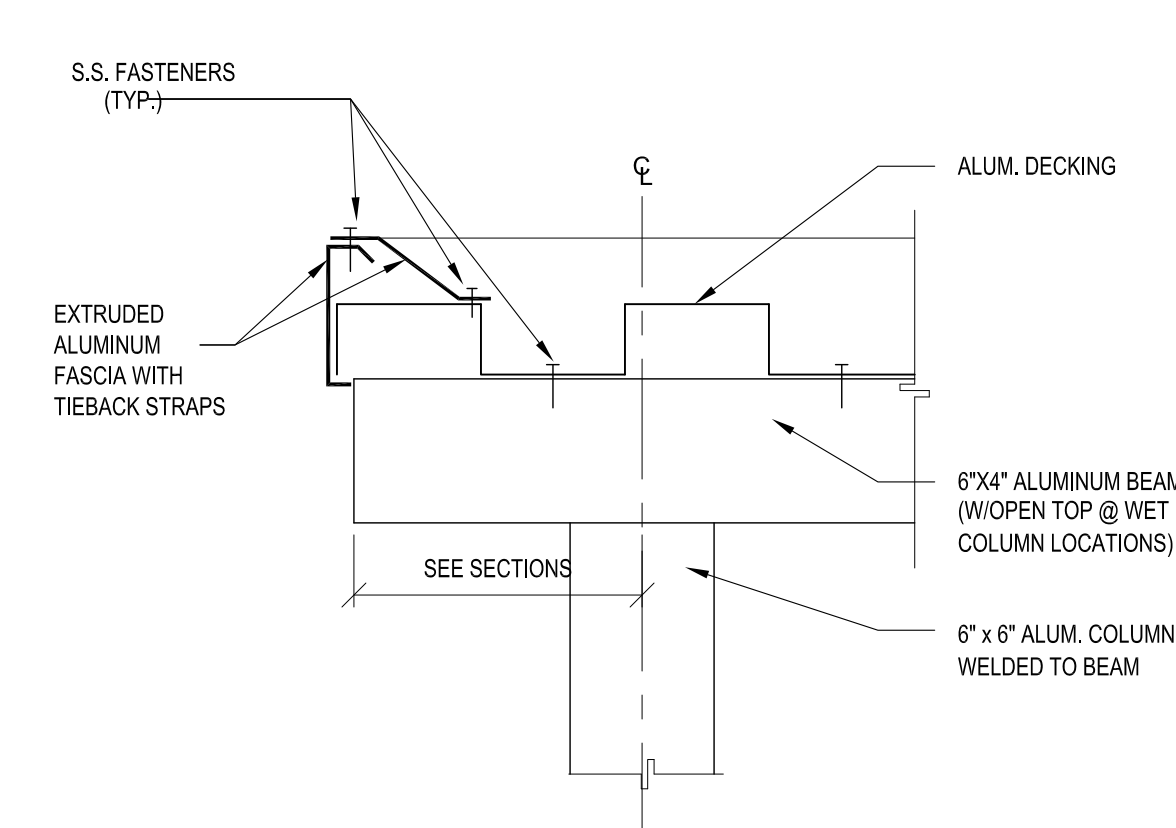
09 EXTERIOR ELEVATION - PROPOSAL
SCALE: 1/4" = 1'-0"



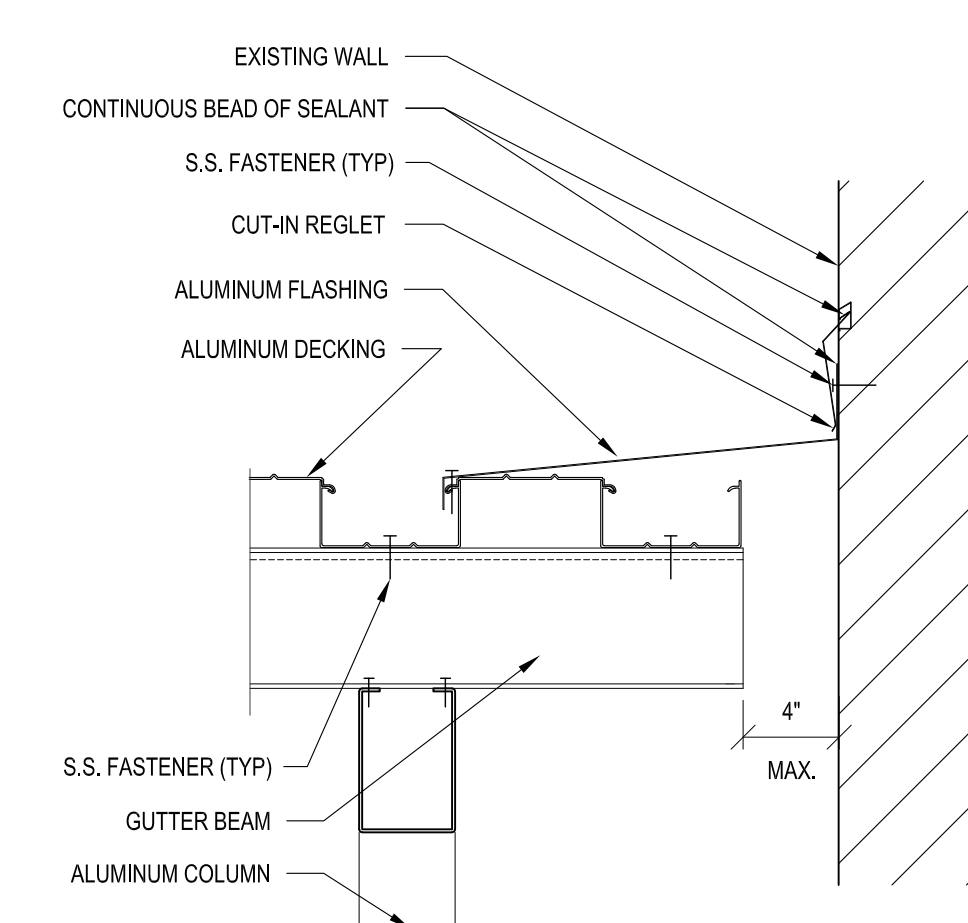
06 EXTERIOR ELEVATION - DEMO
SCALE: 1/4" = 1'-0"



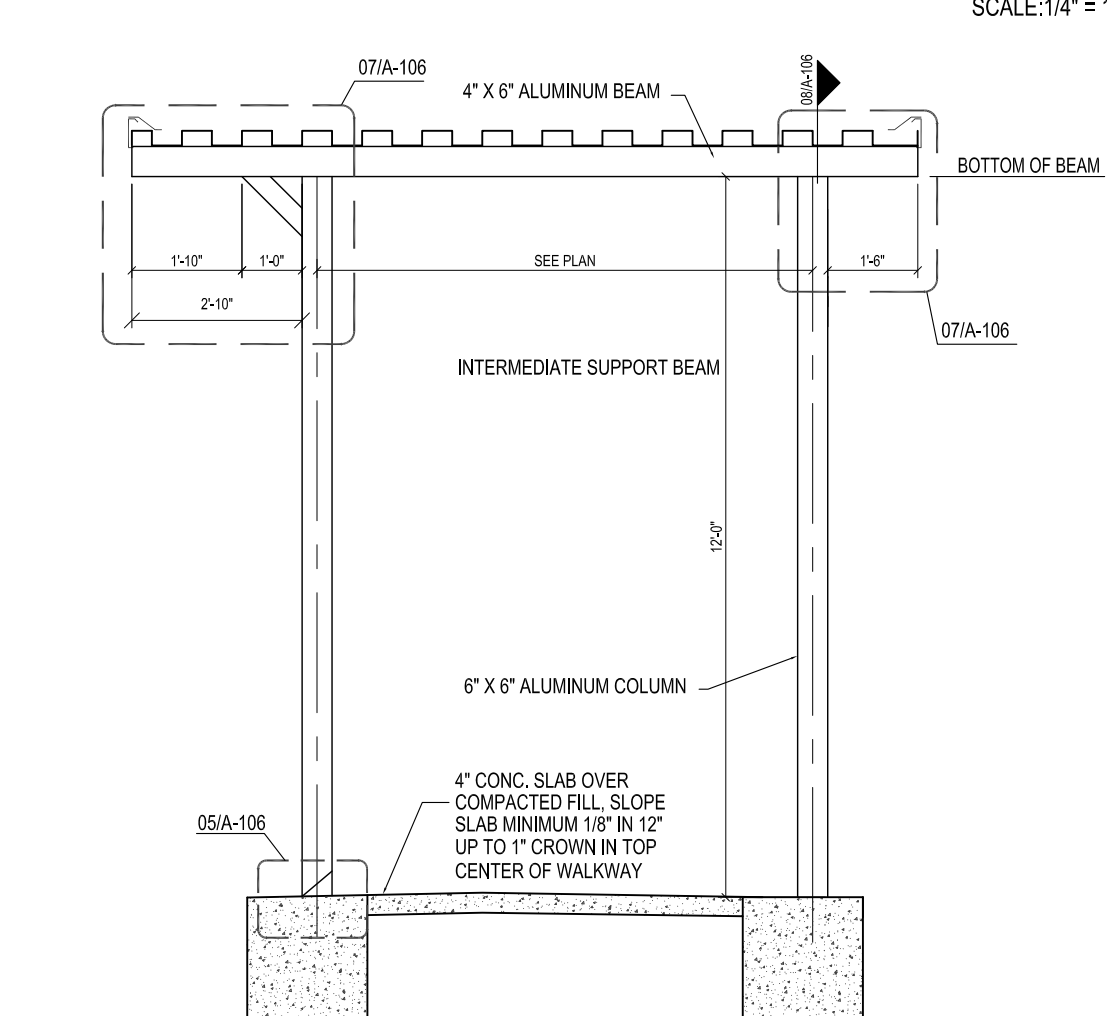
10 SPLIT-LEVEL DETAIL
SCALE: 1-1/2" = 1'-0"



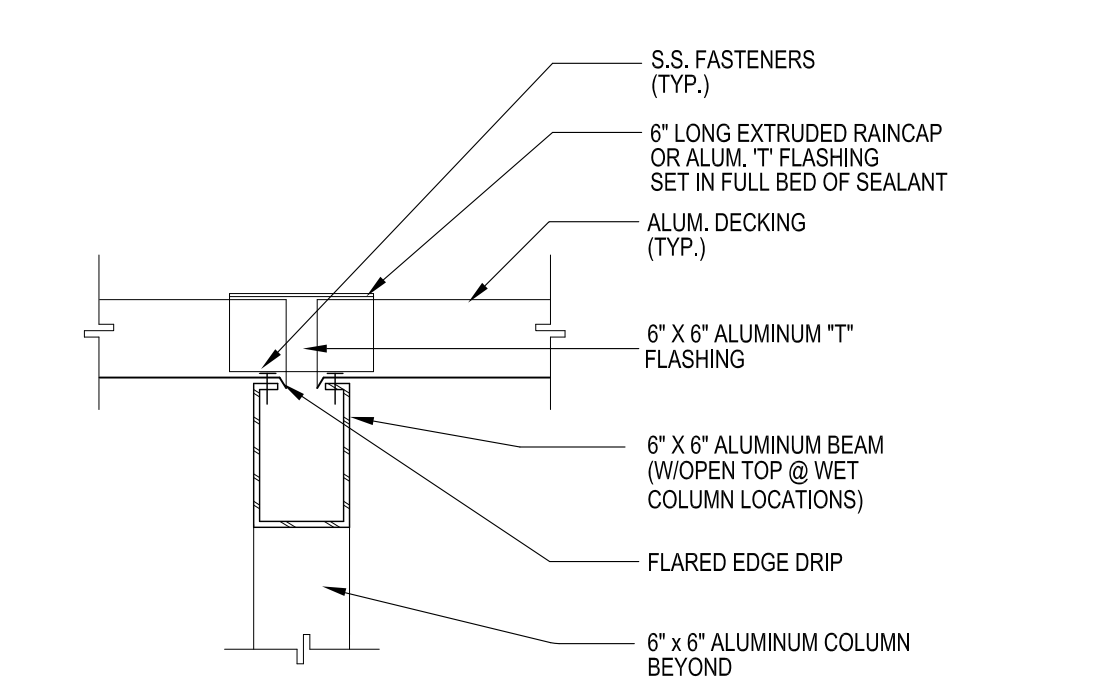
07 CANOPY OVERHANG DETAIL
SCALE: 1-1/2" = 1'-0"



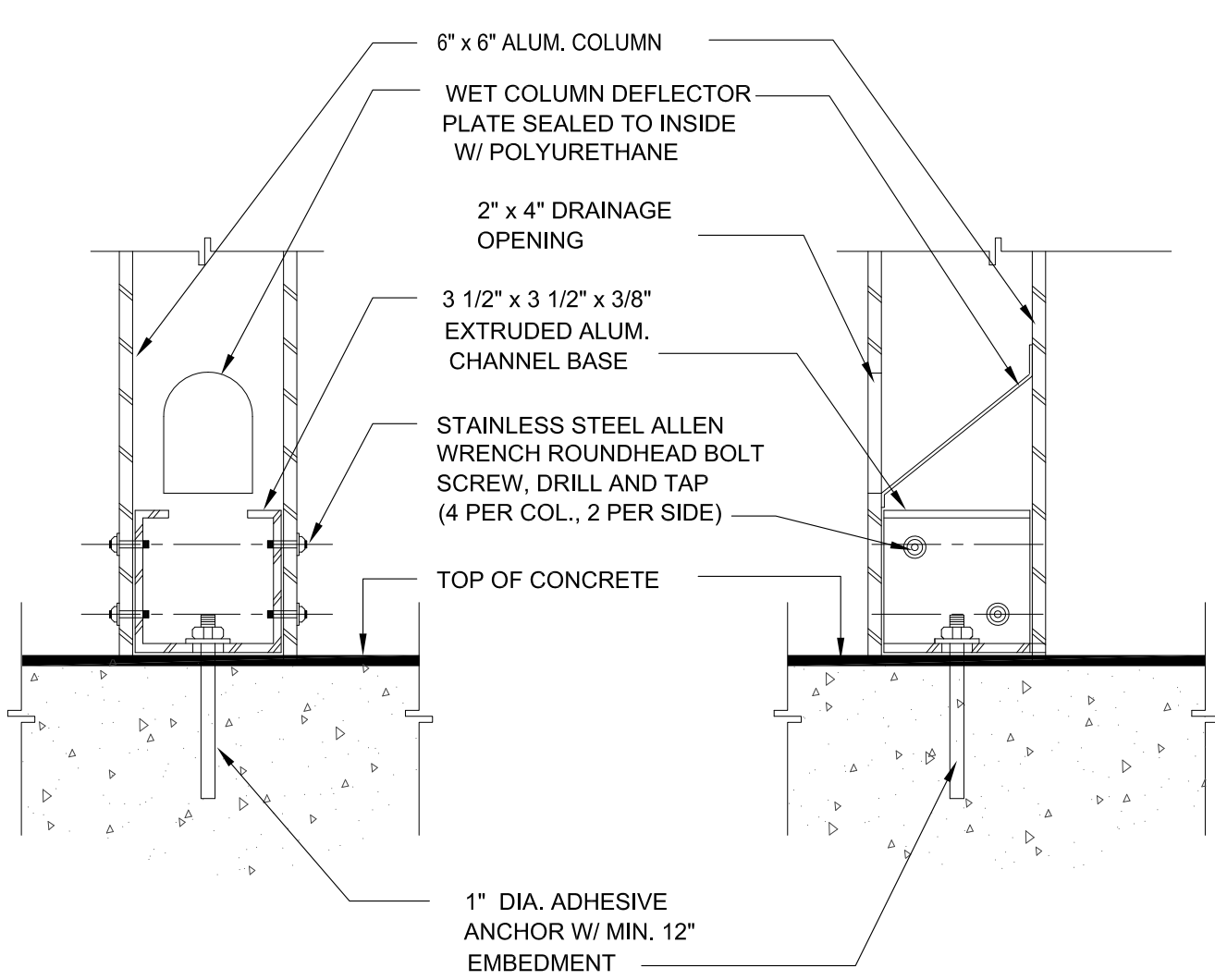
04 CANOPY FLASHING DETAIL
SCALE: 1-1/2" = 1'-0"



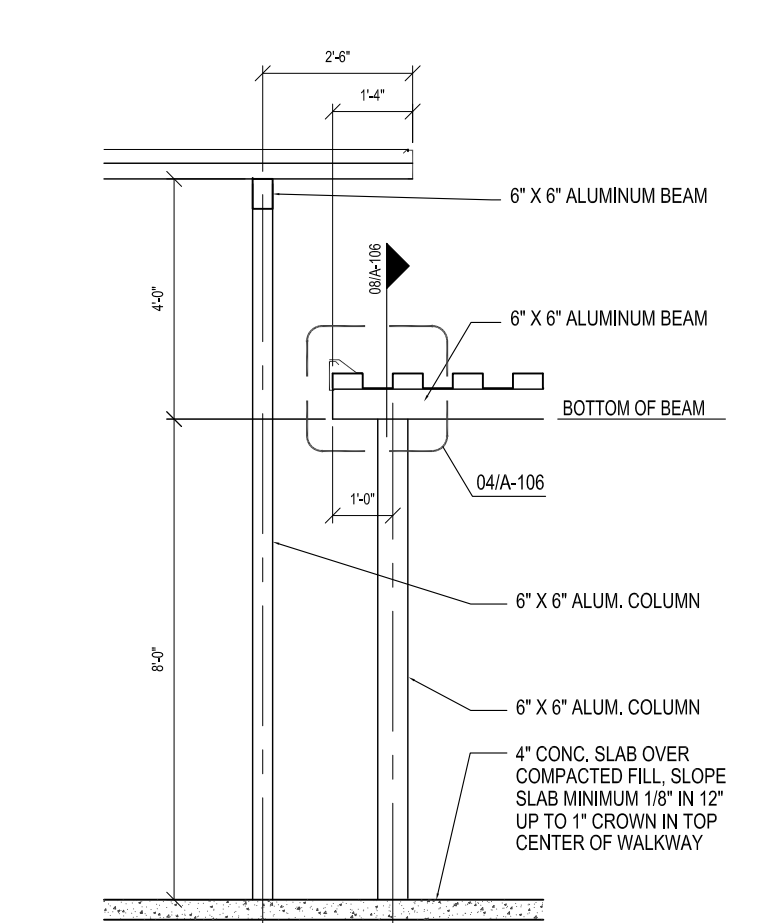
02 COVERED WALKWAY SECTION
SCALE: 1/2" = 1'-0"



08 GUTTER BEAM CANOPY DETAIL
SCALE: 1-1/2" = 1'-0"



05 WET COLUMN DEFLECTOR DETAIL
SCALE: 1-1/2" = 1'-0"



03 COVERED WALKWAY SECTION
SCALE: 1/2" = 1'-0"

Revisions		
No.	Date	Note

TO THE BEST OF MY KNOWLEDGE, THE PLANS AND SPECIFICATIONS COMPLY WITH THE MINIMUM BUILDING CODES.

Daniel T Canavan, AIA
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DETAILS

GENERAL STRUCTURAL NOTES

GENERAL NOTES:

- CONTRACTOR IS RESPONSIBLE FOR AND SHALL VERIFY AND COORDINATE ALL DIMENSIONS AND DETAILS BEFORE PROCEEDING WITH WORK. ANY DISCREPANCIES SHALL BE BROUGHT TO THE IMMEDIATE ATTENTION OF THE ARCHITECT AND ENGINEERS.
- DETAILS SHOWN IN ANY SECTION APPLY TO ALL SIMILAR SECTIONS AND CONDITIONS UNLESS NOTED OTHERWISE.
- CONTRACTOR SHALL FULLY BRACE AND OTHERWISE PROTECT ALL WORK IN PROGRESS UNTIL THE BUILDING IS COMPLETED.
- ALL STRUCTURAL ITEMS FOR THIS PROJECT HAVE BEEN DESIGNED IN ACCORDANCE WITH APPROPRIATE PROVISIONS OF EACH OF THE FOLLOWING:
 - THE FLORIDA BUILDING CODE 2017, (SIXTH EDITION).
 - ACI STANDARD 318-14 BUILDING CODE REQUIREMENTS FOR REINFORCED CONCRETE.
 - BUILDING CODE REQUIREMENTS FOR MASONRY STRUCTURES (ACI 530-13/ASCE 5-13/TMS 402-16).
 - AISC "SPECIFICATION FOR THE DESIGN, FABRICATION AND ERECTION OF STRUCTURAL STEEL FOR BUILDINGS" 360-10.
 - ASCE 7-10 (WITH ERRATA DATED JANUARY 11, 2011) "MINIMUM DESIGN LOADS FOR BUILDINGS AND OTHER STRUCTURES".
- THE STRUCTURAL DRAWINGS SHALL BE USED IN CONJUNCTION WITH THE SPECIFICATIONS AND THE ARCHITECTURAL AND MECHANICAL DRAWINGS. IF THERE IS A DISCREPANCY BETWEEN DRAWINGS, IT IS THE CONTRACTOR'S RESPONSIBILITY TO NOTIFY THE ARCHITECT PRIOR TO PERFORMING WORK. IN CASE OF CONFLICT THE MOST STRINGENT CONDITION SHALL APPLY.
- ALL DIMENSIONS MUST BE COORDINATED WITH ARCHITECTURAL DRAWINGS AND WITH EQUIPMENT MANUFACTURER (I.E. WINDOW, DOOR, AIR HANDLER, ETC.). CONTRACTOR MUST OBTAIN AN ARCHITECTURAL DIRECTIVE IN CASE OF ANY CONFLICT. REFER TO ARCHITECTURAL DRAWINGS FOR DIMENSIONS NOT SHOWN IN STRUCTURAL DRAWINGS.

CONCRETE AND REINFORCING:

- ALL CONCRETE WORK SHALL CONFORM TO THE LATEST ACI "BUILDING CODE REQUIREMENTS FOR REINFORCED CONCRETE, ACI-318".
- ALL CONCRETE SHALL HAVE A MINIMUM 28-DAY COMPRESSIVE STRENGTH AS INDICATED BELOW.

CONCRETE STRENGTH	MAX WATER CEMENT RATIO	TYPE AGGREGATE	LOCATION USED
3000 PSI	0.52	STONE	ALL CONCRETE, U.N.O.

- ALL REINFORCING STEEL SHALL BE INTERMEDIATE GRADE, NEW BILLET STEEL, DEFORMED BARS, CONFORMING TO ASTM A-615, GRADE 60. ALL BARS SHALL BE SECURELY SUPPORTED AND WIRED IN PLACE. PRIOR TO POURING CONCRETE, ALL REINFORCING STEEL TO BE WELDED SHALL CONFORM TO ASTM A-706.
- ALL WELDED WIRE FABRIC (W.W.F.) IN FLAT SHEETS ONLY AND SHALL CONFORM TO ASTM A-185.
- CONCRETE COVER FOR REINFORCING BARS SHOWN IN TYPICAL DETAILS. UNLESS NOTED MINIMUM TEMPERATURE REINFORCING (ASTM A-615/A-60) TO BE 0.0018 X CONCRETE AREA.
- CONTRACTOR SHALL COORDINATE PLACEMENT OF, OR BOX OUT FOR, ALL PIPE SLEEVES, OPENINGS, ETC. REQUIRED FOR VARIOUS TRADES. CONTRACTOR SHALL COORDINATE AND NOTIFY OTHER TRADES IN SUFFICIENT TIME TO ALLOW THEM TO SET ANCHORS, INSERTS, BOLTS, HANGERS, ETC., AS REQUIRED FOR THEIR USE.
- UNDER NO CIRCUMSTANCES SHALL CONCRETE BE PUMPED THROUGH ALUMINUM PIPES. CONCRETE SHALL NOT BE PLACED IN CONTACT WITH ALUMINUM MIXING DRUMS, TRUCK MIXERS, BUCKETS, CHUTES, CONVEYORS, TREMIE PIPES, AND OTHER EQUIPMENT MADE OF ALUMINUM SHALL NOT BE USED ON THIS PROJECT.
- SLUMPS OF OVER 4 INCHES WILL NOT BE PERMITTED UNLESS THE HRWR ADMIXTURE (SUPER PLASTICIZER) IS USED. MAXIMUM SLUMP IS THEN 8 INCHES UNLESS OTHERWISE DIRECTED BY THE ENGINEER.
- NO ADMIXTURE SHALL BE USED IN CONCRETE EXCEPT WITH THE PERMISSION OF THE ENGINEERS AND AFTER LABORATORY DESIGN MIX APPROVAL. ALL ADMIXTURES SHALL CONTAIN NO MORE CHLORIDE IONS THAN ARE PRESENT IN MUNICIPAL DRINKING WATER.
- WATER REDUCING ADMIXTURE SHALL CONFORM TO THE ASTM C-494, TYPE A, AND SHALL BE USED IN ALL CONCRETE.
- AIR ENTRAINING ADMIXTURE SHALL CONFORM TO ASTM C260. AIR CONTENT OF CONCRETE SHALL BE USED AS FOLLOWS:
 - FOR CONCRETE EXPOSED TO SOIL AND/OR WEATHER, 5%.
 - FOR INTERIOR WALLS, COLUMNS, AND SLABS, 3%.
- FLY ASH - ASTM C618-12A, TYPE C OR TYPE F SHOULD BE USED BUT NOT TO EXCEED 20% CEMENTITIOUS CONTENT.
- ALL EXPOSED CONCRETE SLABS SHALL RECEIVE A CURING COMPOUND. THE CURING COMPOUND SHALL CONFORM TO ASTM C309 AND SHALL HAVE 30% SOLIDS MINIMUM. WATER/BLANKET CURING AS PER ACI RECOMMENDATION MAY BE USED AS ALTERNATE.

MASONRY:

- DESIGN AND CONSTRUCTION SHALL CONFORM TO BUILDING CODE REQUIREMENTS FOR MASONRY STRUCTURES (ACI 530-10 ASCE 7-10) / TMS 402-11 AND SPECIFICATIONS FOR MASONRY STRUCTURES ACI 530.1-11 / ASCE 7-10 (WITH ERRATA DATED JANUARY 10, 2011).
- MINIMUM NET COMPRESSIVE STRENGTH OF BLOCK ASSEMBLY SHALL BE 1500 P.S.I. (FM) MORTAR FOR MASONRY SHALL BE TYPE "S" OR "M" FOR ALL EXTERIOR AND INTERIOR BEARING. BED JOINTS ARE TO COVER 100% OF THE MASONRY SURFACES AND ALL HEAD JOINTS ARE TO COVER 100% OF THE PROJECTED AREA OF THE FACE SHELLS.
- FILL ALL CELLS AS REQUIRED WITH 3000 P.S.I. GROUT. SLUMP SHALL BE 8 TO 11 INCHES. SUBMIT DESIGN MIX FOR APPROVAL.
- MINIMUM HORIZONTAL JOINT REINFORCING SHALL BE 9 GAGE HOT DIP GALVANIZED TRUSS OR LADDER TYPE JOINT REINFORCING AT 16" O.C., PROVIDE MANUFACTURE "T" AND "L" SHAPES FOR INTERSECTIONS AND CORNERS. (MINIMUM LAP 8").
- MINIMUM VERTICAL REINFORCING SHALL BE 1-#5 @ 48" OR 1-#4 @ 32" O.C. (U.N.O.).
- PROVIDE ADDITIONAL VERTICAL REINFORCING BAR AT EVERY CORNER, INTERSECTION, CONTROL JOINT, AND OPENING EDGES (U.N.O.).
- MINIMUM SPLICE FOR VERTICAL REINFORCING IS SHOWN IN DETAIL 4-023. SPLICE FOR HORIZONTAL JOINT REINFORCING = 12".
- WALLS ARE DESIGNED TO BE BRACED BY FLOOR OR ROOF MEMBERS. CONTRACTOR SHALL PROVIDE TEMPORARY BRACING DURING CONSTRUCTION.
- ALL CELLS BELOW FIRST FLOOR FINISHED ELEVATION MUST BE FULLY GROUT FILLED.
- ALL KNOCK OUT BLOCK HORIZONTAL BARS SHALL HAVE CORNER BARS AT ALL CORNERS AND WALL INTERSECTIONS. SIZE AND NUMBER OF CORNER BARS SHALL BE SAME AS HORIZONTAL BARS.
- ALL INTERSECTING WALLS AND CORNER WALLS SHALL BE LAID IN AN OVERLAPPING MASONRY BONDING PATTERN, WITH ALTERNATE UNITS HAVING A BEARING OF NOT LESS THAN 3 INCHES ON UNIT BELOW.

POST-INSTALLED ANCHORS

- POST-INSTALLED ANCHORS SHALL ONLY BE USED WHERE SPECIFIED ON THE CONSTRUCTION DOCUMENTS. SPECIAL INSPECTIONS ARE REQUIRED PER THE PROVISIONS SET FORTH BELOW. CONTRACTOR TO CONTACT MANUFACTURER'S REPRESENTATIVE FOR PROPER PRODUCT INSTALLATION TRAINING ON INITIAL ANCHORS.
- SUBSTITUTION REQUESTS, FOR PRODUCTS OTHER THAN THOSE SPECIFIED BELOW, SHALL BE SUBMITTED BY THE CONTRACTOR TO THE ENGINEER-OF-RECORD ALONG WITH CALCULATIONS THAT ARE PREPARED & SEALED BY A REGISTERED PROFESSIONAL ENGINEER. THE CALCULATIONS SHALL DEMONSTRATE THAT THE SUBSTITUTED PRODUCT IS CAPABLE OF ACHIEVING THE PERTINENT EQUIVALENT PERFORMANCE VALUES (MINIMUM) OF THE SPECIFIED PRODUCT USING THE APPROPRIATE DESIGN PROCEDURE AND/OR STANDARD(S) AS REQUIRED BY THE BUILDING CODE.
- EXPANSION ANCHORS SHALL BE STUD TYPE WITH A SINGLE PIECE OF THREE SECTION WEDGE AND ZINC PLATED IN ACCORDANCE WITH ASTM B633. THE ANCHORS SHALL MEET FEDERAL SPECIFICATION F-325, GROUP II, TYPE A, CLASS I FOR CONCRETE EXPANSION ANCHORS. ANCHORS SHALL BE HILTI KWIK BOLT II AS SUPPLIED BY HILTI INC. TULSA OKLAHOMA. ANCHORS SHALL BE INSTALLED IN HOLES DRILLED WITH HILTI CARBIDE TIPPED DRILL BITS OR MATCHED TOLERANCE DIAMOND CORE BITS. ANCHORS SHALL BE INSTALLED IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS.
- INJECTED ADHESIVE ANCHORS SHALL BE USED FOR INSTALLATION OF THREADED RODS. ADHESIVE SHALL BE FURNISHED IN A SIDE BY SIDE REFILL PACK WHICH KEEP COMPONENT A AND B SEPARATE. INJECTION ADHESIVE SHALL BE HILTI HIT HY 150 AS SUPPLIED BY HILTI INC. TULSA OKLAHOMA. ANCHOR RODS MEET ASTM F1554 (36 KSI). NUTS AND WASHERS SHALL BE FURNISHED TO MEET THE REQUIREMENTS OF AN ASTM F1554 (36 KSI) STEEL ROD.

CONCRETE	MAX WATER	TYPE	LOCATION USED
STRENGTH	CEMENT RATIO	AGGREGATE	
3000 PSI	0.52	STONE	ALL CONCRETE, U.N.O.

THE MINIMUM CLEAR COVER FOR REINFORCEMENT BARS SHALL BE ONE BAR DIAMETER OR THE VALUES TABULATED BELOW, WHICHEVER IS THE GREATER.	
SLABS (L.T.WT. CONC. OR STONE CONC.)	1"
GIRDERS AND BEAMS (TO STIRRUPS)	1 1/2"
JOISTS (STONE OR L.T.WT.) BOTTOM BARS	1 1/4"
TIED COLUMNS AND PIERS	
SURFACE EXPOSED TO EARTH AND WEATHER (TO TIES)	2"
OTHER SURFACES (TO TIES)	1 1/2"
FOUNDATION ELEMENTS	
FORMED SURFACES	2"
SURFACES PLACED AGAINST EARTH	3"
WALLS	
SURFACES EXPOSED TO EARTH	2"
SURFACES EXPOSED TO WEATHER	1 1/2"
OTHER SURFACES	1"

TYPICAL CONCRETE COVER FOR REINFORCING BARS

SCALE: N.T.S.

3-064

LAP SPLICE SCHEDULE FOR SINGLE REINFORCED 8" CMU

BAR SIZE	LAP SPLICE	REMARKS
#3	18	
#4	24	
#5	30	
#6	36	
#7	42	
#8	48	
#9	54	

NOTES:

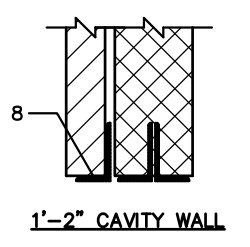
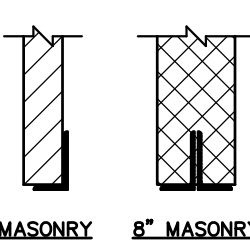
- LENGTH OF SPLICES ARE BASED ON FLORIDA BUILDING CODE (SIXTH EDITION) 2017.
- LAP SPLICES INDICATED ARE IN INCHES.
- THIS SCHEDULE IS FOR 8" CONCRETE MASONRY UNITS (CMU) ONLY.
- SEE DETAIL FOR LAP SPLICE SCHEDULE FOR DOUBLE REINFORCED 8" CMU.

LAP SPLICE SCHEDULE SINGLE REINFORCED 8" CMU

4-023

LOOSE LINTEL SCHEDULE

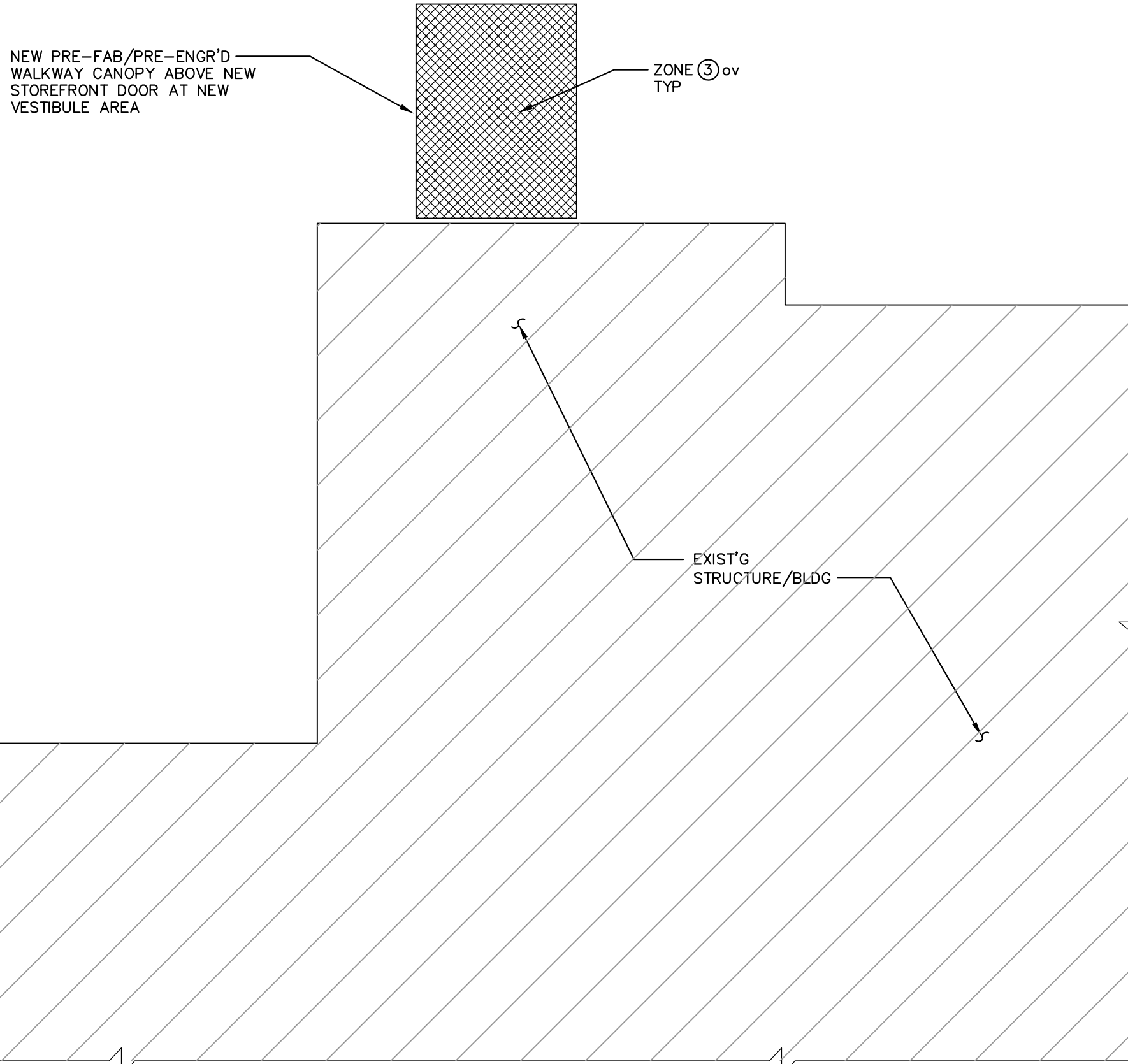
OPENING SIZE	LINTEL
UP TO 4'-0"	L3 1/2" X 3 1/2" X 1/4"
OVER 4'-0" - 5'-0"	L4" X 3 1/2" X 1/4"
OVER 5'-0" - 6'-0"	L4" X 3 1/2" X 5/16"
OVER 6'-0" - 7'-0"	L5" X 3 1/2" X 5/16"
OVER 7'-0" - 8'-0"	L6" X 3 1/2" X 5/16"
OVER 8'-0"	NOTE 6



NOTES (UNLESS NOTED):

- PROVIDE ONE ANGLE FOR EACH 4" OF MASONRY WIDTH.
- FOR 6" MASONRY WIDTH USE L5" X 5/16" UP TO 5'-0" OPENING SIZE AND L5" X 5/8" UP TO 8'-0" OPENING SIZE.
- BEAR LINTELS 6" MINIMUM EACH END OF OPENING.
- ALL DOUBLE ANGLE LINTELS BACK TO BACK SHALL BE BOLTED AT 2'-6" O.C. MAXIMUM. MINIMUM OF TWO BOLTS PER LINTEL.
- STRUCTURAL STEEL CONTRACTOR SHALL SUBMIT A COMPLETE SCHEDULE OF LOOSE LINTELS WITH THE ERECTION PLANS SHOWING MARK, MASONRY OPENING, ANGLE SIZE, LENGTH AND DIMENSIONED SECTION. WHERE LINTEL MARKS ARE USED ON PLAN, USE THE SAME MARK WITH SUBMARK A,B,C,D, ETC. FOR DIFFERENT LENGTH.
- W SECTION WITH 1/4" CONTINUOUS PLATE (W DEPTH = 1/2 OF SPAN; CONTINUOUS PLATE WIDTH = MASONRY LESS 1") BEARING EACH END TO BE 8" MINIMUM.
- WHERE EDGE OF OPENING IS LESS THAN 1'-0" FROM COLUMN FACE, EXTEND LINTEL AND CONNECT TO COLUMN.
- AT CAVITY WALLS EXTERIOR ANGLE TO HAVE 5" HORIZONTAL LEG.
- FOR ALL OPENINGS IN WALLS, SEE ARCHITECTURAL AND MECHANICAL DRAWINGS.

4-030



ROOF WIND PRESSURE (GROSS UPLIFT) DIAGRAM FOR NEW PRE-FAB/PRE-ENGR'D WALKWAY ROOF CANOPY ABOVE STOREFRONT DOOR AT NEW VESTIBULE AREA
NO SCALE



COMPONENTS AND CLADDING ROOF DESIGN WIND (GROSS UPLIFT) PRESSURES (ULTIMATE) PRE-FAB/PRE-ENGR'D WALKWAY ROOF CANOPY

PATTERN	ZONE	ROOF (7' $\theta \le 27^\circ$)					
		EFFECTIVE WIND AREA					
		10 SQ. FT.	20 SQ. FT.	50 SQ. FT.	100 SQ. FT.	200 SQ. FT.	500 SQ. FT.
	1	-71 PSF	-71 PSF	-68 PSF	-65 PSF	-65 PSF	-65 PSF
	2	-124 PSF	-114 PSF	-101 PSF	-91 PSF	-91 PSF	-91 PSF
	3	-184 PSF	-174 PSF	-157 PSF	-144 PSF	-144 PSF	-144 PSF
	2' ov	-157 PSF	-157 PSF	-157 PSF	-157 PSF	-157 PSF	-157 PSF
	3' ov	-257 PSF	-237 PSF	-204 PSF	-177 PSF	-177 PSF	-177 PSF

NOTES:

- ov DENOTES OVERHANG.
- PLUS AND MINUS SIGNS SIGNIFY PRESSURES ACTING TOWARD AND AWAY FROM THE SURFACES, RESPECTIVELY. NEGATIVE PRESSURE DENOTES NET UPLIFT.
- ALL WIND PRESSURE VALUES INDICATED ARE IN POUNDS PER SQUARE FOOT (PSF)
- NET UPLIFT = GROSS UPLIFT - 0.60 X DEAD LOAD
- ROOFING MATERIALS SHALL BE CONNECTED TO THE ROOF STRUCTURE TO RESIST NET UPLIFT. THE NET UPLIFT SHALL BE THE GROSS UPLIFT SHOWN ABOVE MINUS THE DEAD LOADS OF THE MEMBERS UPWARD FROM THE CONNECTION (DEAD LOAD OF MEMBERS UNDER THE CONNECTION CANNOT BE USED FOR NET UPLIFT CALCULATION).

COMPONENTS AND CLADDING DESIGN WIND PRESSURE FOR WALLS, DOORS & WINDOWS (ULTIMATE)

PATTERN	ZONE	EFFECTIVE WIND AREA					
		10 SQ. FT.	20 SQ. FT.	50 SQ. FT.	100 SQ. FT.	200 SQ. FT.	500 SQ. FT.
	4	+78 PSF/-85 PSF	+75 PSF/-81 PSF	+72 PSF/-78 PSF	+65 PSF/-71 PSF	+62 PSF/-71 PSF	+58 PSF/-65 PSF
	5	+78 PSF/-105 PSF	+75 PSF/-98 PSF	+72 PSF/-91 PSF	+65 PSF/-85 PSF	+62 PSF/-75 PSF	+58 PSF/-65 PSF

NOTE:

ALL EXTERIOR DOORS & WINDOW ASSEMBLIES SHALL SATISFY THE REQUIREMENTS OF THE FLORIDA BUILDING CODE 2017 (6TH EDITION), SECTION 1709.5. ALL CONNECTIONS TO BUILDING STRUCTURE SHALL HAVE THE CAPACITY TO WITHSTAND THE PRESSURES INDICATED IN THIS SCHEDULE.

WIND DESIGN DATA:

CODE: FLORIDA BUILDING CODE 2017 (SIXTH EDITION)
ASCE 7-10 (WITH ERRATA DATED JANUARY 11, 2011)
STATE REQUIREMENTS FOR EDUCATIONAL FACILITIES (SREF)

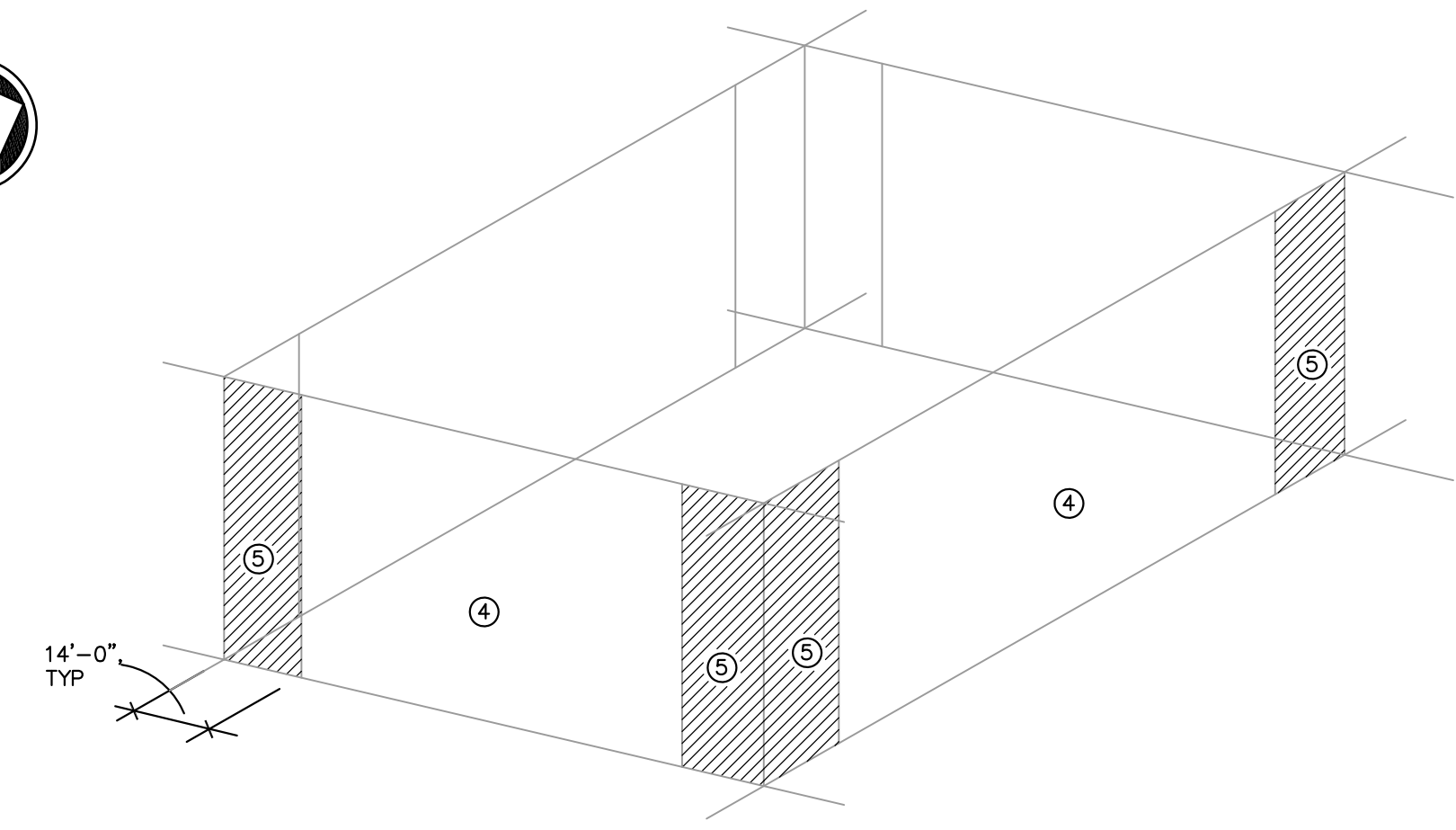
EXPOSURE CATEGORY: C
RISK CATEGORY: III
BASIC WIND SPEED: 174 MPH (UII)
135 MPH (Asd)

ENCLOSURE CLASSIFICATION: ENCLOSED
INTERNAL PRESSURE COEFFICIENT: +/-0.18

*GLAZE OPENINGS IN RISK CATEGORY II, III & IV LOCATED IN HURRICANE PRONE REGIONS SHALL BE PROTECTED IN ACCORDANCE WITH FLORIDA BUILDING CODE 2017 SEC. 1609.1.2.

LOAD SCHEDULE: (NEW WALKWAY ROOF CANOPY)

ROOF DEAD LOAD:	
PRE-FAB/PRE-ENGR'D ROOF CANOPY & MISC.	= 10 PSF
ROOF LIVE LOAD:	= 20 PSF
TOTAL ROOF LOAD:	= 30 PSF



WALL PRESSURE DIAGRAM
NO SCALE

NOTE:

THIS DIAGRAM IS A GENERIC AND SIMPLIFIED WALL PRESSURE DIAGRAM. LOCATION AND WIDTH OF CORNER ZONES (ZONE 5) CORRESPOND TO ZONE 3 OF THE ACTUAL BUILDING AS SHOWN IN THE ROOF PRESSURE DIAGRAM ABOVE.

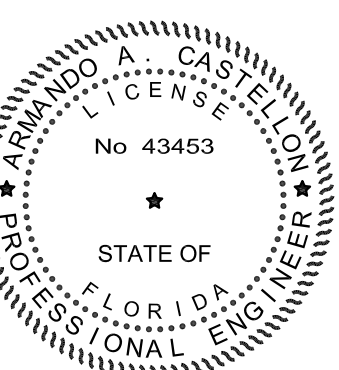
Comm. No: 16025.18

Date: 07/23/2020

Drawn: NGD

Revisions		
No.	Date	Note

TO THE BEST OF MY KNOWLEDGE, THE PLANS AND SPECIFICATIONS CONFORM WITH THE MINIMUM BUILDING CODES.



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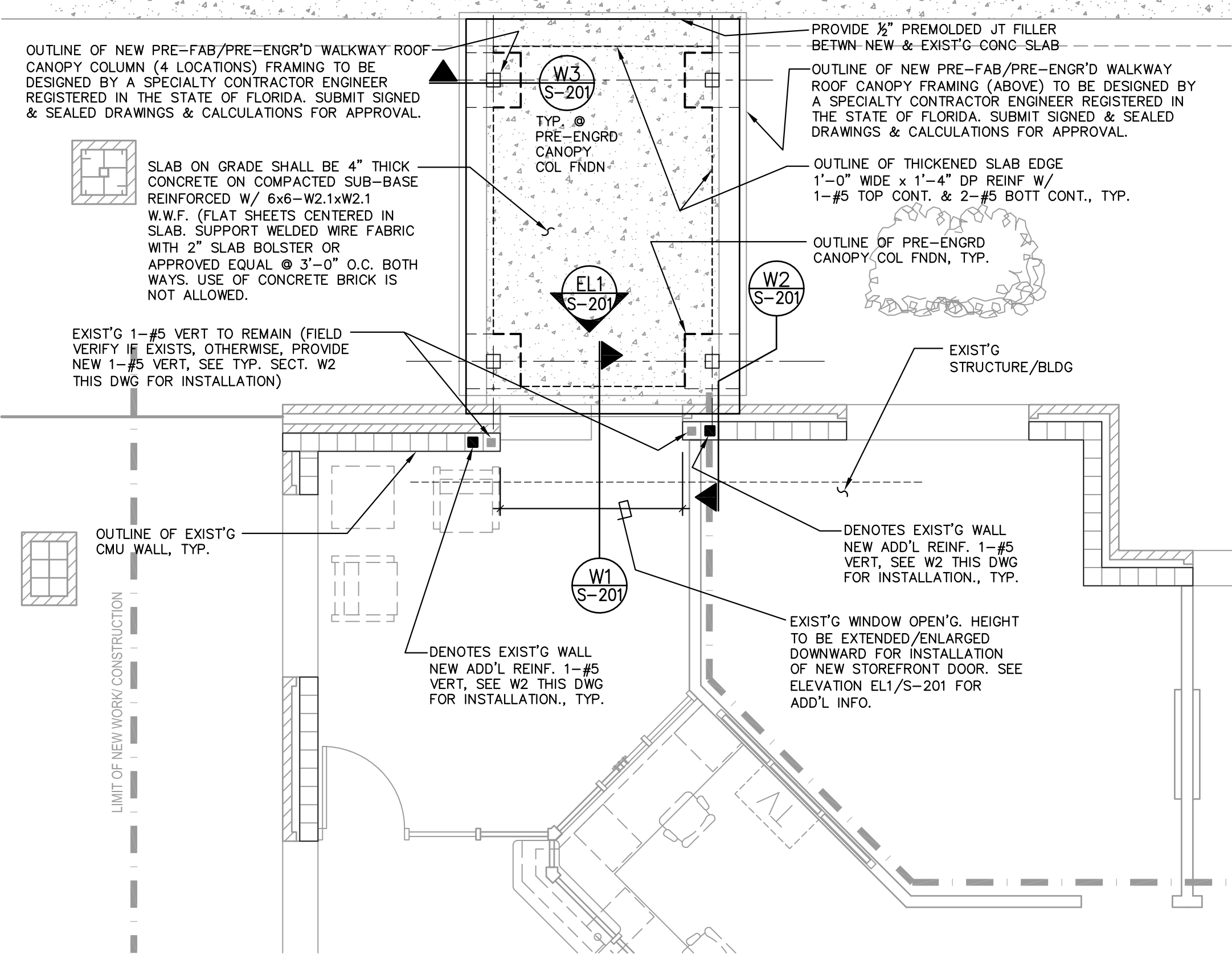
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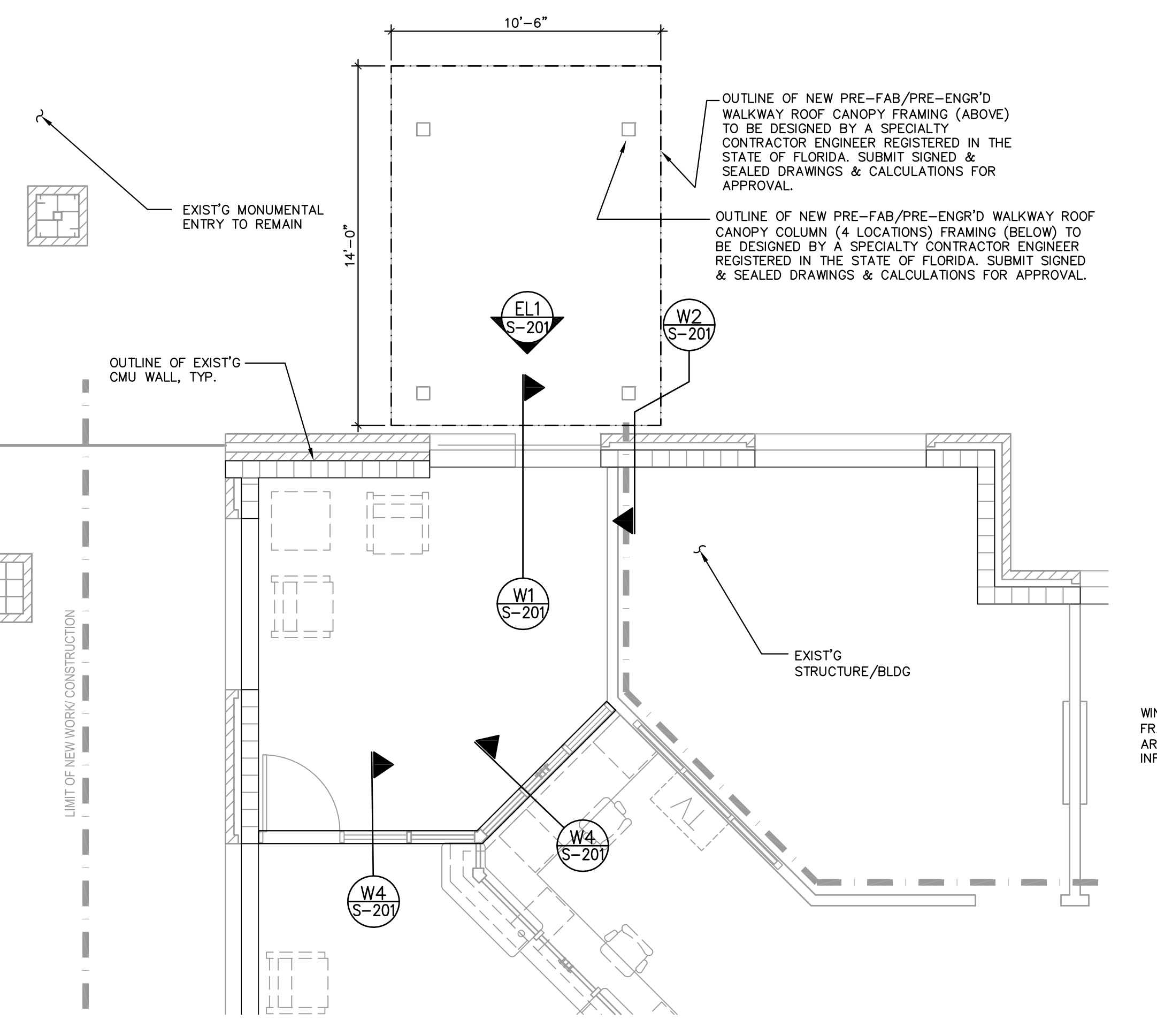
TO THE BEST OF OUR KNOWLEDGE, INFORMATION AND BELIEF, THESE STRUCTURAL PLANS CONFORM TO AND SATISFY THE FLORIDA BUILDING CODE, 2017 EDITION, ACI 318-14, AND LOCAL CODES AS APPLICABLE.

GEN. STRUCT'L NOTES, WIND DESIGN DATA & LOAD SCHEDULE

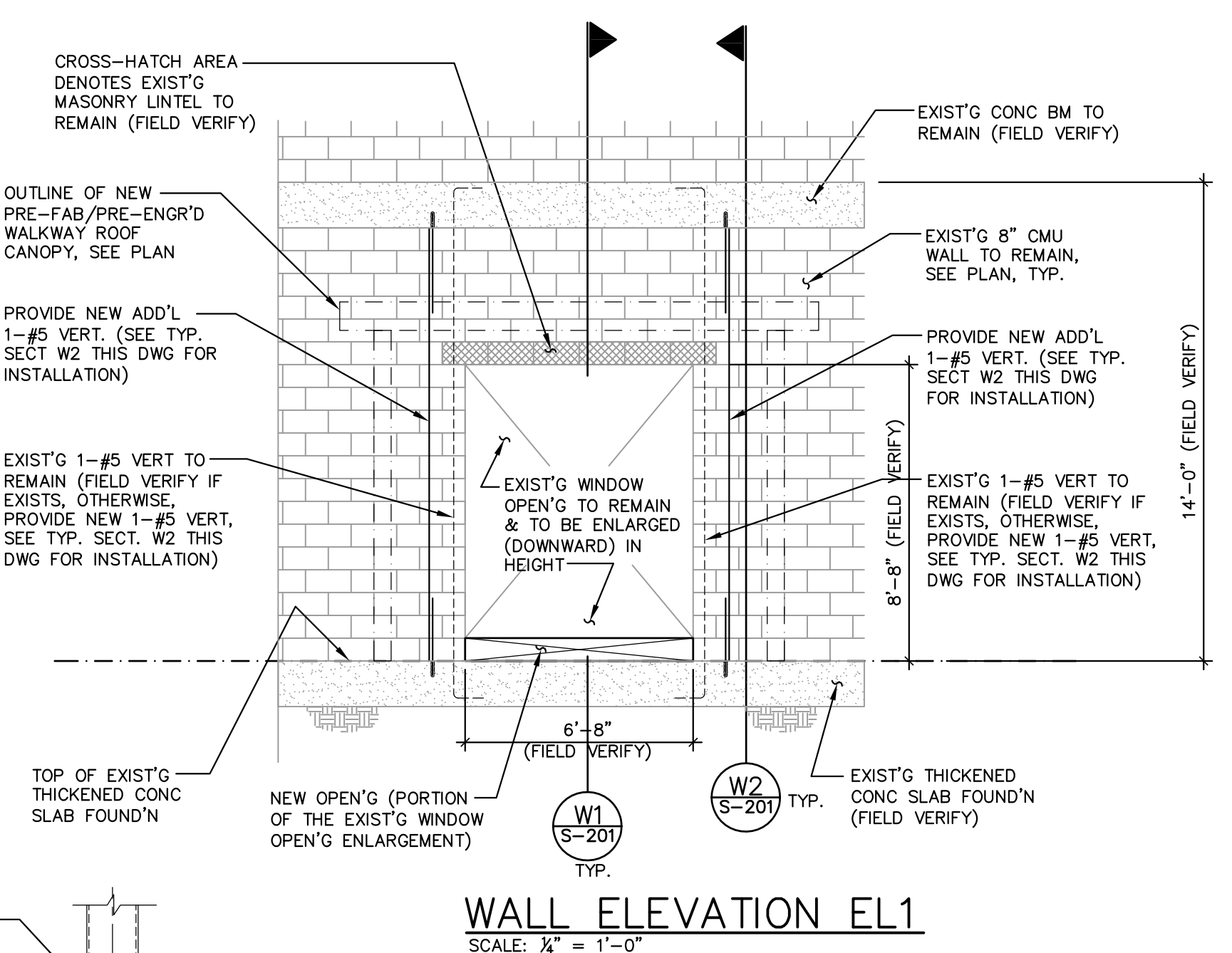
S-101



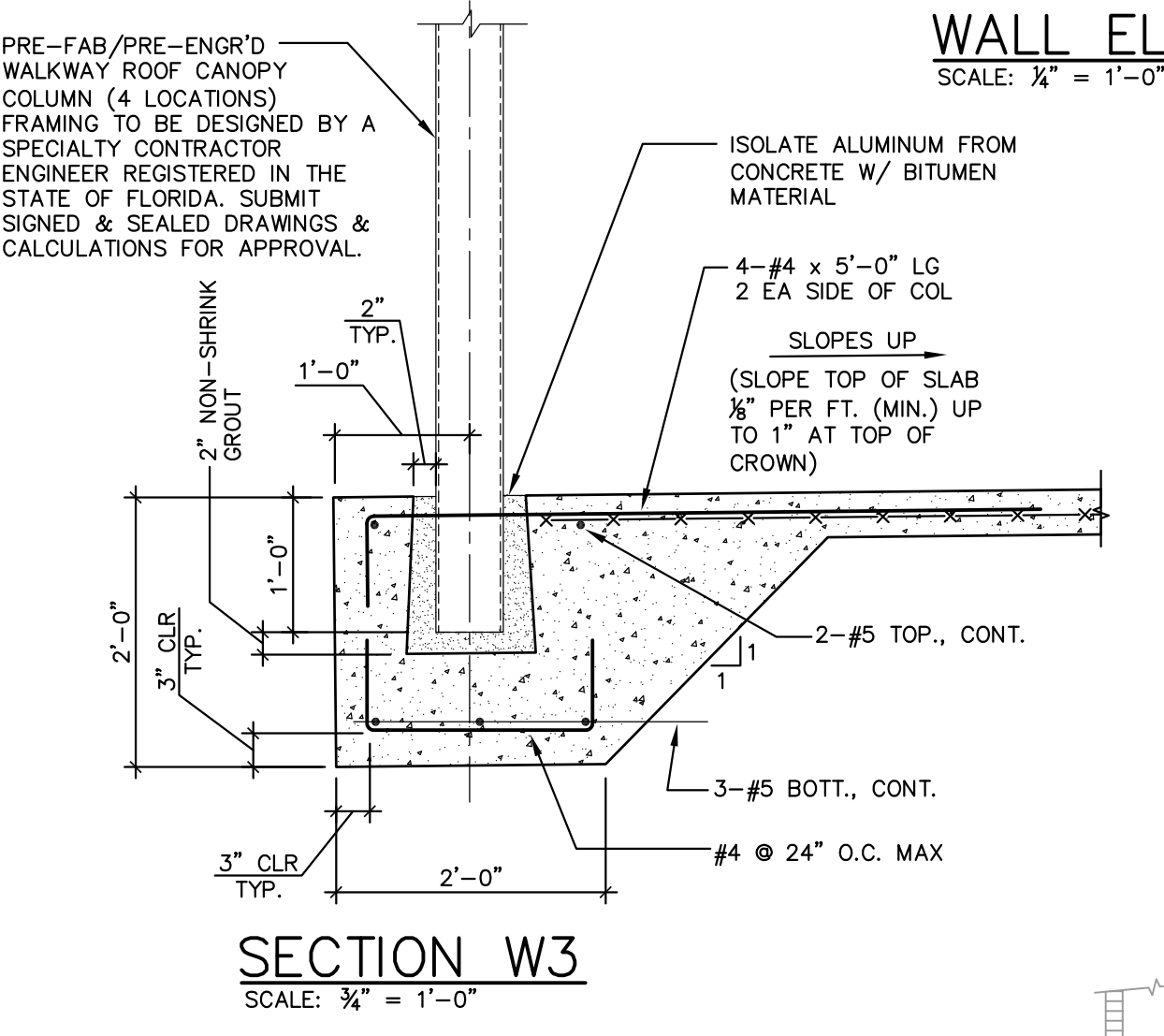
NEW FOUNDATION PLAN FOR NEW STOREFRONT DOOR AT NEW VESTIBULE AREA (RM. 01-101)
SCALE: 1/4" = 1'-0"



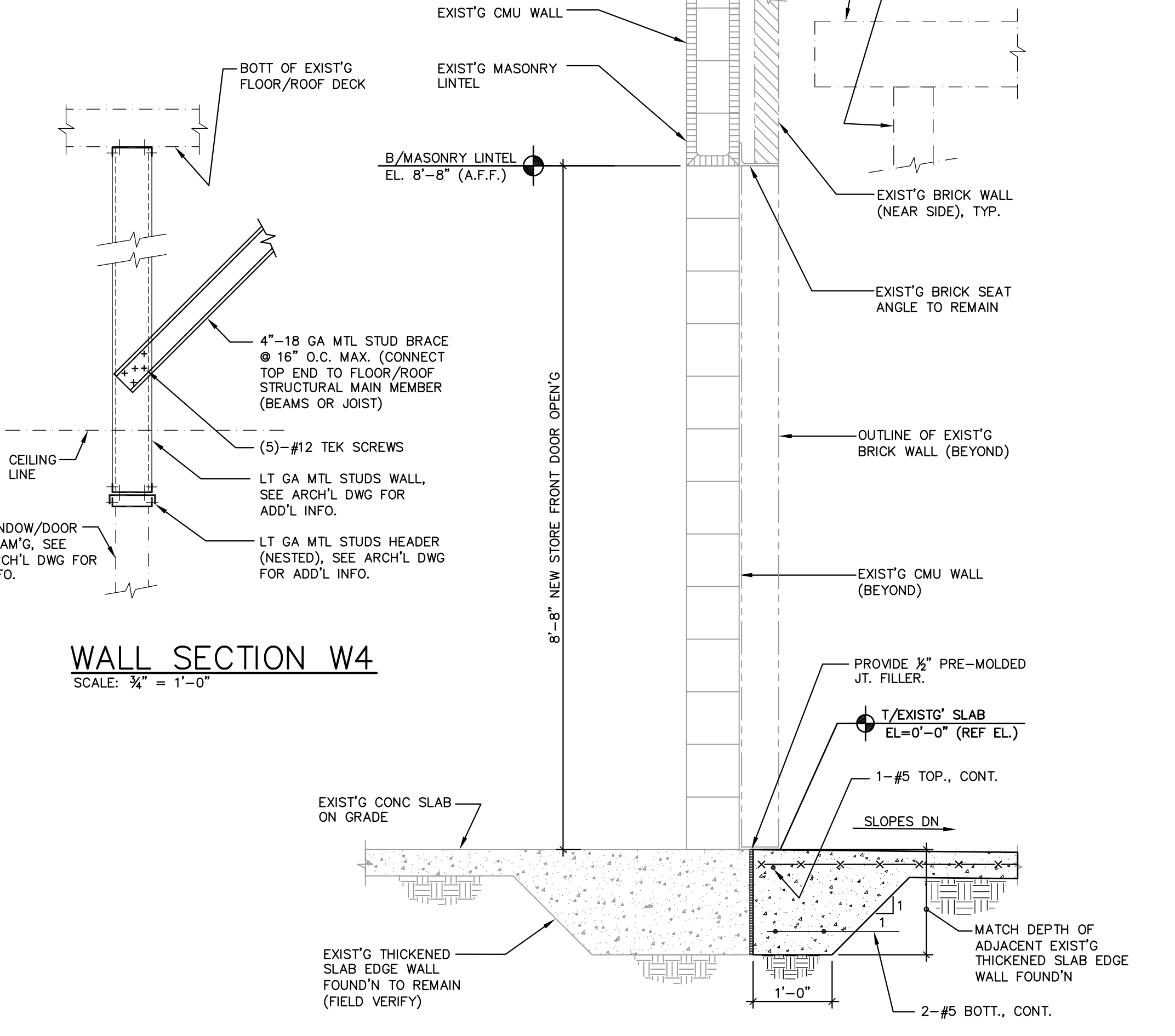
NEW PRE-FAB/PRE-ENGR'D WALKWAY ROOF CANOPY FRAM'G PLAN ABOVE NEW STOREFRONT DOOR AT NEW VESTIBULE AREA (RM. 01-101D)
SCALE: 1/4" = 1'-0"



WALL ELEVATION EL1
SCALE: 1/4" = 1'-0"

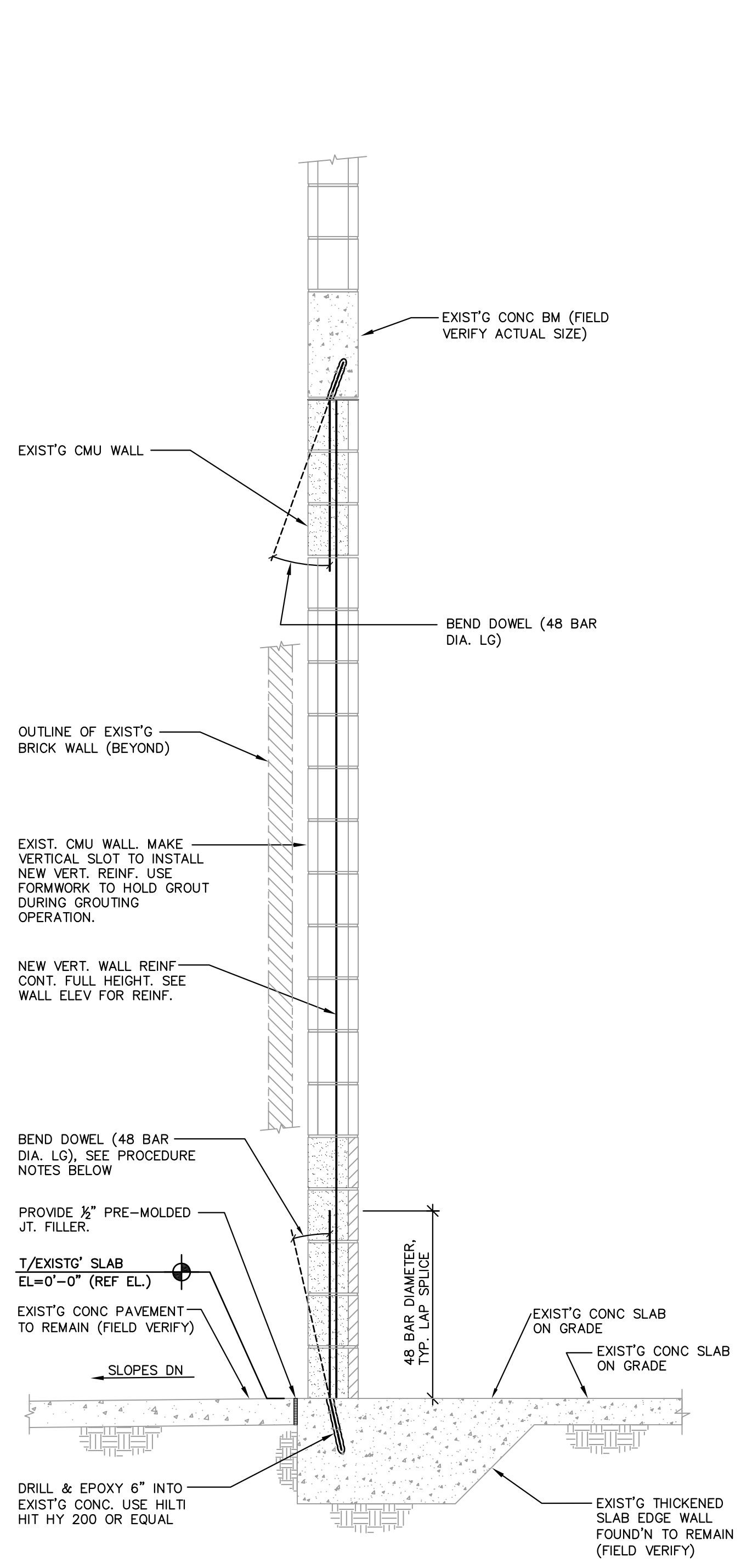


SECTION W3
SCALE: 3/4" = 1'-0"



WALL SECTION W4
SCALE: 3/4" = 1'-0"

WALL SECTION W1
SCALE: 3/4" = 1'-0"



WALL SECTION W2
SCALE: 3/4" = 1'-0"

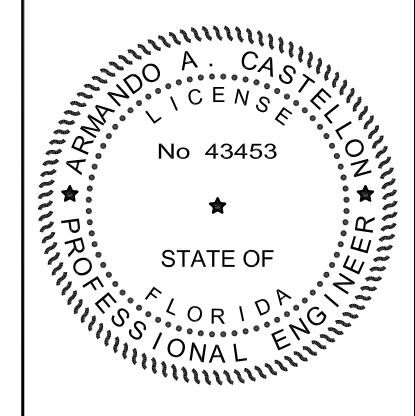
- SUGGESTED CONSTRUCTION PROCEDURE FOR CREATION OF NEW CMU WALL OPENING:**
1. LOCATE PROPOSED LOCATION OF NEW VERTICAL REINFORCING STEEL AND SAWCUT TOP AND BOTTOM END WITH JUST ENOUGH OPENING TO INSTALL NEW DOWELS.
 2. INSTALL NEW DOWELS.
 3. SAWCUT VERTICAL SLOTS FULL HEIGHT AT LOCATION OF NEW VERTICAL REINFORCING STEEL BARS. WIDTH OF SLOTS SHALL BE AS NARROW AS PRACTICABLE TO ERECT NEW BARS.
 4. ERECT NEW BARS.
 5. PROVIDE FORMWORKS AT FACE OF CMU WALL WHERE SLOTS & OPENINGS WERE MADE AND FILL CELLS WITH 3000 PSI GROUT WITH 8" TO 11" SLUMP.
 6. WHEN GROUT HAS REACHED ITS 75% COMPRESSIVE STRENGTH, DRY PACK THE TOP CELL WITH NON-SHRINKAGE, NON-METALIC GROUT WITH A MINIMUM COMPRESSIVE STRENGTH OF 5000 PSI.
 7. SAWCUT OUTLINE OF PROPOSED NEW NEW OPENING. CAREFULLY REMOVE MASONRY UNITS WITHIN ITS BOUNDS.

TO THE BEST OF OUR KNOWLEDGE, INFORMATION AND BELIEF, THESE STRUCTURAL PLANS CONFORM TO AND SATISFY THE FLORIDA BUILDING CODE, 2017 EDITION, ACT 316-14, AND LOCAL CODES AS APPLICABLE.

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No.	Date	Note

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FOUNDATION & CANOPY FRAM'G PLANS AND SECTIONS

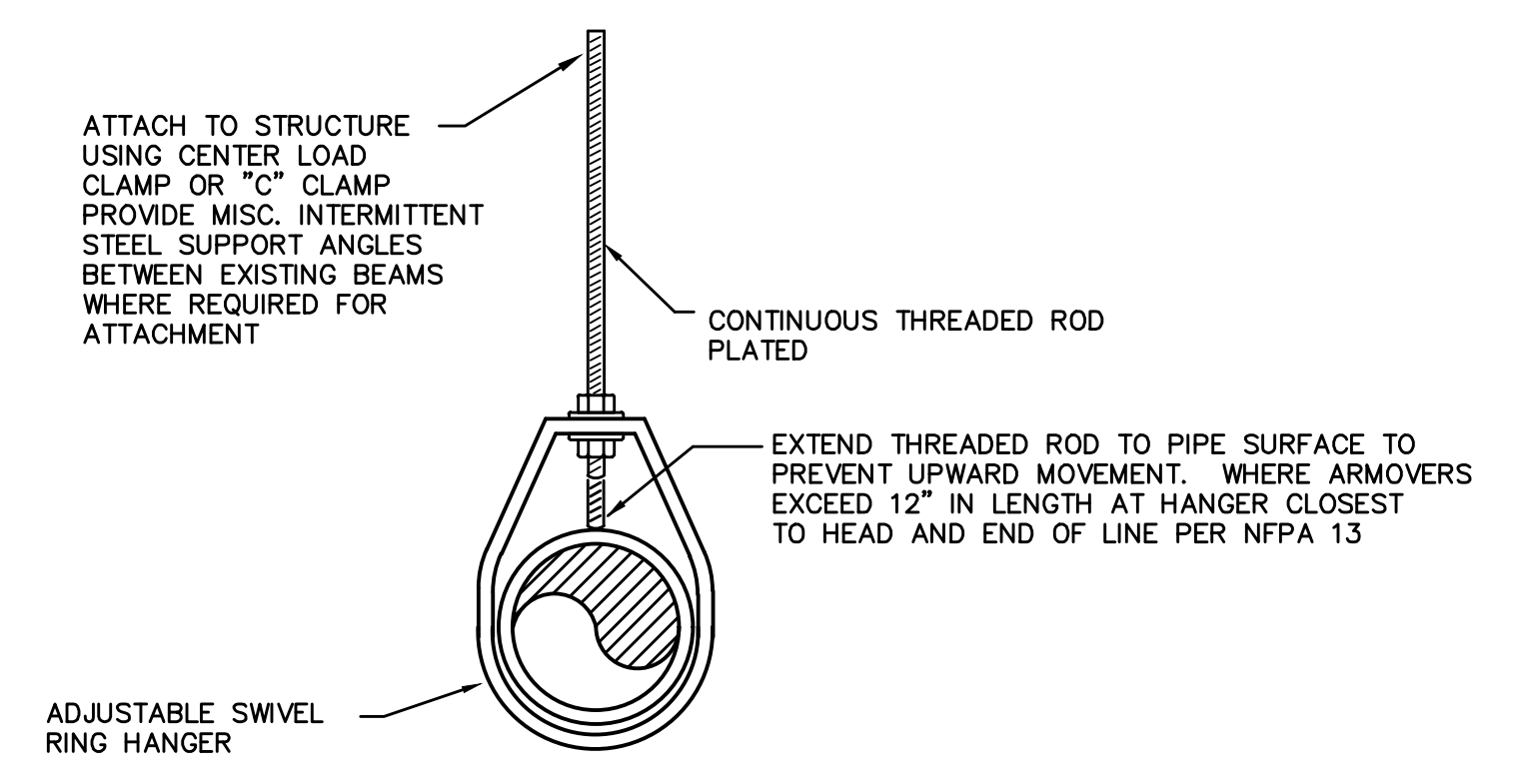
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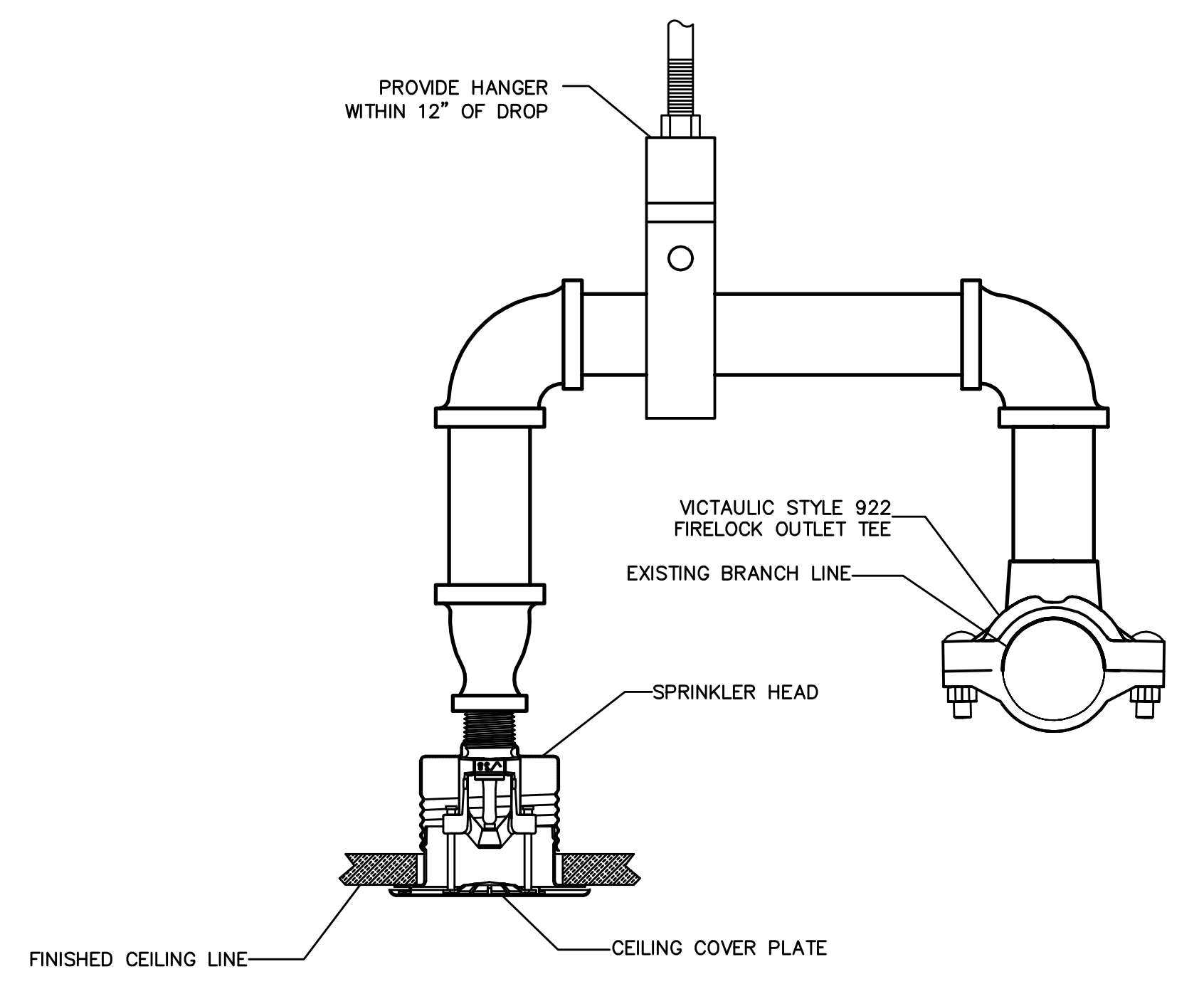
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| <p>1. APPLICABLE CODES AND STANDARDS TO BE APPLIED:</p> <ul style="list-style-type: none"> - 2017 FLORIDA BUILDING CODE 6TH EDITION - 2017 FLORIDA FIRE PREVENTION CODE 6TH EDITION - 2014 FGI GUIDELINES - NFPA-13 - 2013 - STANDARD FOR THE INSTALLATION OF SPRINKLER SYSTEM - PER FLORIDA BUILDING CODE SECTION 110.8.4.4: TO THE BEST OF THE ENGINEER'S KNOWLEDGE, THE PLANS AND SPECIFICATIONS SUBMITTED HEREIN COMPLY WITH THE APPLICABLE MINIMUM BUILDING CODES AND THE APPLICABLE FIRE SAFETY STANDARDS, AS DETERMINED BY THE LOCAL AUTHORITY, IN ACCORDANCE WITH SECTION 110 OF THE FLORIDA BUILDING CODE AND CHAPTER 633 OF THE FLORIDA STATUTES. <p>2. THE GENERAL OVERALL SCOPE OF WORK IS RELOCATION AND RE-USE OF EXISTING SPRINKLER HEADS WITHIN THE AREA OF CONSTRUCTION TO COORDINATE WITH ARCHITECT MODIFICATIONS. THE OVERALL NET CHANGE IN SPRINKLER HEADS IS APPROXIMATELY 1 ADDITIONAL HEAD.</p> <p>3. PROVIDE CHROME ESCUTCHEONS WHERE PIPING PENETRATES WALLS IN EXPOSED AREAS.</p> <p>4. ALL SPRINKLER PIPING SHALL BE PAINTED WHERE INSTALLED BELOW CEILINGS, AND SIMILAR LOCATIONS WHERE EXPOSED, COLOR AS DIRECTED BY THE ARCHITECT IN PUBLIC SPACES, RED WHERE EXPOSED IN UNOCCUPIED SPACES SUCH AS EQUIPMENT ROOMS.</p> | <p>5. TEST SYSTEMS AT 200 PSI FOR TWO HOURS IN ACCORDANCE WITH NFPA-13 AND 24 AND REQUIREMENTS OF AHJ AND PREPARE "CONTRACTORS MATERIAL AND TEST CERTIFICATE" AS PRESCRIBED BY NFPA STANDARDS.</p> <p>6. LABEL DRAIN PIPING, INSPECTOR'S TEST, MAIN DRAIN, SHUT-OFF VALVES, AND SIMILAR COMPONENTS.</p> <p>7. SUBMIT FITTINGS PRODUCT DATA FOR ALL MATERIALS, INCLUDING PIPING FITTINGS, VALVES, HEADS, AND SIGNS.</p> <p>8. PROVIDE AUXILIARY DRAINS FOR TRAPPED SECTIONS OF PIPING.</p> <p>9. HAZARD CLASSIFICATION OF OCCUPANCIES, DENSITY AREA (GPM/SQ.FT.) AND HOSE DEMAND (GPM) DESIGN REQUIREMENTS ARE IN ACCORDANCE WITH NFPA-13.</p> <p>10. TO THE BEST OF THE ENGINEER'S KNOWLEDGE MICROBIAL INDUCED CORROSION (MIC) IS NOT OF CONCERN FOR THIS WATER SUPPLY. SCHEDULE 40 BRANCH PIPING IS SPECIFIED, IN-PART FOR CORROSION RESISTANCE.</p> <p>11. INSTALL SYSTEM IN ACCORDANCE WITH NFPA 13, THE REQUIREMENTS OF AHCA AND THE LOCAL AUTHORITY HAVING JURISDICTION. MATERIALS SHALL BE FM/UL LISTED FOR USE IN FIRE PROTECTION SYSTEMS, UNLESS OTHERWISE NOTED.</p> | <p>12. LAYOUT SHOWN IS DIAGRAMMATIC IN NATURE. THE INSTALLING CONTRACTOR IS SOLELY RESPONSIBLE TO COORDINATE EXACT HEAD LAYOUT WITH THE WORK OF OTHER TRADES TO AVOID OBSTRUCTIONS TO SPRINKLER DISCHARGE PATTERNS IN ACCORDANCE WITH NFPA-13. THE CONTRACTOR SHALL MAKE EVERY ATTEMPT TO PROVIDE HEADS WITHIN THE CENTER OF TILES OR AN APPROVED PATTERN BY THE ARCHITECT.</p> <p>13. THE CONTRACTOR SHALL SECURE AND PAY FOR ALL CONSTRUCTION PERMITS, FEES, AND LICENSES AND INSPECTIONS NECESSARY FOR A PROPER COMPLETION OF ALL WORK.</p> <p>14. CONTRACTOR SHALL USE ONLY THOSE ENTRANCES AND PARKING FACILITIES ASSIGNED BY THE OWNER FOR SITE ACCESS. ALL MATERIAL DELIVERIES AND DEMOLITION/TRASH SHALL BE REMOVED DAILY.</p> <p>15. NEW SPRINKLER HEADS REQUIRED SHALL MATCH THOSE EXISTING HEADS BEING RELOCATED IN MANUFACTURER AND QUICK RESPONSE TYPE, CONCEALED HEADS SHALL BE BASES OF DESIGN.</p> <p>16. IF THE FIRE SPRINKLER SYSTEMS ARE OUT OF SERVICE FOR ANY EXTENDED PERIOD OF TIME (GREATER THAN FOUR HOURS IN A 24-HOUR PERIOD) IN PROJECT WORK AREA (DURING DEMOLITION OR CONSTRUCTION), AN APPROVED FIRE WATCH TO BE PROVIDE FOR ALL PORTIONS LEFT UNPROTECTED BY THE FIRE PROTECTION SYSTEM SHUTDOWN (OR THE AHJ SHALL BE PERMITTED TO REQUIRE THE BUILDING TO BE EVACUATED) UNTIL THE FIRE PROTECTION SYSTEM HAS BEEN RETURN TO SERVICE. SEE FLORIDA FIRE PREVENTION CODE (6TH EDITION-2017) SECTION 13.19, NFPA 101 (2015 EDITION) SECTION 9.7.6 AND NFPA 25 (EDITION 2014) SECTION 15.5.</p> |
|--|---|---|

LEGEND	
—	FIRE PROTECTION PIPING
- - - - -	EXISTING FIRE PROTECTION PIPING
●	EXISTING PENDANT SPRINKLER HEAD
●	NEW CONCEALED SPRINKLER HEAD
(X) (X)	NOTES ON DRAWINGS PLAN

FIRE PROTECTION SHEET LISTING	
FP0.1	GENERAL NOTES, LEGEND AND DETAILS
FP1.1	FIRE PROTECTION PLANS



1 PIPE HANGER DETAIL
FP0.1



2 CONCEALED PENDANT SPRINKLER HEAD DETAIL - WET PIPE SYSTEM
FP0.1 HEADS TO BE INSTALLED PER NFPA 13.

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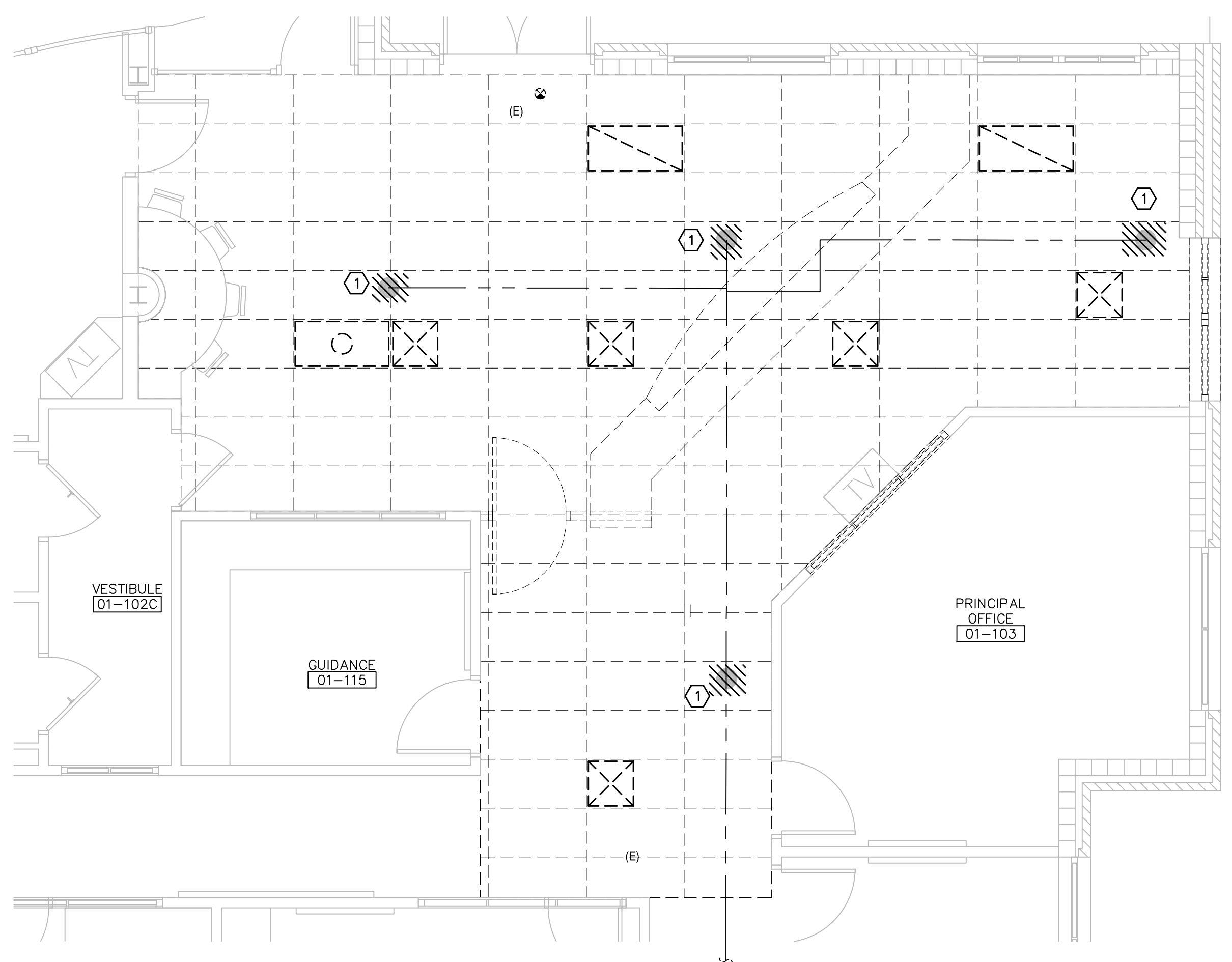
Revisions		
No.	Date	Note

TO THE BEST OF MY KNOWLEDGE, THE PLANS AND SPECIFICATIONS COMPLY WITH THE MINIMUM BUILDING CODES.

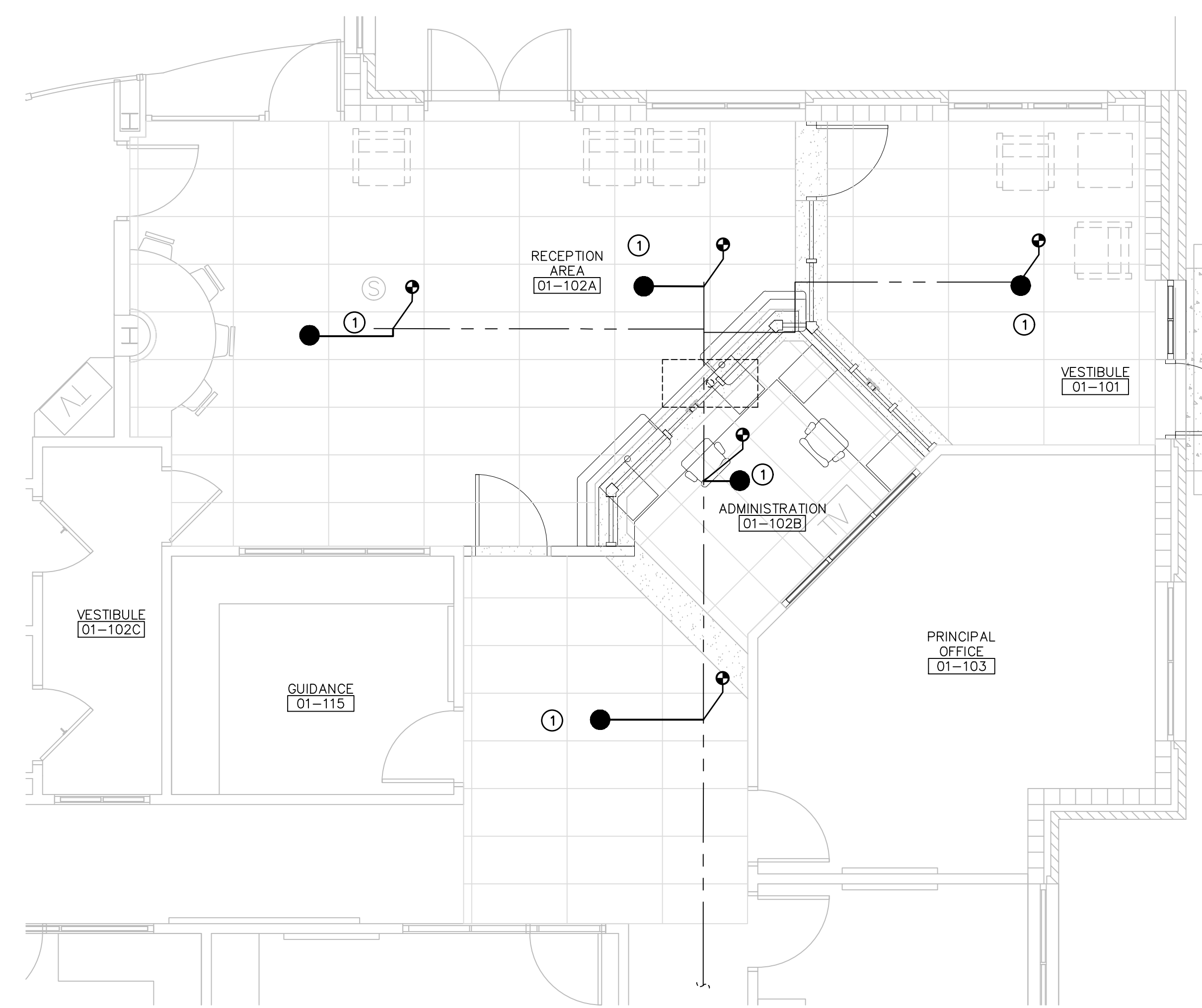
Certification Number 6099
Charles C. Gableman, P.E. 01098
Kyle B. Lorraine, P.E. 90028

GENERAL NOTES, LEGEND AND DETAILS

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1 FIRE PROTECTION PLAN - DEMOLITION
 SCALE: 1/4" = 1'-0"
 NORTH



2 FIRE PROTECTION PLAN - NEW WORK
 SCALE: 1/4" = 1'-0"
 NORTH

DEMOLITION NOTES
 ① EXISTING SPRINKLER TO BE RELOCATED. SEE NEW WORK PLAN FOR NEW LOCATION.

NEW WORK NOTES
 ① RELOCATED SPRINKLER HEADS. PROVIDE NEW SPRING LINE AS NEEDED TO ACCOMMODATE NEW LOCATION.

GENERAL NOTES
 1 THE GENERAL OVERALL SCOPE OF WORK IS RELOCATION AND RE-USE OF EXISTING SPRINKLER HEADS WITHIN THE AREA OF CONSTRUCTION TO COORDINATE WITH ARCHITECT MODIFICATIONS. THE OVERALL NET CHANGE IN SPRINKLER HEADS IS APPROXIMATELY 1 ADDITIONAL HEADS.
 2 ALL SPRINKLER LOCATION THIS PLAN ARE FROM EXISTING AND CONTRACTOR SHOULD FIELD VERIFY LOCATION.
 3 CONTRACTOR SHALL VERIFY THE CONDITION AND OPERABILITY OF THE EXISTING SPRINKLER HEADS AND SPRIG LINE IN THE AREA OF CONSTRUCTION. IF THEY ARE IN GOOD WORKING CONDITION, RELOCATE TO NEW LOCATION ON THE NEW WORK PLAN. OTHERWISE PROVIDE NEW SPRINKLER.
 4 THE CONTRACTOR SHALL INCLUDE IN HIS BASE BID THE COST OF PROVIDING SUCH MATERIAL AND LABOR AS REQUIRED COORDINATING HIS WORK WITH THAT OF THE OTHER TRADES AND PROVIDING SAME AT NO ADDITIONAL COST TO THE OWNER.

RATED WALL LEGEND
 - - - - - 1 HOUR RATED WALL
 - - - - - SMOKE PARTITION
 THE RATED WALL DESIGNATIONS SHOWN HERE ARE TAKEN FROM THE ARCHITECTURAL LIFE SAFETY PLANS. ALL OF THESE RATED WALL TYPES MAY NOT OCCUR ON THIS PLAN. REFER TO THE LIFE SAFETY PLANS (DESIGNATED 'LS') WHICH ARE PRECEDENT OVER THE MECHANICAL PLANS

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 1010 East 10th Street
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 Permit Documents Submittal

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Certification Number 6099
 Charles C. Gableman, P.E. 01928
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FIRE PROTECTION PLANS
FP1.1

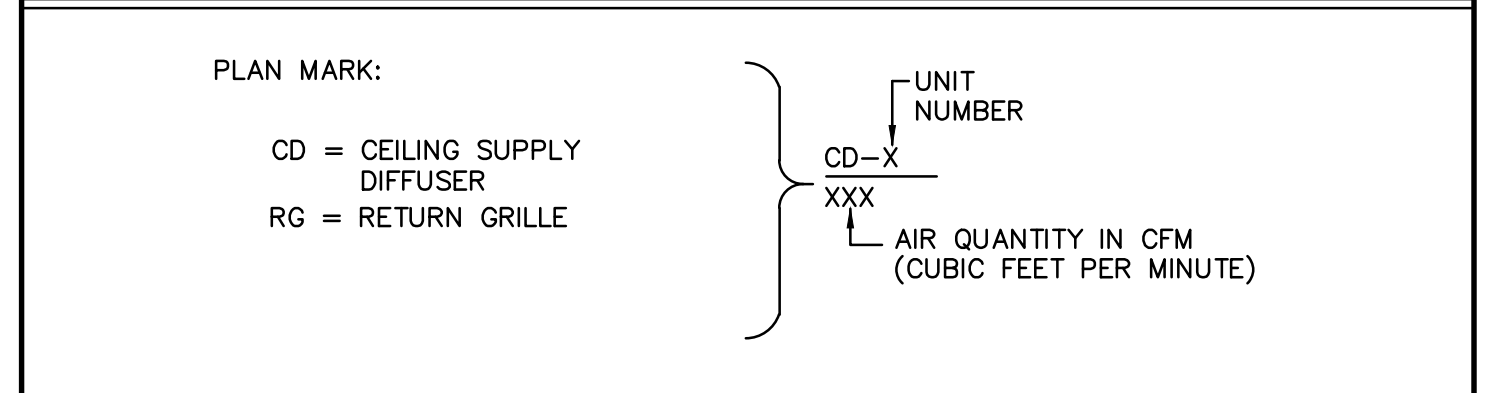
LEGEND

- REVISIONS
- ACCESS DOOR (DUCT)
- ACCESS PANEL (CEILING MOUNTED)
- A.F.F. ELEVATION/ABOVE FINISHED FLOOR
- C — CONDENSATE DRAIN LINE
- BOC BOTTOM OF COLUMN
- BOJ BOTTOM OF JOIST
- TOS TOP OF STRUCTURE
- RBJ RUN BETWEEN JOISTS
- RTJW RUN THRU JOIST WEBBING
- SA SUPPLY AIR
- RA RETURN AIR
- OA OUTDOOR AIR
- EA EXHAUST AIR
- TU TERMINAL UNIT
- DCV DEMAND CONTROL VENTILATION
- CEILING SUPPLY AIR DEVICE
→ ARROW DENOTES DIRECTION OF THROW
- NEW SUPPLY, RETURN, EXHAUST OR OUTSIDE AIR DUCTWORK FIRST DESIGNATION IS SIDE SHOWN.
- DOUBLE WALL INSULATED DUCT, SUPPLY OR RETURN FIRST DESIGNATION IS SIDE SHOWN, FREE AREA DIMENSION.
- ALUMINUM EXHAUST DUCT
- TYPE 304 STAINLESS STEEL DUCT
- TURNING VANES (NUMBER OF VANES SHALL BE BASED ON ACTUAL DUCT SIZE & NOT ON SCHEMATIC SYMBOL ON DRAWING – SEE SMACNA)
- RETURN OR OUTSIDE AIR DUCT
- DISCHARGE OR SUPPLY DUCT
- EXHAUST FAN
- EXHAUST GRILLE
- FLEXIBLE DUCT CONNECTION
- VOLUME DAMPER (WITH OR WITHOUT MD)
- FIRE DAMPER WITH ACCESS DOOR
- SMOKE DAMPER WITH ACCESS DOOR
- FIRE SMOKE DAMPER WITH ACCESS DOOR
- DROP IN DIRECTION OF AIR FLOW
- RISE IN DIRECTION OF AIR FLOW
- FLEXIBLE AIR DUCT
- SPIN COLLAR WITH MANUAL DAMPER
- AUTOMATIC MOTORIZED DAMPER
- THERMOSTAT OR TEMPERATURE SENSOR
- SMOKE DETECTOR
- HUMIDISTAT OR HUMIDITY SENSOR
- STATIC PRESSURE SENSOR
- HIGH OCCUPANCY SWITCH
- OUTDOOR AIR SENSOR
- 0-12 HOUR TIMER SWITCH
- ELECTRIC DUCT HEATER WITH CONTROL AND TERMINAL CABINET
- CARBON DIOXIDE SENSOR

GENERAL MECHANICAL NOTES

1. ALL SUPPLY, RETURN, EXHAUST, AND OUTSIDE AIR DUCTWORK SHALL BE CONSTRUCTED OF GALVANIZED SHEET METAL. DUCTS SHALL BE FABRICATED IN COMPLIANCE WITH SMACNA "HVAC DUCT CONSTRUCTION STANDARDS METAL AND FLEXIBLE." REFER TO THE PROJECT SPECIFICATIONS FOR PRESSURE CLASSIFICATION AND SEALING REQUIREMENTS. THE FIRST 20 FEET OF SUPPLY AND RETURN AIR DUCTWORK FROM THE AIR HANDLING UNITS SHALL BE CONSTRUCTED OF THE DUAL WALL TYPE WITH A PERFORATED GALVANIZED INNER WALL, 1" THICK MYLAR ENCAPSULATED DUCT LINER, AND GALVANIZED OUTER WALL EQUAL TO UNITED MCGILL K-27.
2. EXHAUST AND OUTSIDE AIR DUCTWORK SHALL BE UNINSULATED. ALL DUCTWORK SHALL BE SLOPED BACK TOWARDS LOUVER AT 1/8 INCH PER FOOT.
3. ALL CONCEALED SUPPLY AIR DUCTS SHALL BE EXTERNALLY INSULATED WITH DUCT WRAP AS INDICATED IN SPECIFICATIONS. RIGID INSULATION SHALL BE PROVIDED IN EXPOSED LOCATIONS SUCH AS MECHANICAL ROOMS.
4. RETURN DUCTS LOCATED ABOVE CEILINGS OF CONDITIONED SPACES SHALL BE UNINSULATED. RETURN DUCTS LOCATED ABOVE UNCONDITIONED SPACES SHALL BE INSULATED THE SAME AS SUPPLY AIR DUCTS.
5. EXACT LOCATION OF AIR DISTRIBUTION DEVICES SHALL BE COORDINATED WITH THE ARCHITECTURAL CEILING PLANS.
6. PROVIDE ACCESS DOORS AT ALL FIRE DAMPERS/FIRE/SMOKE DAMPERS, SMOKE DETECTORS, DUCT HEATERS, AND AUTOMATIC TEMPERATURE CONTROL DEVICES WITH MAXIMUM ALLOWABLE STANDARD SIZE PERMITTED BY DUCT DIMENSIONS. DOORS SHALL BE REMOVABLE TYPE WITH CAM LATCHES AND SAFETY CHAIN, AND FULLY GASKETED TO THE PERIMETER. PROVIDE ACCESS PANELS IN CEILING WHERE REQUIRED TO PROVIDE ACCESS TO DAMPERS, DUCT HEATERS AND SIMLAR DEVICES.
7. COORDINATE INSTALLATION WITH ALL OTHER INVOLVED TRADES. IN THE CASE OF CONFLICT BETWEEN DRAWINGS AND SPECIFICATION, THE MORE STRINGENT REQUIREMENT AS DETERMINED BY THE ARCHITECT / ENGINEER SHALL TAKE PRECEDENT.
8. REFER TO PLANS FOR ADDITIONAL NOTES.
9. FLEXIBLE AIR DUCT SHALL BE USED FOR RUNOUTS BETWEEN THE SUPPLY AND RETURN AIR DUCTS AND AIR DISTRIBUTION DEVICES WHERE INDICATED. FLEXIBLE DUCT SHALL BE A MINIMUM OF SIX AND MAXIMUM OF TEN FOOT IN LENGTH AND OF THE MYLAR-COATED WIRE HELIX TYPE WITH FIBERGLASS INSULATION WITH A VALVE OF R-6 OR GREATER AND METALIZED NYLAR LAMINATE VAPOR BARRIER COVER. ATTACH FLEXIBLE AIR DUCT TO DIFFUSERS AND SPIN COLLARS WITH PLASTIC OR METAL DRAW BANDS AND SEAL THE ENDS WITH TAPE AND MASTIC TO MAINTAIN THE VAPOR BARRIER. FLEXIBLE DUCT AND SPIN COLLAR SIZE SHALL BE THE SAME NOMINAL DIAMETER AS THE NECK OF THE AIR DISTRIBUTION DEVICE IT IS CONNECTED TO. FLEXIBLE DUCT SHALL BE ONE-PIECE AND NOT BE SPLICED TOGETHER.
10. SPIN COLLARS SHALL BE OF THE INTEGRAL DAMPER TYPE WITH LOCKING WING NUT AND 2 INCH TALL STAND OFF BRACKET. ALL SPIN COLLARS SHALL BE ATTACHED TO THE SIDE OF DUCT WITH THE CONNECTION SEALED WITH MASTIC, CONNECTION TO TOP OR BOTTOM OF DUCT SHALL NOT BE USED UNLESS SPECIFICALLY APPROVED BY THE ENGINEER. SPRAY PAINT DAMPER HANDLES DAY-GLOW ORANGE AND INSTALL A 24 INCH LONG RED RIBBON ON THE HANDLE FOR T.A.B. PURPOSES AFTER INSTALLATION.
11. ELEVATIONS GIVEN: B.E. = BOTTOM ELEVATION, C.E. = CENTERLINE ELEVATION, T.E. = TOP ELEVATION; ARE TAKEN FROM THE CONCRETE FLOOR SLAB. THESE ELEVATIONS ARE APPROXIMATE AND MUST BE VERIFIED IN THE FIELD BY THE CONTRACTOR PRIOR TO FABRICATION OF ANY DUCTWORK OR PIPING.
12. PROVIDE SINGLE THICKNESS METAL TURNING VANES IN ALL SQUARE ELBOWS INCLUDING SUPPLY, RETURN, EXHAUST, RELIEF AND OUTSIDE AIR DUCTS. WHERE UNEQUAL SQUARE ELBOWS ARE SHOWN, TURNING VANES WITH TRAILING EDGE EXTENSIONS SHALL BE USED.
13. DOCUMENTS ARE SCHEMATIC IN NATURE AND DO NOT INDICATE EVERY BEND, ELBOW, OR OFFSETS REQUIRED IN DUCTWORK AND PIPING. FIELD VERIFY ALL SIZES AND ELEVATIONS PRIOR TO FABRICATION/INSTALLATION. PROVIDE MODIFICATIONS WHERE REQUIRED FOR COORDINATION IN BASE CONTRACT PRICE AT NO ADDITIONAL COST.
14. ENDS OF DUCTWORK SHALL BE KEPT SEALED USING PLASTIC SHEETING AND DUCT TAPE DURING CONSTRUCTION.
15. LOCATIONS FOR TEMPERATURE, HUMIDITY AND CO2 SENSORS ARE APPROXIMATE IN NATURE AND SHALL NOT BE SCALED FROM THE DRAWINGS. COORDINATE EXACT LOCATIONS WITH ROOM FURNITURE LAYOUT AND CONFIRM PROPOSED LOCATION WITH THE OWNERS REPRESENTATIVE PRIOR TO ROUGH-IN. CO2 SENSOR HEIGHTS SHALL BE 48" A.F.F.
16. EQUIPMENT SHALL BE SUPPLIED AND INSTALLED WITH PROVISION FOR IN-PLACE CLEANING AND SIMILAR MAINTENANCE TASKS IN ACCORDANCE WITH THE REQUIREMENTS OF ASHRAE 62.
17. PROVIDE MISCELLANEOUS STRUCTURAL STEEL TO SPAN ACROSS JOISTS WHERE REQUIRED FOR INTERMEDIATE SUPPORT. PROVIDE WEIGHT AND SUPPORT POINTS TO STRUCTURAL ENGINEER FOR INCLUSION IN CALCULATIONS.
18. THE LOCATION OF FIRE DAMPERS IN DUCT PENETRATIONS OF ONE-HOUR RATED WALLS AND PARTITIONS IS BASED ON THE 2014 FLORIDA BUILDING CODE (MECHANICAL), 607.5.3. WHERE EXCEPTIONS ARE ALLOWED BY CODE FOR OMISSION OF DAMPERS, THESE EXCEPTIONS HAVE BEEN EMPLOYED FOR THIS PROJECT. FIRE DAMPERS HAVE BEEN OMITTED FROM DUCTS WHICH COMPLY WITH ALL SIX (SIX) CODE REQUIREMENTS:
 - 3.1 THE DUCT SHALL NOT EXCEED 100 SQUARE INCHES.
 - 3.2 THE DUCT SHALL BE CONSTRUCTED OF STEEL A MINIMUM OF 0.0217-INCH IN THICKNESS.
 - 3.3 THE DUCT SHALL NOT HAVE OPENINGS THAT COMMUNICATE THE CORRIDOR WITH ADJACENT SPACES OR ROOMS.
 - 3.4 THE DUCT SHALL BE INSTALLED ABOVE A CEILING.
 - 3.5 THE DUCT SHALL NOT TERMINATE AT A WALL REGISTER IN THE FIRE-RESISTANCE-RATED WALL.
 - 3.6 A MINIMUM 12-INCH-LONG BY 0.060-INCH-THICK STEEL SLEEVE SHALL BE CENTERED IN EACH DUCT OPENING. THE SLEEVE SHALL BE SECURED TO BOTH SIDES OF THE WALL AND ALL FOUR SIDE OF THE SLEEVE WITH MINIMUM 1 1/2-INCH BY 1 1/2-INCH BY 0.060-INCH STEEL RETAINING ANGLES. THE RETAINING ANGLES SHALL BE SECURED TO THE SLEEVE AND THE WALL WITH #10 SCREWS. THE ANNULAR SPACE BETWEEN THE STEEL SLEEVE AND THE WALL OPENING SHALL BE FILLED WITH ROCK (MINERAL) WOOL BATTING ON ALL SIDES.
19. IN ALL FINISHED ROOMS WITH NO SUSPENDED CEILINGS, ALL EXPOSED DUCTWORK SHALL BE CLEANED, PRIMED AND PAINTED WITH TWO COATS OF GLIDDEN ICI SPRAY MASTER, UNIGRIP, PITTSBURGH G9514, OR APPROVED EQUAL.
20. CONTRACTOR SHALL OBTAIN A COMPLETE SET OF CONSTRUCTION DRAWINGS AND SPECIFICATIONS, AND REVIEW TO ENSURE ALL ITEMS INDICATED ON THE DRAWINGS ARE INCLUDED IN HIS BASE BID; ALL ITEMS REQUIRING A MECHANICAL CONNECTION (DUCTWORK, PIPING, ETC.) SHALL BE HOOKED-UP TO PROVIDE A FULLY OPERATIONAL AND FUNCTIONAL SYSTEM, AND INCLUDED IN THE BASE BID.
21. ACCESS PANELS IN HARD CEILINGS IN SUCH AREAS AS LOCKERS, GROUP TOILETS, ETC., SHALL BE A MINIMUM OF 18 X 18 TO ALLOW FOR TEST AND BALANCE ACCESS, WHERE 18 X 18 ACCESS DOOR CANNOT BE USED DUE TO CONFLICT, PROVIDE MAXIMUM ALLOWABLE PANEL AS NOT TO CONFLICT WITH OTHER TRADES. COORDINATE COLOR OF PANEL WITH ARCHITECT.
22. PAINT INSIDE OF ALL VISIBLE PLENUMS FLAT BLACK.
23. THE CONTRACTOR SHALL PERFORM A PRE-CONSTRUCTION TEST AND BALANCE TO DOCUMENT EXISTING EQUIPMENT OPERATING CONDITIONS AND PROVIDE A BASELINE FOR THE MODIFIED SYSTEMS TO BE COMPARED TO. THE SCOPE SHALL APPLY TO SUPPLY DIFFUSERS, RETURN GRILLS, EXHAUST GRILLS, AND TRANSFER AIR OPENINGS WITHIN THE SCOPE OF WORK ONLY. FINAL TEST AND BALANCE PERFORMANCE SHALL BE AS INDICATED ON THE NEW WORK PLANS.
24. WORK SHALL BE IN ACCORDANCE WITH THE FOLLOWING CODES:
 - FLORIDA BUILDING CODE, BUILDING, 2017
 - FLORIDA BUILDING CODE, MECHANICAL, 2017
 - FLORIDA BUILDING CODE, ENERGY CONSERVATION, 2017
 - FLORIDA STATE FIRE PREVENTION CODE, 2017
 - NFPA 90A-2016 – STANDARD FOR THE INSTALLATION OF AIR CONDITIONING AND VENTILATION SYSTEMS
 - NFPA 101-2016 – LIFE SAFETY CODE

DIFFUSER, AND GRILLE DESIGNATION



MECHANICAL SHEET LISTING

M0.1	MECHANICAL LEGEND AND GENERAL NOTES
M0.2	MECHANICAL SCHEDULES AND DETAILS
M1.1	FIRST FLOOR HVAC PLANS

Revisions		
No.	Date	Note

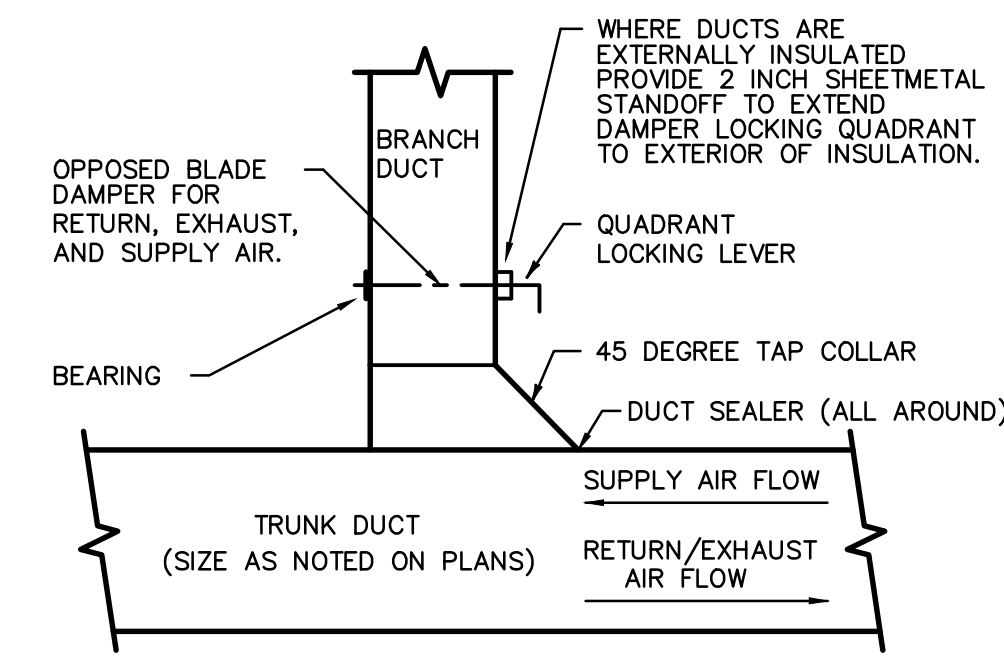
TO THE BEST OF MY KNOWLEDGE, THE PLANS AND SPECIFICATIONS COMPLY WITH THE MINIMUM BUILDING CODES.

DUCT AND PIPE INSTRUCTION AND INSULATION REQUIREMENTS

SUPPLY AIR DUCT			
FROM AHU'S CONNECTION TO 50 FEET DOWNSTREAM ON SUPPLY SIDE FOR ALL AIR HANDLING UNIT SYSTEMS	1" INTERNALLY LINED	WITH PERFORATED INNER LINER AND MYLAR FILM SEPARATING INSULATION FROM AIR STREAM	DOUBLE WALL DUCT
AFTER 50 FEET DOWNSTREAM ON SUPPLY SIDE FOR ALL AIR HANDLING UNIT SYSTEMS		CONCEALED - 2" THICK EXTERNAL WRAP EXPOSED - 1 1/2" RIGID BOARD WITH CORNER ANGLES	
DOWN STREAM OF VAV TERMINAL		CONCEALED - 2" THICK EXTERNAL WRAP EXPOSED - 1 1/2" RIGID BOARD WITH CORNER ANGLES	
ALL LOW PRESSURE EXPOSED DUCTWORK IN PUBLIC AREAS	1" INTERNALLY LINED	WITH PERFORATED INNER LINER AND MYLAR FILM SEPARATING INSULATION FROM AIR STREAM	DOUBLE WALL DUCT
AC UNIT TO TERMINAL - BALANCE OF DUCTWORK TO TERMINAL 50 DEG AIR SYSTEM	INSTALLED R-6	EXPOSED: 2" RIGID FIBERGLASS WITH CORNER ANGLES CONCEALED 2" WITH 1.5# DENSITY BLANKET	
AC UNIT TO TERMINAL - BALANCE OF DUCTWORK TO TERMINAL EXPOSED 50 DEG AIR SYSTEM	INSTALLED R-6	EXPOSED: 2" RIGID FIBERGLASS WITH CORNER ANGLES CONCEALED: .75# DENSITY BLANKET	
TERMINAL TO OUTLET	INSTALLED R-6	.75# DENSITY BLANKET	
FIRE DAMPER AND REHEAT COILS IN INTERNALLY INSULATED DUCT		EXPOSED: 1" RIGID FIBERGLASS WITH CORNER ANGLES CONCEALED: INSTALLED R-6 .75# DENSITY BLANKET	
RETURN AIR DUCT			
FROM AHU'S CONNECTION TO 50 FEET DOWNSTREAM ON RETURN SIDE FOR ALL AIR HANDLING UNIT SYSTEMS	1" INTERNALLY LINED	WITH PERFORATED INNER LINER AND MYLAR FILM SEPARATING INSULATION FROM AIR STREAM	DOUBLE WALL DUCT
TERMINAL TO OUTLET		CONCEALED - 2" THICK EXTERNAL WRAP EXPOSED - 1 1/2" RIGID BOARD WITH CORNER ANGLES	
TRANSFER AIR DUCT			
ALL TRANSFER DUCTS		1 1/2" 1# DENSITY BLANKET. MECHANICAL SPACE OR EXPOSED: 1" RIGID FIBERGLASS WITH CORNER ANGLES	
EXHAUST AIR DUCTS			
ALL GENERAL RESTROOM EXHAUST DUCTS		NOT REQUIRED	
KITCHEN HOOD EXHAUST DUCTS		WRAPPED IN 2 HOUR FIRE RATED DUCT WRAP ENCLOSURE EQUAL TO 3M FIREMASTER	
NOTES: • REFER TO SPECIFICATION 23-07-00 FOR MORE DETAIL AND INFORMATION • INSULATION MUST MEET OR EXCEED ASHRAE 90.1, TABLE 6.8.3 (WHICHEVER IS GREATER)			

DIFFUSER AND GRILLE SCHEDULE

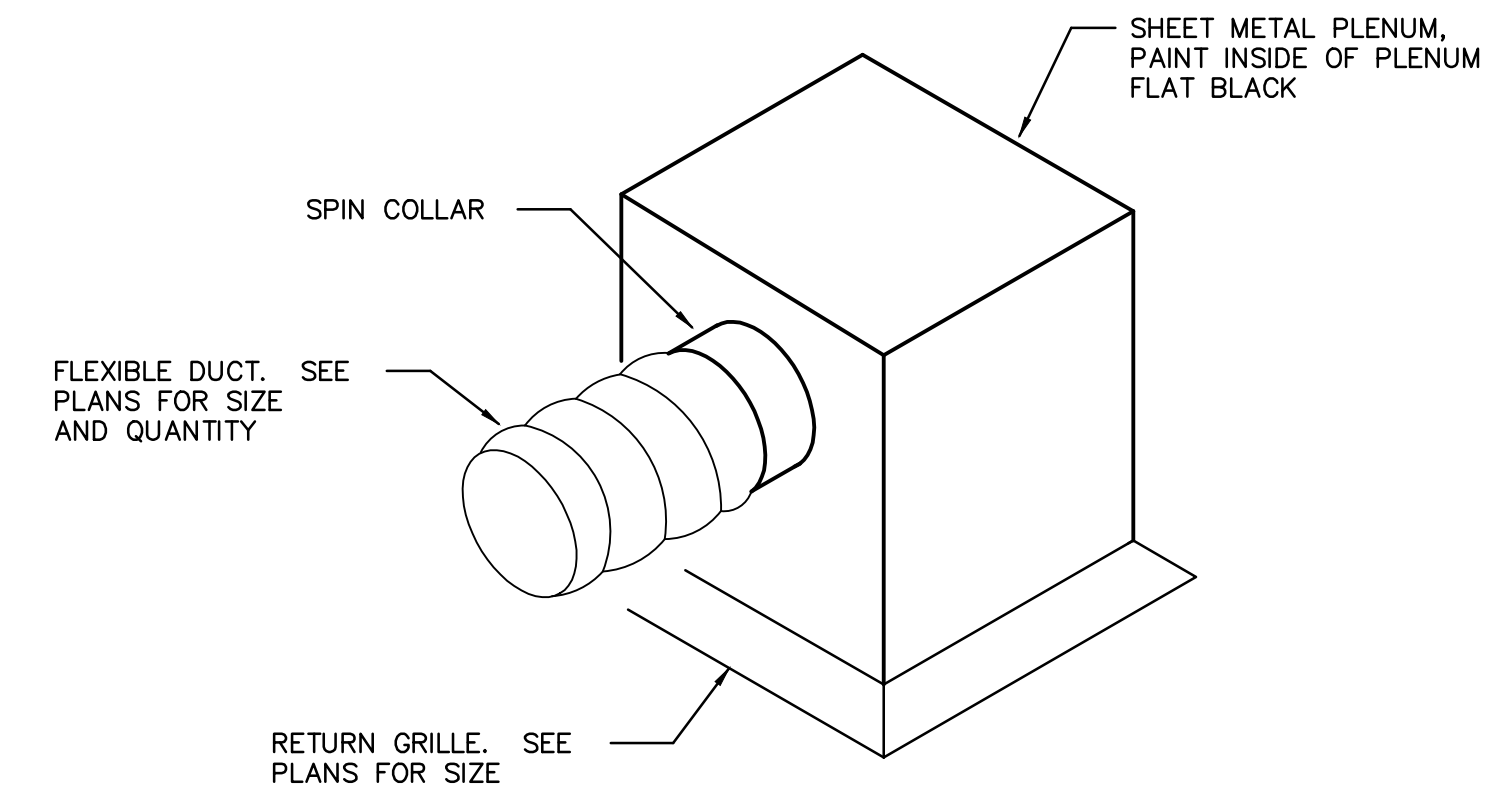
PLAN MARK	MAKE	MODEL NUMBER	MODULE SIZE	NECK SIZE	FINISH	MATERIAL	MOUNTING	REMARKS
RG-1	TITUS	4FL	24x24	22x22	OFF-WHITE	ALUMINUM	LAY-IN	①②③
CD-1	TITUS	TDC-AA	24x24	6x6	OFF-WHITE	ALUMINUM	LAY-IN	①④
CD-2	TITUS	TDC-AA	24x24	12x12	OFF-WHITE	ALUMINUM	LAY-IN	①④
① CONFIRM ALL MOUNTING TYPES WITH ACTUAL CEILING CONSTRUCTION PRIOR TO ORDERING AND INSTALLATION. ② POSITION SO BLADES POINT TOWARDS THE WALL (CEILING MOUNTED) OR CEILING (WALL MOUNTED). ③ PROVIDE SHEET METAL PLENUM BOX ON TOP OF RA GRILLES WHERE REQUIRED FOR FLEX DUCT TAP. ④ 4-WAY THROW PATTERN UNLESS OTHERWISE INDICATED BY ARROWS ON FLOOR PLANS								



BRANCH DUCT TAKE-OFF DETAIL

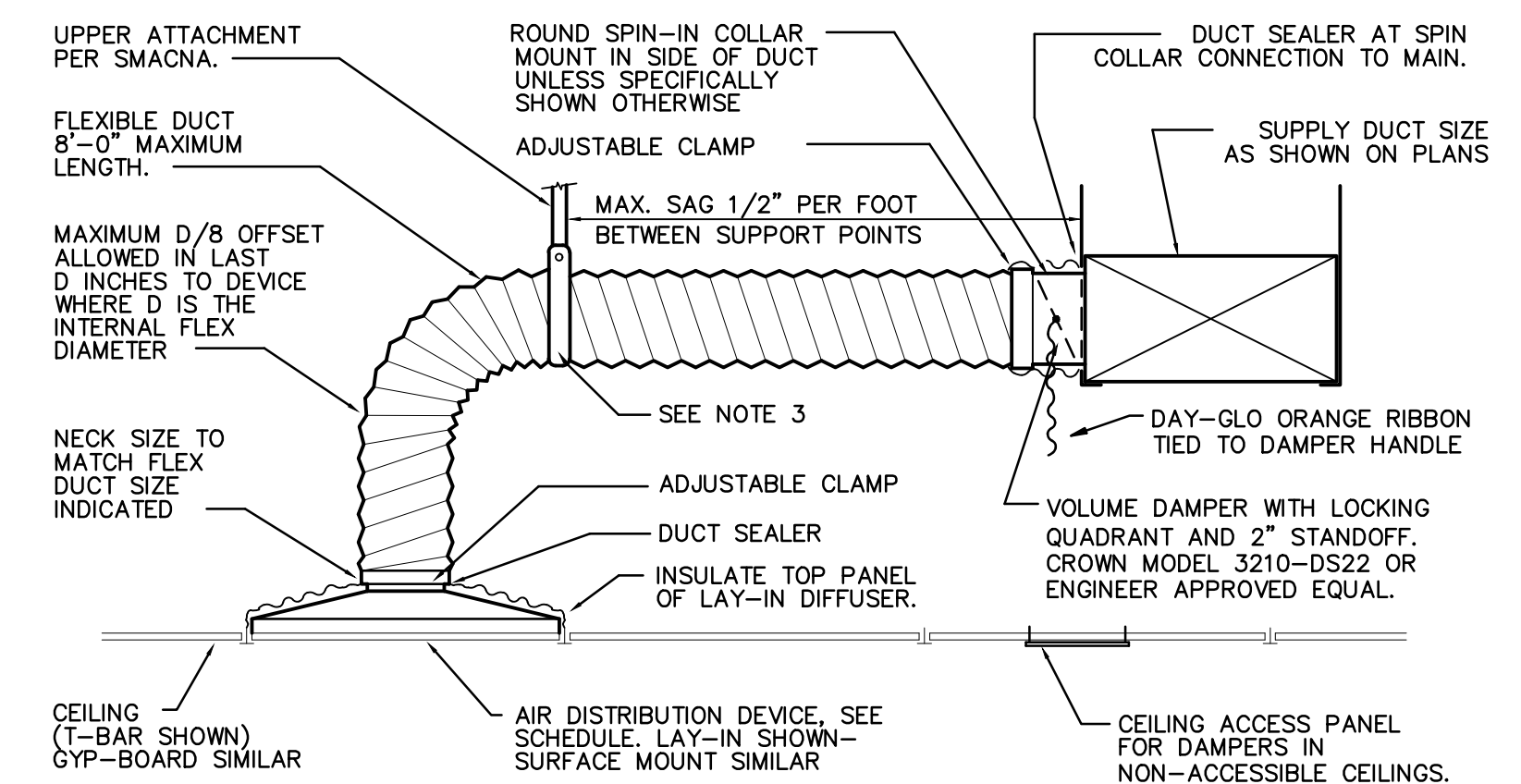
RECTANGULAR LOW PRESSURE

SCALE: NONE



RETURN GRILLE DETAIL

SCALE: NONE



FLEXIBLE DUCT NOTES

- FLEXIBLE DUCTS SHALL BE ONE-PIECE AND SHALL NOT BE SPLICED TOGETHER.
- EXTEND FLEXIBLE DUCT INSULATION TO DUCT/DIFFUSER PANEL INSULATION AND SEAL WITH MASTIC.
- MINIMUM 1-1/2" WIDE 22 GAUGE GALVANIZED STRAP HANGER WITH HEMMED EDGES PER SMACNA FIGURE 3-10.
- FLEXIBLE AIR DUCT SHALL BE FULLY EXTENDED AND NOT COMPRESSED WITH ELBOW RADIUS NO LESS THAN R/D = 1.0.
- WHEN AIRFLOW IS 75 CFM OR LESS, SPIN COLLAR SHALL BE PROVIDED LESS DAMPER AND A SEPERATE LOW LEAKAGE DAMPER INSTALLED ON OUTLET OF SPIN COLLAR

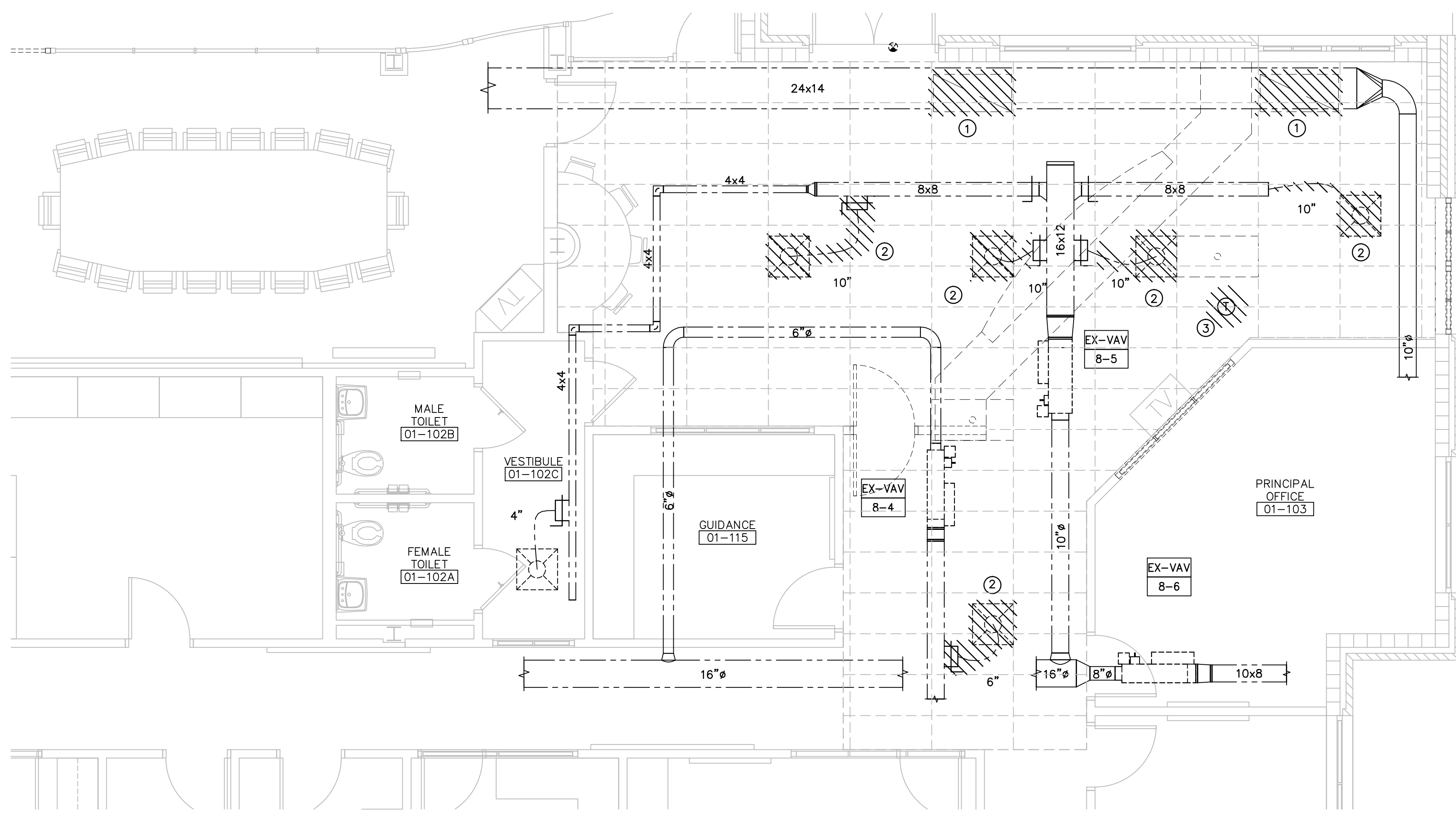
FLEXIBLE DUCT DETAIL

SCALE: NONE

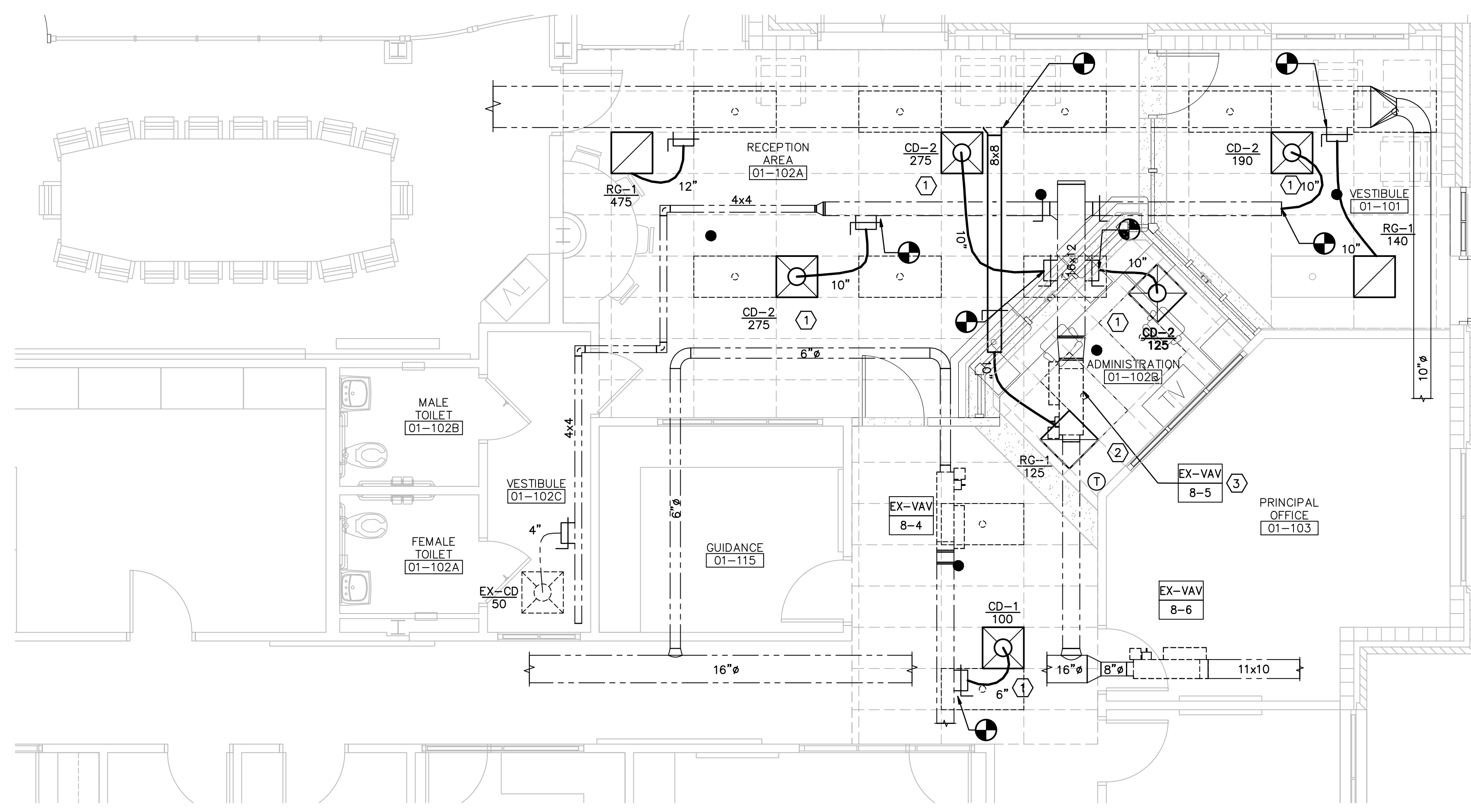
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Comm. No:	16025.18	
Date:	07/23/2020	
Drawn:	SL	
Revisions		
No.	Date	Note

TO THE BEST OF MY KNOWLEDGE, THE PLANS AND SPECIFICATIONS COMPLY WITH THE MINIMUM BUILDING CODES.



1 M1.1 FIRST FLOOR HVAC PLAN - DEMOLITION
SCALE: 1/4" = 1'-0" NORTH



1 M2.1 FIRST FLOOR HVAC PLAN - NEW WORK
SCALE: 1/4" = 1'-0" NORTH

- GENERAL NOTES**
- EXISTING DUCTWORK, AIR DEVICES, AND ASSOCIATED INSULATION SHALL BE PROTECTED FROM DAMAGE DURING CONSTRUCTION. CONTRACTOR SHALL REPLACE ANY INSULATION DAMAGED AS A RESULT OF CONSTRUCTION.
 - CONTRACTOR SHALL TAKE PRE-CONSTRUCTION AIR-FLOW READINGS AT ALL SUPPLY DIFFUSERS AND RETURN GRILLES WITHIN THE SCOPE OF WORK. READINGS SHALL BE PERFORMED AND SUBMITTED TO THE ENGINEER PRIOR TO ANY DEMOLITION.
 - CONTRACTOR SHALL BALANCE ALL SUPPLY DIFFUSERS AND RETURN GRILLES TO AIR QUANTITIES (CFM) SHOWN ON NEW WORK PLAN.

- DEMOLITION PLAN NOTES**
- EXISTING RETURN GRILLE TO BE REMOVED. CUT BACK BRANCH DUCT TO MAIN, CAP AND SEAL. REPAIR AND REPLACE INSULATION AS NECESSARY TO MAINTAIN THERMAL AND VAPOR BARRIER.
 - EXISTING SUPPLY DIFFUSER TO BE REMOVED.
 - EXISTING THERMOSTAT TO BE RELOCATED. REFER TO NEW WORK PLAN FOR NEW LOCATION.

- NEW WORK PLAN NOTES**
- REPLACEMENT DIFFUSER: REPLACE EXISTING FLEXIBLE DUCTWORK AS NECESSARY TO RECONNECT DIFFUSER.
 - RELOCATED THERMOSTAT. EXTEND OR REPLACE EXISTING CONTROL WIRING TO NEW LOCATION, RECONNECT AND RESTORE FUNCTIONALITY.
 - RE-BALANCE EXISTING TERMINAL UNIT VAV 8-5 TO 915 CFM.

Revisions		
No.	Date	Note

TO THE BEST OF MY KNOWLEDGE, THE PLANS AND SPECIFICATIONS COMPLY WITH THE MINIMUM BUILDING CODES.

ELECTRICAL SYMBOL LEGEND

	GROUND TYPE SINGLE RECEPTACLE 120V-20A. +18" AFF UNLESS NOTED OTHERWISE		EQUIPMENT SCHEDULE NOTATION
	GROUND TYPE DUPLEX RECEPTACLE 120V-20A. +18" AFF UNLESS NOTED OTHERWISE		T.V. ANTENNA OUTLET
	GROUND TYPE DUPLEX RECEPTACLE 120V-20A. MOUNT ABOVE COUNTER OR AT HEIGHT NOTED.		T.V. ORIENTATION OUTLET
	GROUND TYPE DUPLEX RECEPTACLE 120V-20A. WITH INTEGRAL GROUND FAULT INTERRUPT PROTECTION.		JUNCTION PULL BOX
	RECEPTACLE 120V-20A. MOUNT 18" AFF UNLESS OTHERWISE NOTED.		SECURITY JUNCTION BOX
	TAMPER RESISTANT GROUND TYPE DUPLEX RECEPTACLE 120V-20A. MOUNT 18" AFF UNLESS OTHERWISE NOTED.		VIDEO JUNCTION BOX
	GROUND TYPE DUPLEX RECEPTACLE 120V-20A. WITH BLUE FACE AND COVER. MOUNT 18" AFF UNLESS OTHERWISE NOTED.		CARD ACCESS JUNCTION BOX
	GROUND TYPE DOUBLE DUPLEX RECEPTACLE 120V-20A. MOUNT IN TWO GANG OUTLET BOX 18" AFF UNLESS OTHERWISE NOTED.		COMMUNICATIONS OUTLET
	TAMPER RESISTANT GROUND TYPE DOUBLE DUPLEX RECEPTACLE 120V-20A. MOUNT IN TWO GANG OUTLET BOX 18" AFF UNLESS OTHERWISE NOTED.		BELL
	GROUND TYPE DUPLEX RECEPTACLE 120V-20A. MOUNT IN FLUSH FLOOR BOX.		TELEPHONE OUTLET
	120V SPECIAL PURPOSE OUTLET (SUFFIX INDICATES AMPS)		FIRE ALARM HORN/STROBE
	3 WIRE 10 OR 4 WIRE 30 SPECIAL PURPOSE OUTLET (SUFFIX INDICATES AMPS)		FIRE ALARM STROBE LIGHT ONLY
	TRANSFORMER - SEE SCHEDULE FOR RATING		FIRE ALARM PULL STATION
	DISCONNECT SWITCH SEE SCHEDULE FOR RATING		COMBINATION FIXED TEMPERATURE AND RATE OF RISE HEAT DETECTOR
	120/208V PANELBOARD		CEILING MTD SMOKE DETECTOR (PHOTO ELECTRIC TYPE)
	277/480V PANELBOARD		DUCT MOUNTED SMOKE DETECTOR (PHOTO ELECTRIC TYPE)
	CELL BOOSTER ACCESS POINT		SMOKE DETECTOR REMOTE INDICATOR/RESET
	CELL BOOSTER ANTENNA		MAGNETIC DOOR HOLDER
	PATCH PANEL - (DEDICATED FOR CCTV)		POST INDICATING VALVE SWITCH
	NETWORK VIDEO RECORDER		TAMPER SWITCH
	POWER OVER ETHERNET		PRESSURE SWITCH
	WIRELESS ACCESS POINT		FLOW SWITCH
	SECURED ACCESS DOOR		CLOCK
	SECURITY - KEYPAD (ALARM COMMAND CENTER)		MICROPHONE OUTLET - WALL MOUNTED
	SECURITY - DOOR CONTACT		PUBLIC ADDRESS/INTERCOM SPEAKER-CEILING
	INDICATES "TELECOM/POWER" POWER POLE		PUBLIC ADDRESS/INTERCOM SPEAKER-WALL
	CARD READER		PUSH BUTTON STATION (ONE OR MORE BUTTONS) "P" INDICATES PRIVACY TYPE "K" INDICATES KEY-OPERATED
	VIDEO INTERCOM		CAMERA - SINGLE HEAD VIEW
	LIGHT SWITCH WITH OCCUPANCY/VACANCY SENSOR - DUAL TECHNOLOGY		CAMERA - DOUBLE HEAD VIEW
	DIMMER SWITCH WITH OCCUPANCY/VACANCY SENSOR - DUAL TECHNOLOGY		CAMERA - TRIPLE HEAD VIEW
	EXIT LIGHT		CAMERA - FOUR HEAD VIEW
	LIGHTING FIXTURE		SECURITY STROBE
	EMERGENCY WALL PACK WITH BACKUP BATTERY		TIME CLOCK
			SECURITY HUB
			CAMERA INTERCOM

HEIGHTS AND LOCATIONS:

WALL BRACKET FIXTURES	7'-0" TO CENTER OF OUTLET
INTERCOM SPEAKERS	7'-0" TO CENTER
CLOCKS	7'-0" TO CENTER (IN GENERAL)
FIRE ALARM HORN/STROBES AND STROBES	6'-8" TO CENTER
PANELBOARDS	6'-0" TO TOP
LIGHTING SWITCHES	42" TO CENTER
FIRE ALARM PULL STATIONS	42" TO CENTER
WALL MOUNTED TELEPHONE	42" TO CENTER
INTERCOM CALL BACK RECEPTACLES	18" TO CENTER
BROADBAND TV OUTLETS	18" TO CENTER OR 6'-8" TO CENTER (MIP)
TELEPHONE OUTLETS	18" TO CENTER
OTHER DEVICES	18" TO CENTER
COORDINATE ALL DEVICE LOCATIONS WITH ARCHITECTURAL ELEVATIONS PRIOR TO ROUGH-IN.	

GENERAL ELECTRICAL NOTES

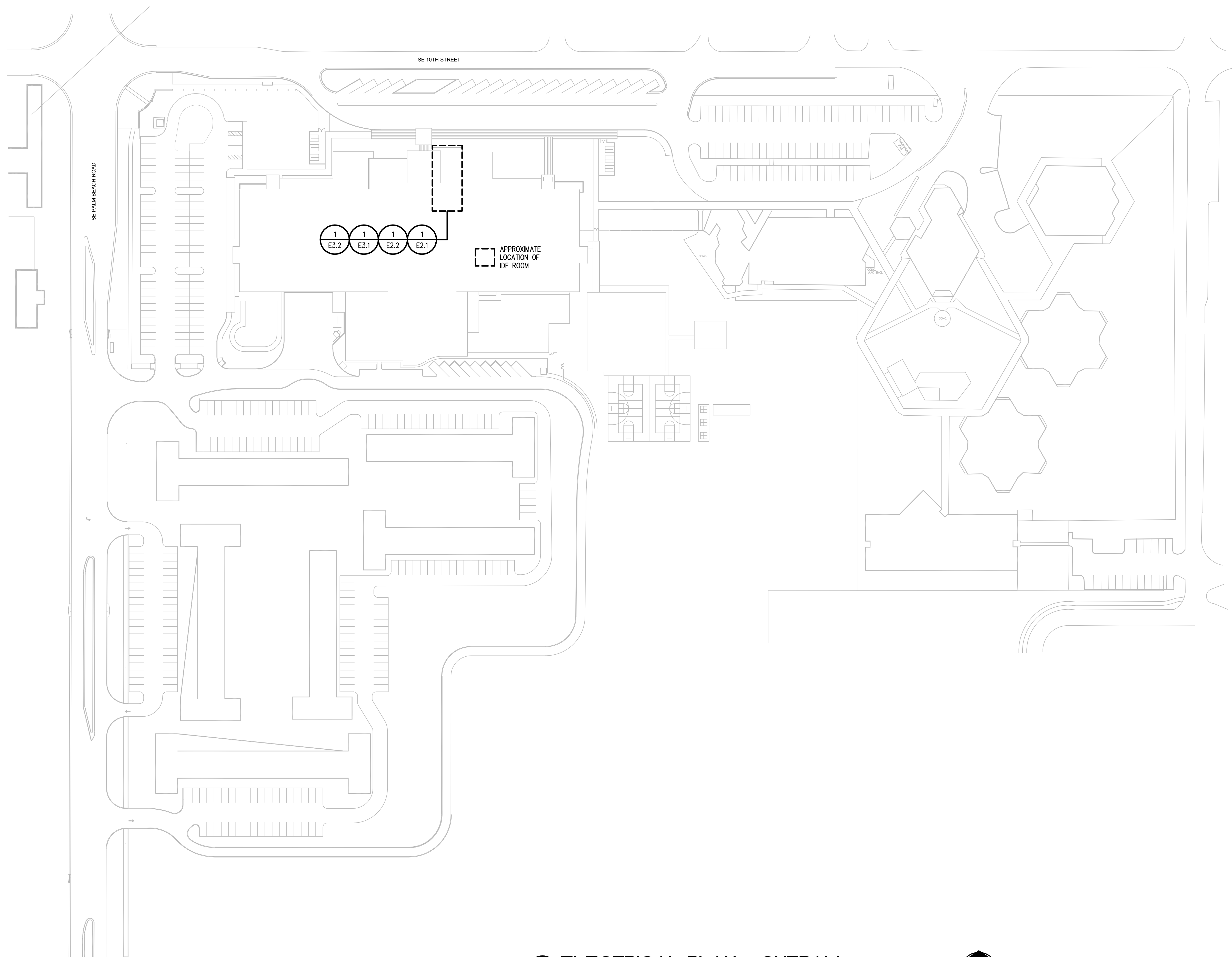
1. ALL ELECTRICAL WORK SHALL COMPLY WITH NATIONAL ELECTRICAL CODE, THE NATIONAL FIRE CODES, THE AMERICANS WITH DISABILITIES ACT, AND THE FLORIDA BUILDING CODE.
2. THE CONTRACTOR SHALL THOROUGHLY REVIEW THE PROJECT TO ENSURE THAT ALL WORK SHALL MEET OR EXCEED THE ABOVE REQUIREMENTS. ANY ALLEGED DISCREPANCIES SHALL BE BROUGHT TO THE ENGINEER'S ATTENTION PRIOR TO BID.
3. THE CONTRACTOR IS DIRECTED TO OBTAIN COPIES OF ALL RELATED PLANS, SPECIFICATIONS, SHOP DRAWINGS AND ADDENDUM TO COORDINATE THE RELATED WORK AND SCHEDULING.
4. THE CONTRACTOR IS REMINDED THAT ELECTRICAL SERVICE TO AND FOR MECHANICAL AND OTHER EQUIPMENT ARE BASED ON EQUIPMENT DESIGN DATA. THE VALUES MAY DIFFER DEPENDING UPON THE ACTUAL EQUIPMENT TO BE FURNISHED. ANY MODIFICATION TO THE ELECTRICAL, BASED UPON ACTUAL EQUIPMENT SELECTION, SHALL RESULT IN NO ADDITIONAL COST TO THE OWNER.
5. THE CONTRACTOR SHALL THOROUGHLY REVIEW THE ARCHITECTURAL AND MECHANICAL PLANS TO ASSURE THAT ELECTRICAL SERVICE FOR ALL ITEMS AND/OR EQUIPMENT REQUIRING ELECTRICAL SERVICE IS INCLUDED. ANY ITEM AND/OR EQUIPMENT NOT PROVIDED WITH ELECTRICAL SERVICE, REQUIRING ELECTRICAL SERVICE, SHALL BE BROUGHT TO THE ENGINEER'S ATTENTION.
6. MECHANICAL AND ELECTRICAL EQUIPMENT HAVE BEEN LOCATED AND ARRANGED TO MINIMIZE THE INTERFERENCES OF EQUIPMENT AND STRUCTURE. THE CONTRACTOR SHALL THOROUGHLY FAMILIARIZE HIMSELF WITH THE WORK TO BE PERFORMED BY OTHER TRADES AND THE PHYSICAL CHARACTERISTICS OF THE STRUCTURE IN ORDER TO SCHEDULE AND INSTALL EQUIPMENT AND TO MINIMIZE POSSIBLE INTERFERENCE. FAILURE TO PROPERLY COMMUNICATE AND SCHEDULE WORK WITH OTHER TRADES RESULTING IN ADDITIONAL WORK AND MATERIAL SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR. THE MODIFICATIONS REQUIRED TO RESOLVE THE CONFLICT SHALL BE DECIDED BY THE ENGINEER.
7. ALL PANELBOARDS SHALL BE PROVIDED WITH A TYPED SCHEDULE SHOWING CIRCUIT NUMBERS AND A COMPLETE DESCRIPTION OF EACH CIRCUIT.
8. MINIMUM TRADE SIZE CONDUIT PERMITTED SHALL BE 1/2 INCH UNLESS NOTED OTHERWISE.
9. ALL CONDUCTOR METAL SHALL BE COPPER WITH 600 VOLT INSULATION TYPE THHN. (MINIMUM SIZE SHALL BE #12AWG.) CONTRACTOR SHALL ADJUST WIRE AND CONDUIT SIZES IF OTHER INSULATION TYPES ARE USED.
10. ALL LIGHT SWITCHES AND DUPLEX RECEPTACLES SHALL BE RATED FOR 20 AMPERE AT 125/277 VOLTS A/C. WRING DEVICES SHALL BE MANUFACTURED BY HUBBELL OR APPROVED EQUAL. PROVIDE BARRIERS AT 277V SWITCHES WHERE REQUIRED BY N.E.C. ARTICLE 404-8(b).
11. ALL ELECTRICAL WRING DEVICES INDICATED TO BE INSTALLED IN MASONRY WALLS OR FLOORS SHALL BE FLUSH MOUNTED, INCLUDING BRANCH CIRCUIT PANELBOARDS, UNLESS OTHERWISE NOTED. THE CONDUITS TO ASSOCIATED ELECTRICAL EQUIPMENT SHALL BE CONCEALED IN WALLS OR FLOOR.
12. ALL CONDUIT RUNS SHALL BE CONCEALED UNLESS SPECIFICALLY NOTED OTHERWISE.
13. THE FIXTURE SCHEDULE IS FOR REFERENCE ONLY. MODEL NUMBERS LISTED MAY NOT INCLUDE ALL REQUIRED OPTIONS. REFER TO SPECIFICATIONS FOR ADDITIONAL INFORMATION. EQUAL FIXTURES OF OTHER MANUFACTURERS MAY BE SUBSTITUTED AS EQUAL. ALL SUBSTITUTIONS ARE SUBJECT TO APPROVAL AS EQUAL BY THE ENGINEER.
14. ALL EXIT LIGHTS SHALL BE PROVIDED WITH UNIVERSAL MOUNTING BRACKETS. THE CONTRACTOR SHALL VERIFY ALL DIRECTIONAL ARROWS PRIOR TO ORDERING FIXTURES.
15. THE CONTRACTOR SHALL FURNISH THE AIR CONDITIONING SUBCONTRACTOR AND THE CEILING SUBCONTRACTOR COPIES OF APPROVED LIGHT FIXTURE SHOP DRAWINGS.
16. ALL RECESSED LIGHTING FIXTURES IN FIRE RATED CEILINGS SHALL BE TENTED TO COMPLY WITH THE APPLICABLE CEILING RATING. THE CONTRACTOR SHALL VERIFY REQUIREMENTS.
17. THE CONTRACTOR SHALL COORDINATE WITH THE MECHANICAL SUBCONTRACTOR TO ENSURE THAT ALL NECESSARY CONDUITS FOR AIR CONDITIONING CONTROLS ARE INCLUDED. IT IS THE ELECTRICAL SUBCONTRACTOR'S RESPONSIBILITY TO ENSURE THAT ALL EQUIPMENT IS WIRED PROPERLY AND ALL CONTROLS ARE OPERATIONAL. THE ELECTRICAL SUBCONTRACTOR SHALL FURNISH ALL MATERIALS NOT SUPPLIED BY THE MECHANICAL SUBCONTRACTOR.
18. COMMUNICATION CONDUITS ARE TO BE LONG RADIUS TYPE AND SHALL CONTAIN PULL WIRES. PROVIDE PLATES FOR ALL OUTLETS.
19. ALL SPECIAL PURPOSE OUTLETS SHALL BE PROVIDED TO MATCH EQUIPMENT TO BE SUPPLIED.
20. THE PLANS INDICATE THE DESIRED ARRANGEMENT AND GENERAL LOCATIONS OF LIGHT FIXTURES. THE ARCHITECTURAL PLANS INDICATE ADDITIONAL DATA AS TO THE FINAL FIXTURE PLACEMENT. THE CONTRACTOR SHALL VERIFY CEILING TYPES AND INSTALLATION REQUIREMENTS PRIOR TO ORDERING LIGHT FIXTURES.
21. ALL PANELBOARDS, SWITCHES AND CIRCUIT BREAKERS SHALL BE SQUARE D, GE, SIEMENS, OR CUTLER HAMMER.
22. ALL CONDUITS SHALL HAVE A SEPARATE GREEN GROUND CONDUCTOR INSTALLED FOR GROUNDING.
23. ANY EXISTING UTILITIES LOCATED IN THE AREA OF CONSTRUCTION WHICH REQUIRE RELOCATION BY THE OWNER SHALL BE COORDINATED WITH THE OWNER'S REPRESENTATIVE A MINIMUM OF TEN DAYS IN ADVANCE.
24. ALL DISCONNECT SWITCHES SHALL BE THE HEAVY DUTY TYPE WITH BUSSMAN TIME DELAY, DUAL ELEMENT AND CURRENT LIMITING FUSES.
25. THE CONTRACTOR SHALL CHECK THE ARCHITECTURAL DRAWINGS FOR EXACT LOCATION AND/OR DIMENSIONS FOR INSTALLATION OF ALL ELECTRICAL ITEMS. ALL QUESTIONABLE LOCATIONS SHALL BE APPROVED BY OWNER'S REPRESENTATIVE PRIOR TO INSTALLATION.
26. ALL EMPTY CONDUITS SHALL CONTAIN JET LINE #232 POLYOFIN 200 LB. TEST.
27. ALL WORK SHOWN ON THE ELECTRICAL PLANS SHALL BE PERFORMED BY THE CONTRACTOR UNLESS NOTED OTHERWISE.
28. ALL EXIT FIXTURES SHALL BE CONNECTED TO THE BUILDING EMERGENCY PANEL UNSWITCHED.
29. ALL SURGE PROTECTED OUTLETS SHALL BE EQUAL TO HUBBELL #5352 IS.
30. EQUIPMENT INSTALLED WITHIN CONCEALED SPACES SHALL HAVE REASONABLE ACCESS PANELS PROVIDED NEARBY FOR INSPECTION, TESTING AND SERVICE CONSIDERATIONS.
31. ALL SECURITY SYSTEM WRING AND DEVICE INSTALLATIONS SHALL BE DONE BY THE PALM BEACH COUNTY SCHOOL DISTRICT.
32. THE FIRE ALARM MANUFACTURER SHALL PROVIDE CERTIFIED TECHNICIAN TO SUPERVISE THE INSTALLATION, FINAL CONNECTIONS AND TESTING OF THE FIRE ALARM SYSTEM. AT THE COMPLETION OF THE PROJECT, THE MANUFACTURER SHALL INSPECT THE SYSTEM AND CERTIFY THAT IT IS INSTALLED IN ACCORDANCE WITH NFPA 72. ALL FIRE ALARM COMPONENTS SHALL COMPLY WITH ADA REQUIREMENTS.
33. REFER TO SPECIFICATIONS FOR MORE INFORMATION.

DRAWING INDEX

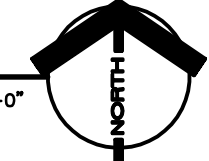
SHEET NO.	DESCRIPTION
E0.1	ELECTRICAL NOTES AND LEGEND
E1.1	ELECTRICAL PLAN - OVERALL
E2.1	LIGHTING PLAN - DEMOLITION
E2.2	LIGHTING PLAN - NEW WORK
E3.1	POWER AND SYSTEMS PLAN - DEMOLITION
E3.2	POWER AND SYSTEMS PLAN - NEW WORK
E4.1	ELECTRICAL RISERS AND SCHEDULES
E5.1	ELECTRICAL DETAILS

Revisions		
No.	Date	Note

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1
ELECTRICAL PLAN - OVERALL
SCALE: 1"=60'-0"



Martin County School District
 JD Parker ES Enhanced Security Project A2
 1010 East 10th Street
 Stuart, Florida 34996
 Permit Documents Submittal

Comm. No: 16025.18
 Date: 07/23/2020
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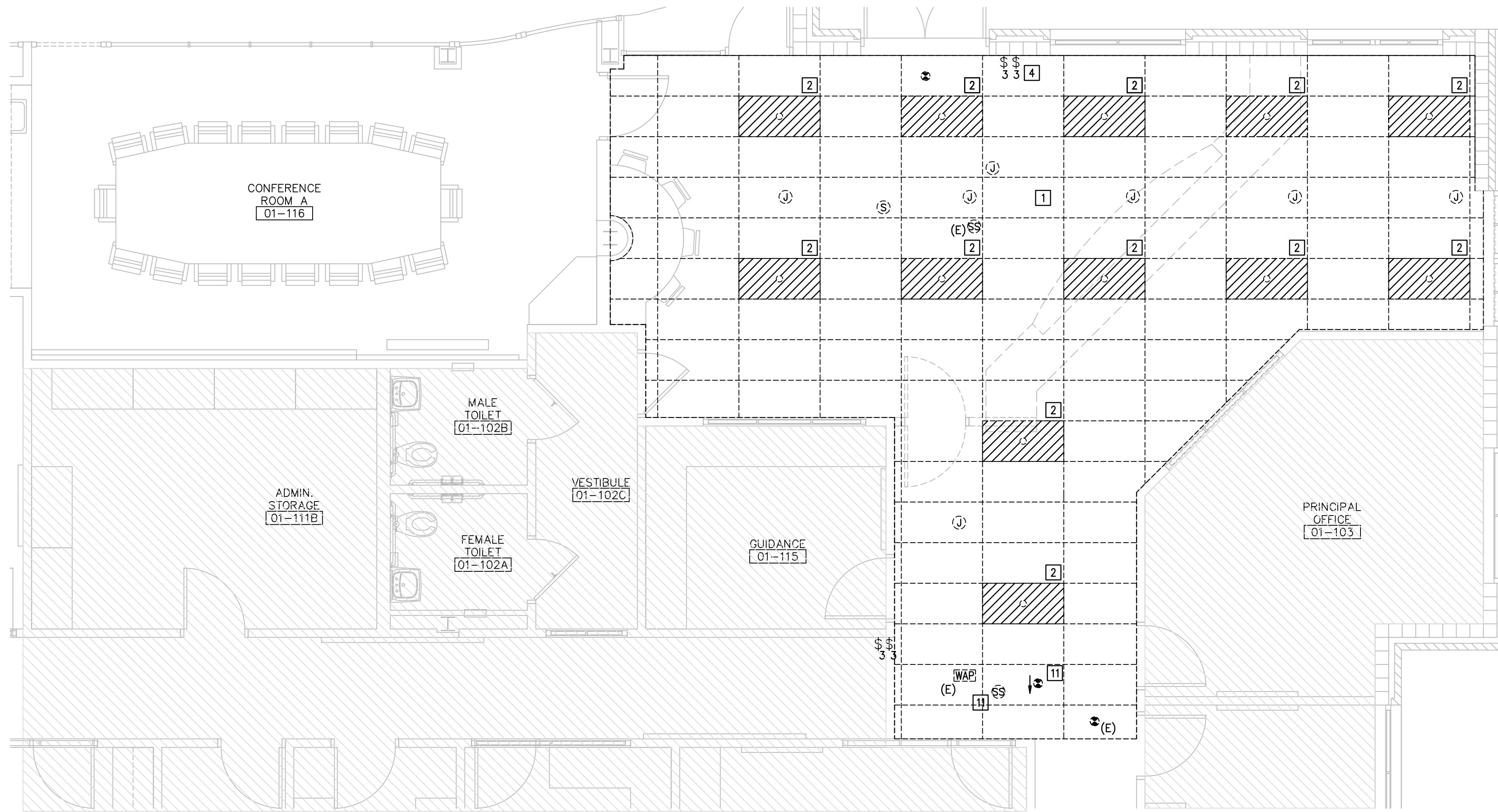
Certification Number 6059
 Charles C. Gableman, P.E. 61926
 Kyle E. Lorzino, P.E. 90028

ELECTRICAL PLAN - OVERALL

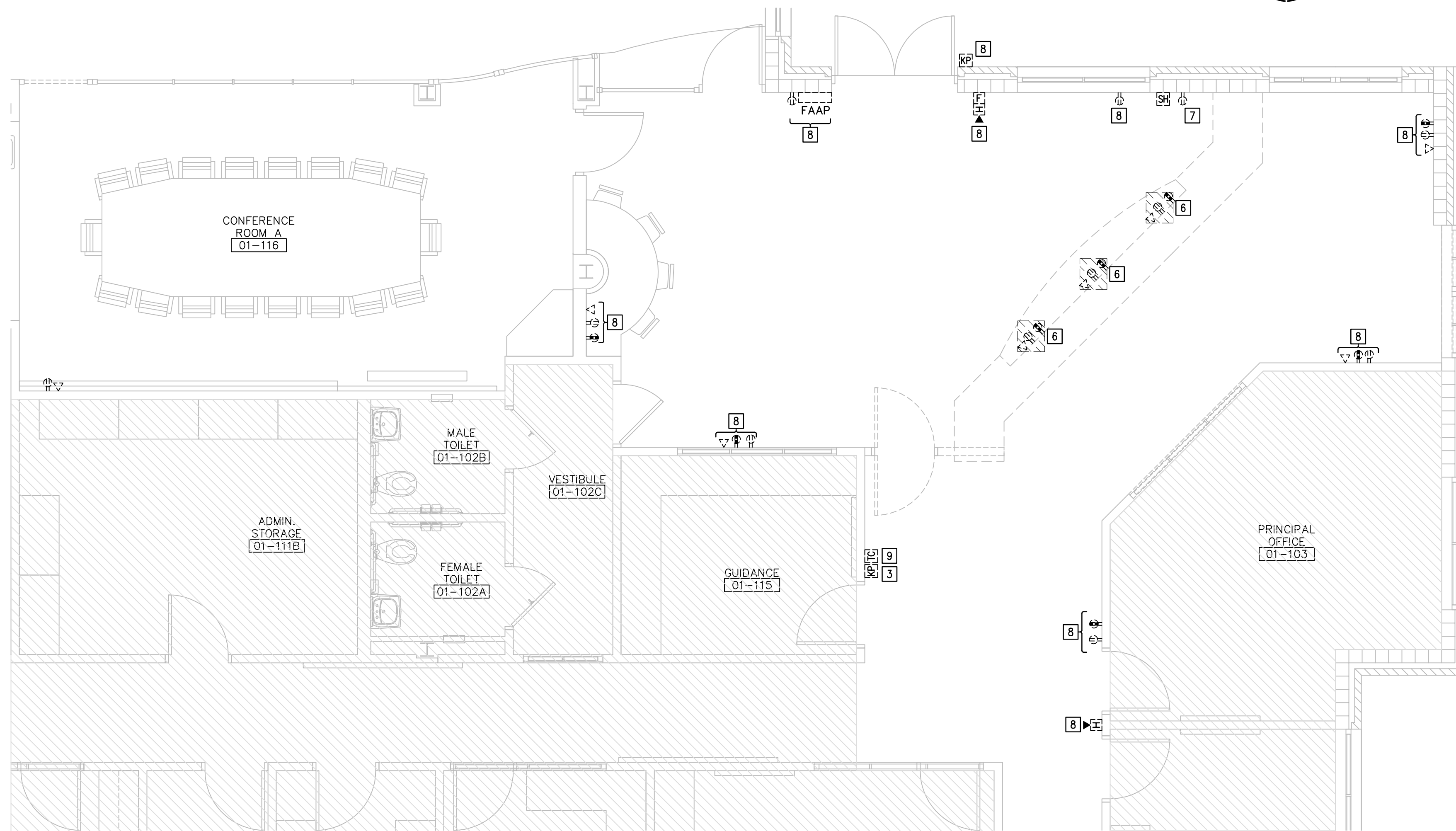
E1.1

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1 LIGHTING PLAN - DEMOLITION (14)
 SCALE: 1/4" = 1'-0"
 NORTH



1 POWER AND SYSTEMS PLAN - DEMOLITION
 SCALE: 1/4" = 1'-0"
 NORTH

GENERAL NOTE
 FIELD VERIFY ALL EXISTING CIRCUITS TO BE REUSED PRIOR TO ROUGH-IN.

- PLAN NOTES**
- 1 EXISTING CEILING GRID TO BE REMOVED. TEMPORARILY REMOVE, SUPPORT FROM STRUCTURE, AND REINSTALL CEILING MOUNTED DEVICES AS REQUIRED. FIRE ALARM AND SECURITY DEVICES SHALL BE PROVIDED WITH APPROPRIATE DUST COVERS OR BAGGED.
 - 2 EXISTING LIGHTING FIXTURE TO BE REMOVED. EXISTING CIRCUITING TO REMAIN FOR INSTALLATION OF NEW FIXTURES.
 - 3 EXISTING WALL SWITCH TO BE RELOCATED, SEE NEW WORK PLAN.
 - 4 WALL SWITCHES TO REMAIN UNLESS NOTED OTHERWISE AND SHOWN FOR REFERENCE ONLY.
 - 5 FIXTURE TO BE DEMOLISHED. CIRCUITING TO BE REWORKED. SEE NEW WORK PLAN E2.2.
 - 6 DISCONNECT AND REMOVE POWER AND DATA TO ACCOMMODATE REMOVAL OF EXISTING COUNTERS.
 - 7 RECEPTACLE OR DATA PORT IS LOCATED IN AREA OF WALL TO BE DEMOLISHED AND SHALL BE RELOCATED AS NECESSARY.
 - 8 EXISTING DEVICE TO REMAIN.
 - 9 EXISTING TIMECLOCK TO REMAIN.
 - 10 EXISTING TO BE REMOVED. REMOVE CONDUIT AND WIRING BACK TO COMMON J-BOX OR LOCAL TERMINAL/CONTROL PANEL PANEL.
 - 11 EXISTING DEVICE TO BE RELOCATED.

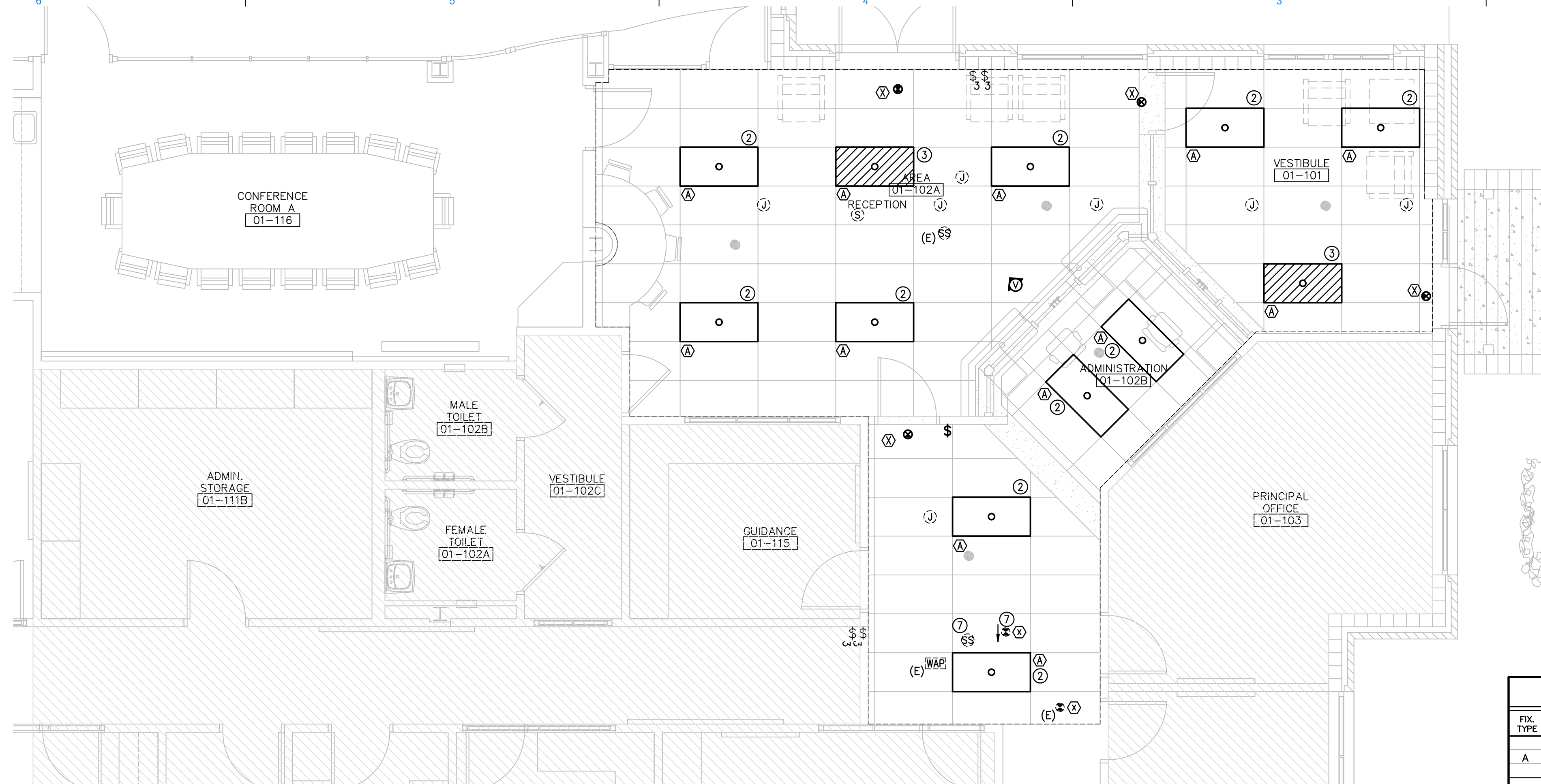
GENERAL DEMOLITION NOTES

- A. ALL EXISTING ELECTRICAL EQUIPMENT/FIXTURES/DEVICES IN THE REMODELING AREAS SHALL BE ADDRESSED AS INDICATED BY THE DEMO. PLAN NOTES.
- B. DISCONNECT AND REMOVE ALL CONDUIT, CONDUCTORS, BOXES, SUPPORTS, ETC. ASSOCIATED WITH ELECTRICAL EQUIPMENT/FIXTURE/DEVICES TO BE REMOVED, AS DESCRIBED IN DEMO. PLAN NOTES. REMOVE CONDUIT AND CONDUCTORS BACK TO SOURCE - FOR THOSE CIRCUITS THAT SERVE OTHER EQUIPMENT/FIXTURES/DEVICES THAT ARE TO REMAIN, REMOVE CONDUIT AND CONDUCTORS SERVING DEMOLISHED EQUIPMENT, BACK TO NEAREST JUNCTION POINT, AND SAFELY DEAD-END.
- C. THE CONTRACTOR IS CAUTIONED THAT EXISTING SERVICES ARE ROUTED CONCEALED IN PARTITIONS AND IN OR UNDER FLOOR SLABS. PRIOR TO DEMOLITION OR ANY CUTTING, DRILLING, BORING, ETC., THE CONTRACTOR SHALL CONFIRM THE LOCATION OF ANY SUCH SERVICES. ANY DISRUPTION OR DAMAGE TO SERVICES THAT MUST REMAIN IN-TACT, SHALL BE REPAIRED IMMEDIATELY BY THE CONTRACTOR, AT NO EXPENSE TO THE OWNER, EXCEPT IN THE CASE OF MUTUALLY AGREED UPON UNFORESEEABLE CONDITIONS.

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Revisions		
No.	Date	Note

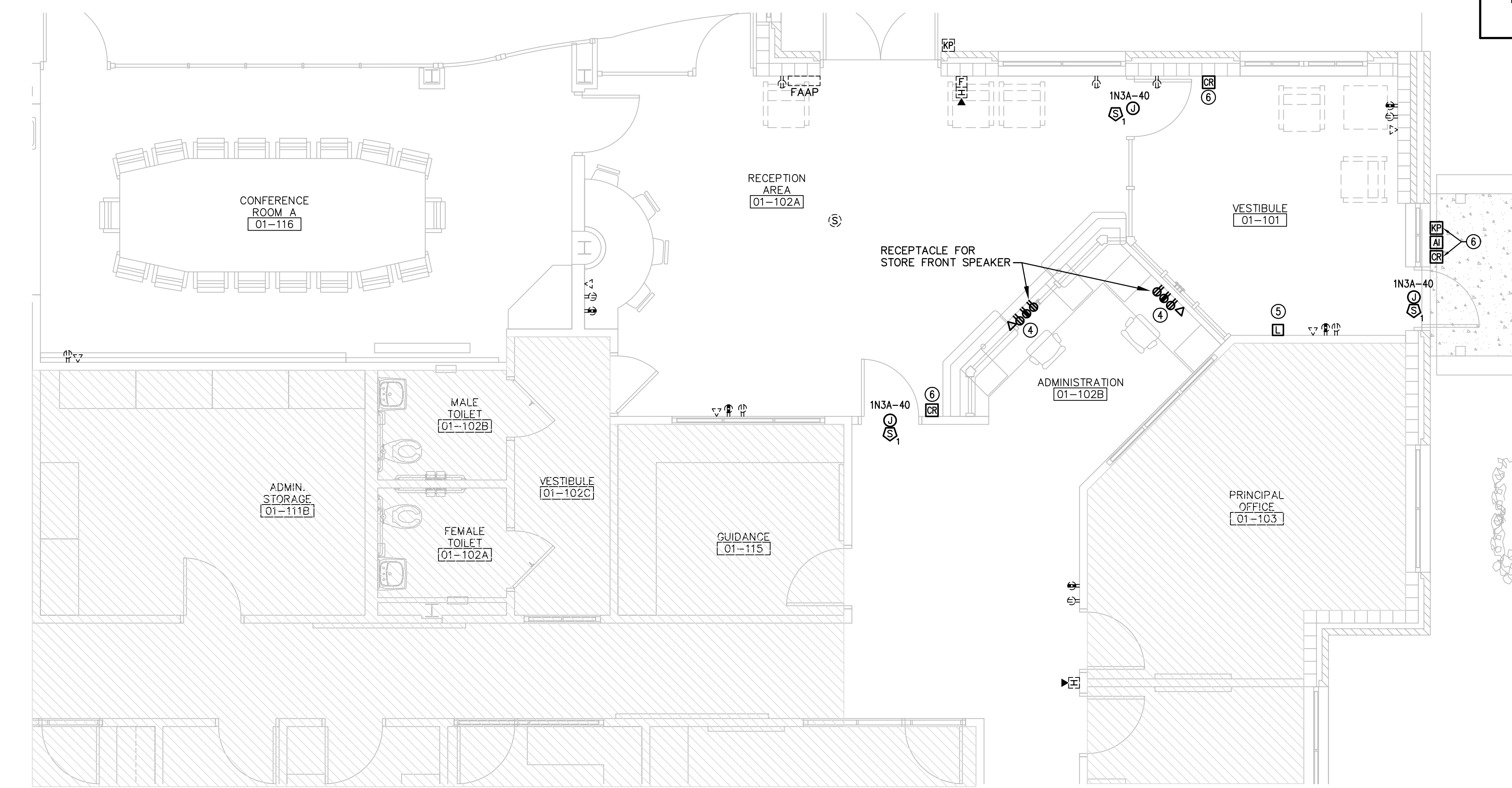
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1 LIGHTING PLAN - NEW WORK
 SCALE: 1/4" = 1'-0"
 NORTH

LIGHTING FIXTURE SCHEDULE									
FIX. TYPE	MANUFACTURER	CATALOG NUMBER	LAMPS	TYPE OF FIXTURE	MOUNTING			VOLTS	NOTES
					REC	SUR	SUS		
A	METALUX	24CZ2-70HE-UNV-L840-GD1-U	LED 51W	2x4 LED CENTER BASKET TROFFER DIMMABLE	•			120-277	
X	ISOLITE	RL-EM-R-WW-SD	LED 2W	LED EXIT SIGN			•	120-277	
	ABL	2BLT4 72LHE SDP GZ10 LP835							
	COLU	LCA124-40VLG-ED1U							
	ABL	LQM S W 3 R 120/277 EL N SD							
	COMP	CERSD							

FIXTURE SCHEDULE NOTES:
 1. CONTRACTOR SHALL VERIFY AVAILABLE VOLTAGE FOR LIGHTS PRIOR TO ORDERING FIXTURE.



1 POWER AND SYSTEMS PLAN - NEW WORK
 SCALE: 1/4" = 1'-0"
 NORTH

GENERAL NOTE
 FIELD VERIFY ALL EXISTING CIRCUITS TO BE REUSED PRIOR TO ROUGH-IN.

- PLAN NOTES**
- INTERCEPT AND EXTEND CONDUIT AND CONDUCTORS AS NECESSARY TO MAINTAIN ORIGINAL CONTROL.
 - NEW FIXTURE CONNECTED TO EXISTING LOBBY LIGHTING CIRCUIT 4H3-3 AND CONTROLS.
 - NEW FIXTURE CONNECTED TO EXISTING LOBBY LIGHTING CIRCUIT 4E1-22 (EM ON GENERATOR) AND CONTROLS.
 - INTERCEPT AND EXTEND EXISTING POWER AND DATA FROM DEMOLISHED ADMINISTRATION COUNTER AND ROUTE TO NEW MILLWORK. CONNECT NEW OUTLETS TO EXISTING 120V CIRCUIT AND CONNECT DATA AS NECESSARY.
 - CONNECT NEW FIRE ALARM DEVICE TO EXISTING FIRE ALARM SYSTEM. ADD NAC PANEL BATTERY CAPACITY AS REQUIRED.
 - ADD 3/4" CONDUIT WITH PULL STRING ROUTED TO ACCESSIBLE CEILING SPACE.
 - COORDINATE RELOCATED DEVICE LOCATION WITH LIGHT FIXTURE LAYOUT.
 - ADD 3/4" CONDUIT WITH PULL STRING ROUTED TO EXISTING HEAD END UNIT.

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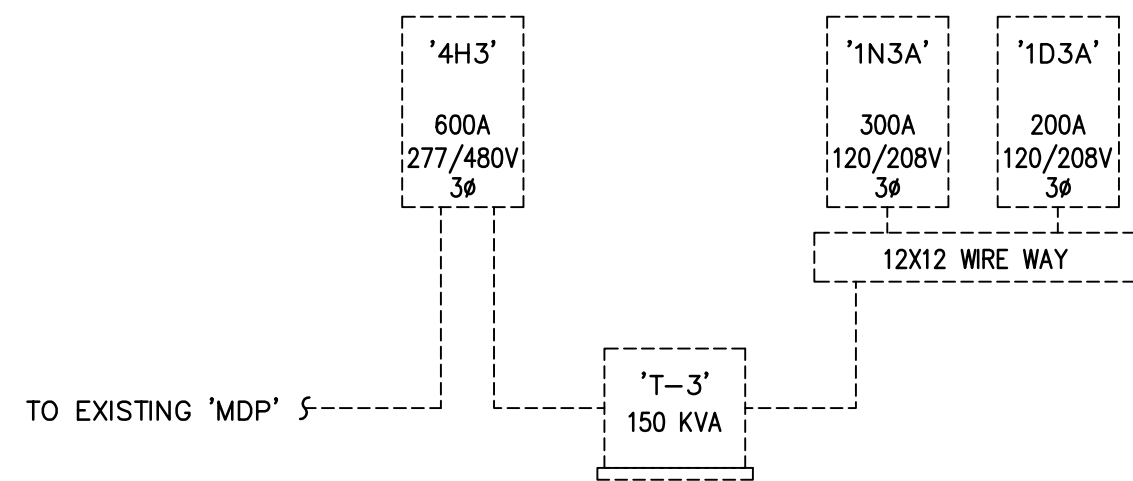
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Certification Number 0059
 Charles C. Gallesman, P.E. 61996
 Kyle E. Lortz, P.E. 80028

ELECTRICAL - NEW WORK PLANS

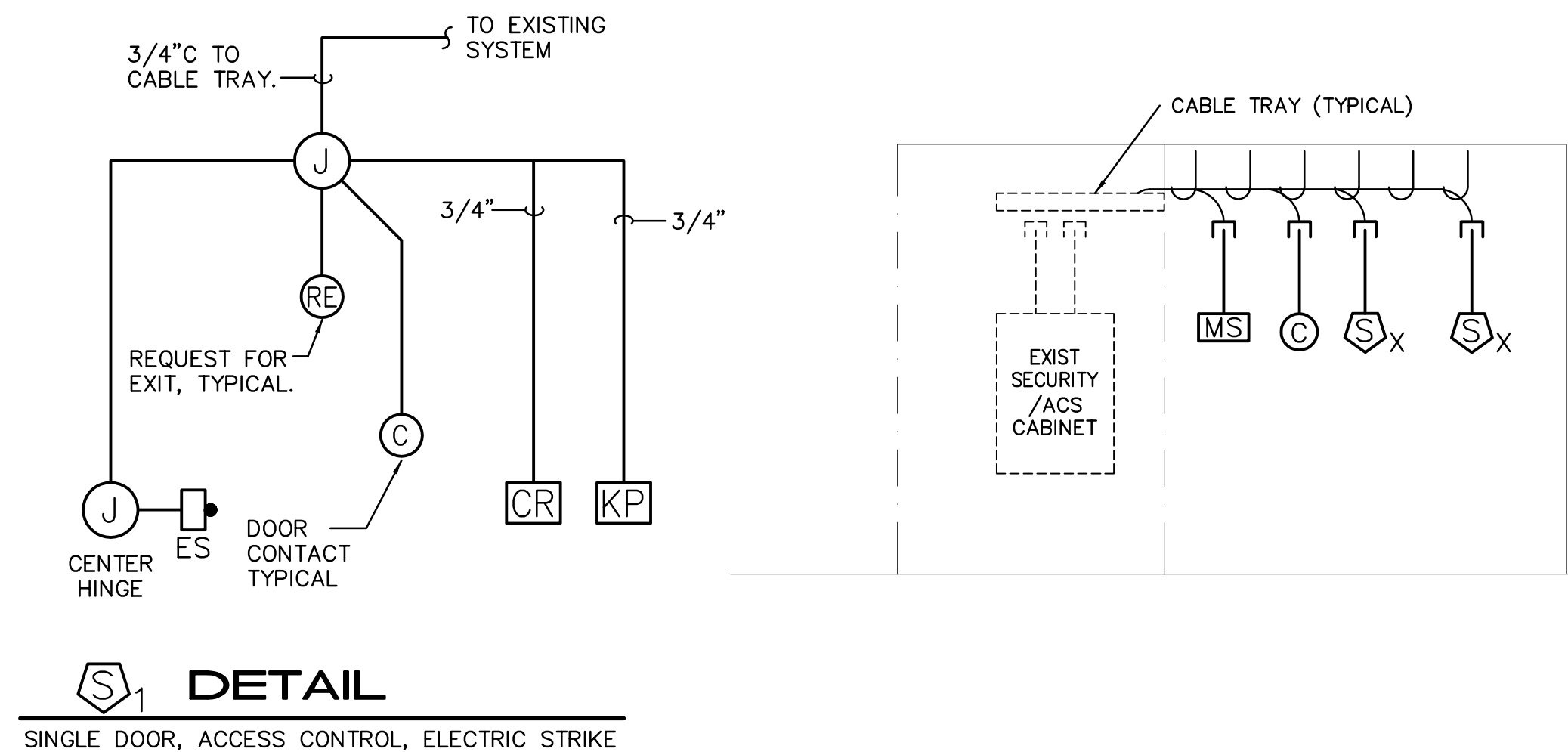
E3.1



1 PARTIAL RISER DIAGRAM

E4.1

SCALE: NONE



2 DETAIL
SINGLE DOOR, ACCESS CONTROL, ELECTRIC STRIKE

E4.1

2 ACCESS CONTROL DOOR DETAILS

PANELBOARD SCHEDULE														'1N3A'		
BUS KVA			LOAD	POLES	TRIP	LOAD	LOAD	TRIP	POLES	LOAD	BUS KVA					
A	B	C									A	B	C			
1.32			RECEPTACLES (EXIST)	1	20	1	2	20	1	RECEPTACLES (EXIST)	1.32					
	0.96		RECEPTACLES (EXIST)	1	20	3	4	20	1	RECEPTACLES (EXIST)			1.08			
		0.96	RECEPTACLES (EXIST)	1	20	5	6	20	1	RECEPTACLES - GFI (EXIST)			0.36			
1.32			RECEPTACLES - GFI (EXIST)	1	20	7	8	20	1	RECEPTACLES (EXIST)	0.6					
	0.72		RECEPTACLES (EXIST)	1	20	9	10	20	1	RECEPTACLES (EXIST)			1.08			
		0.84	RECEPTACLES (EXIST)	1	20	11	12	20	1	RECEPTACLES (EXIST)			0.72			
1.2			RECEPTACLES (EXIST)	1	20	13	14	20	1	RECEPTACLES - GFI (EXIST)	0.36					
	1.2		RECEPTACLES (EXIST)	1	20	15	16	20	1	RECEPTACLES - GFI (EXIST)			0.36			
		1.2	RECEPTACLES (EXIST)	1	20	17	18	20	1	RECEPTACLES (EXIST)			0.72			
1.32			RECEPTACLES (EXIST)	1	20	19	20	20	1	RECEPTACLES (EXIST)	1.08					
	0.72		RECEPTACLES - GFI (EXIST)	1	20	21	22	20	1	RECEPTACLES (EXIST)			0.72			
		0.36	RECEPTACLES - GFI (EXIST)	1	20	23	24	20	1	RECEPTACLES (EXIST)			0.96			
0.96			RECEPTACLES - GFI (EXIST)	1	20	25	26	20	1	RECEPTACLES (EXIST)	1.08					
	0.96		RECEPTACLES (EXIST)	1	20	27	28	20	1	RECEPTACLES (EXIST)			0.24			
		0.96	RECEPTACLES (EXIST)	1	20	29	30	20	1	RECEPTACLES (EXIST)			0.36			
0.96			RECEPTACLES (EXIST)	1	20	31	32	20	1	EWG (EXIST)	1.2					
	0.96		RECEPTACLES (EXIST)	1	20	33	34	20	1	EWG (EXIST)			1.2			
		0.96	RECEPTACLES - GFI (EXIST)	1	20	35	36	20	1	RECEPTACLES (EXIST)			0.72			
		-	RECEPTACLES - GFI (EXIST)	1	20	37	38	20	1	RECEPTACLES - GFI (EXIST)	0.24					
	-	-	RECEPTACLES (EXIST)	1	20	39	40	20	1	ACCESS CONTROL			0.3			
	-	-	SPARE	1	20	41	42	20	1	SPARE			-			

RATED VOLTAGE: 120/208V 3 PHASE, 4 WIRE FEED IS (X) BOTTOM () TOP FROM 'T-3'
 RATINGS IS TO BE 300 AMPS
 MAIN PROTECTION: 300 AMP MAIN BREAKER
 BRANCH POLES: 42
 PANELBOARD IS () FUSED (X) BOLT IN CB TYPE
 ALL BREAKERS RATED: 10,000 AMPS, SYM RMS

CONNECTED LOAD: 33 kVA

I = $\frac{32580\text{ VA}}{208\sqrt{3}}$ = 90.4 A

PANELBOARD SCHEDULE														'1D3A'		
BUS KVA			LOAD	POLES	TRIP	LOAD	LOAD	TRIP	POLES	LOAD	BUS KVA					
A	B	C									A	B	C			
0.72			RECEPTACLES	1	20	1	2	20	1	RECEPTACLES	0.96					
	0.36		RECEPTACLES	1	20	3	4	20	1	RECEPTACLES			0.72			
		0.6	RECEPTACLES	1	20	5	6	20	1	RECEPTACLES			0.6			
0.6			RECEPTACLES	1	20	7	8	20	1	RECEPTACLES	0.36					
	0.6		RECEPTACLES	1	20	9	10	20	1	RECEPTACLES			0.72			
		0.36	RECEPTACLES	1	20	11	12	20	1	RECEPTACLES			0.72			
0.72			RECEPTACLES	1	20	13	14	20	1	RECEPTACLES	0.72					
	0.6		RECEPTACLES	1	20	15	16	20	1	RECEPTACLES			0.72			
		0.6	RECEPTACLES	1	20	17	18	20	1	RECEPTACLES			0.6			
0.36			RECEPTACLES	1	20	19	20	20	1	RECEPTACLES	0.72					
	0.24		RECEPTACLES	1	20	21	22	20	1	RECEPTACLES			0.72			
		1.08	RECEPTACLES	1	20	23	24	20	1	RECEPTACLES			1.08			
0.72			RECEPTACLES	1	20	25	26	20	1	RECEPTACLES	0.72					
	0.72		RECEPTACLES	1	20	27	28	20	1	RECEPTACLES			1.08			
		0.72	RECEPTACLES	1	20	29	30	20	1	RECEPTACLES			0.72			
0.36			RECEPTACLES	1	20	31	32	20	1	RECEPTACLES	0.72					
	0.72		RECEPTACLES	1	20	33	34	20	1	RECEPTACLES			0.72			
		0.96	RECEPTACLES	1	20	35	36	20	1	RECEPTACLES			0.6			
-	-	-	SPARE	-	-	37	38	20	1	SPARE	-	-	-			
-	-	-	SURGE	3	30	39	40	20	1	SPARE	-	-	-			
-	-	-	SPARE	-	-	41	42	20	1	SPARE	-	-	-			

RATED VOLTAGE: 120/208V 3 PHASE, 4 WIRE FEED IS (X) BOTTOM () TOP FROM 'T-3'
 RATINGS IS TO BE 200 AMPS
 MAIN PROTECTION: 200 AMP MAIN BREAKER
 BRANCH POLES: 42
 PANELBOARD IS () FUSED (X) BOLT IN CB TYPE
 ALL BREAKERS RATED: 10,000 AMPS, SYM RMS

CONNECTED LOAD: 24 kVA

I = $\frac{24240\text{ VA}}{208\sqrt{3}}$ = 67.3 A

PANELBOARD SCHEDULE														'4H3'		
BUS KVA			LOAD	POLES	TRIP	LOAD	LOAD	TRIP	POLES	LOAD	BUS KVA					
A	B	C									A	B	C			
3.05			LIGHTING	1	20	1	2	30	1	VAV 3-1	3.32					
	2.22		LIGHTING	1	20	3	4	30	1	VAV 3-2			6.65			
		2.22	LIGHTING	1	20	5	6	30	1	VAV 3-3			6.65			
3.05			LIGHTING	1	20	7	8	30	1	VAV 3-4	6.65					
	1.66		LIGHTING	1	20	9	10	30	1	VAV 3-5			6.65			
		1.94	LIGHTING	1	20	11	12	30	1	VAV 3-6			6.65			
2.77			LIGHTING	1	20	13	14	30	1	VAV 3-7	6.65					
	2.77		LIGHTING	1	20	15	16	30	1	VAV 3-8			6.65			
		2.77	LIGHTING	1	20	17	18	30	1	VAV 3-9			6.65			
3.05			LIGHTING	1	20	19	20	30	1	VAV 3-10	6.65					
	1.66		EXT. LIGHTING	1	20	21	22	20	1	VAV 3-11			6.65			
		0.83	EXT. LIGHTING	1	20	23	24	20	1	VAV 3-12			6.65			
2.22			VAV 8-1	1	20	25	26	30	1	VAV 8-1	2.22					
	2.22		VAV 8-7	1	30	27	28	30	1	VAV 8-2			2.22			
		2.22	VAV 8-8	1	30	29	30	30	1	VAV 8-3			3.32			
2.22			VAV 8-9	1	30	31	32	30	1	VAV 8-4	2.22					
	2.22		VAV 8-10	1	20	33	34	30	1	VAV 8-5			6.65			
		2.22	VAV 8-11	1	20	35	36	30	1	VAV 8-6			3.32			
-	-	-	SPARE	-	-	37	38	-	1	SPARE	44.34					
-	-	-	SURGE	3	30	39	40	200	1	TRANSFORMER T-3			44.34			
-	-	-	SPARE	-	-	41	42	-	1	SPARE	-	-	44.34			

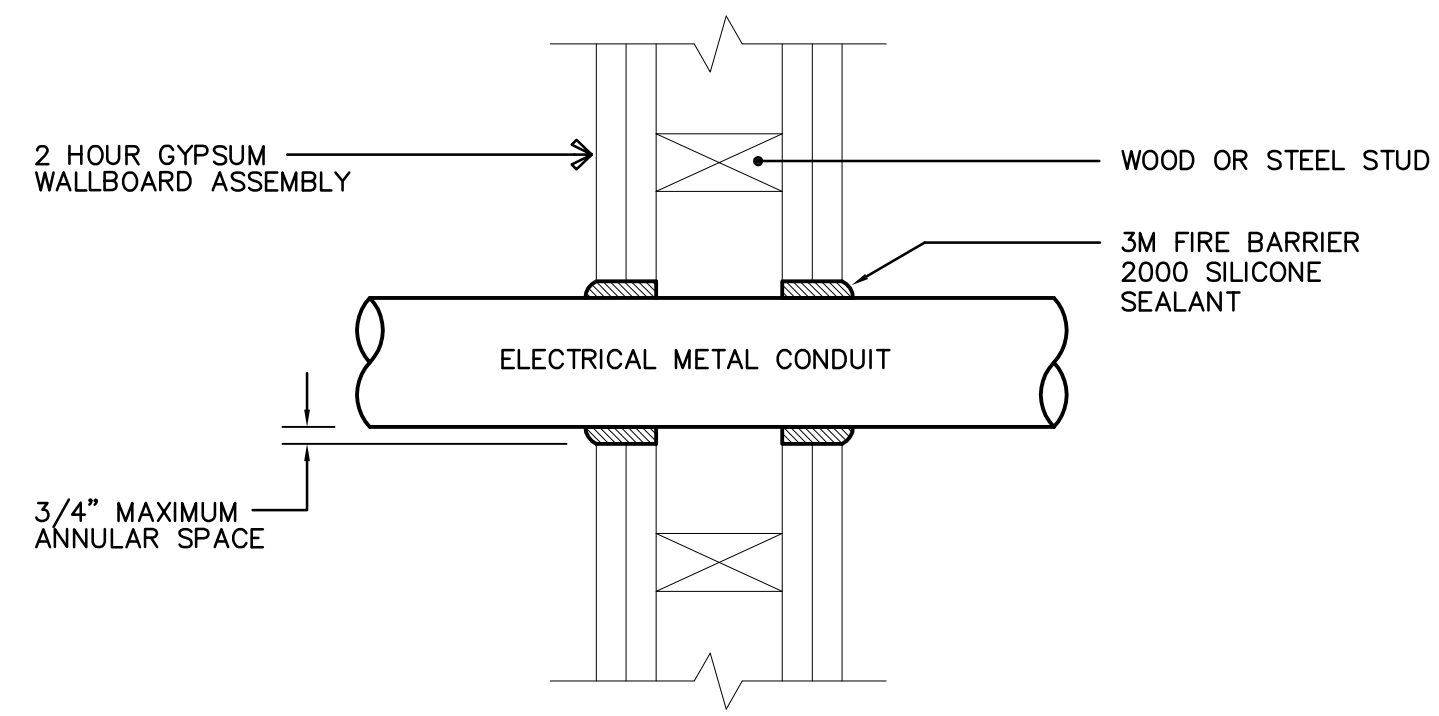
RATED VOLTAGE: 480/277V 3 PHASE, 4 WIRE FEED IS (X) BOTTOM () TOP FROM 'MDP'
 RATINGS IS TO BE 600 AMPS
 MAIN PROTECTION: 600 AMP MAIN BREAKER
 BRANCH POLES: 42
 PANELBOARD IS () FUSED (X) BOLT IN CB TYPE
 ALL BREAKERS RATED: 65,000 AMPS, SYM RMS

CONNECTED LOAD: 271 kVA

I = $\frac{270750\text{ VA}}{480\sqrt{3}}$ = 325.7 A

1N3A	1D3A	4H3
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Revisions		
No.	Date	Note

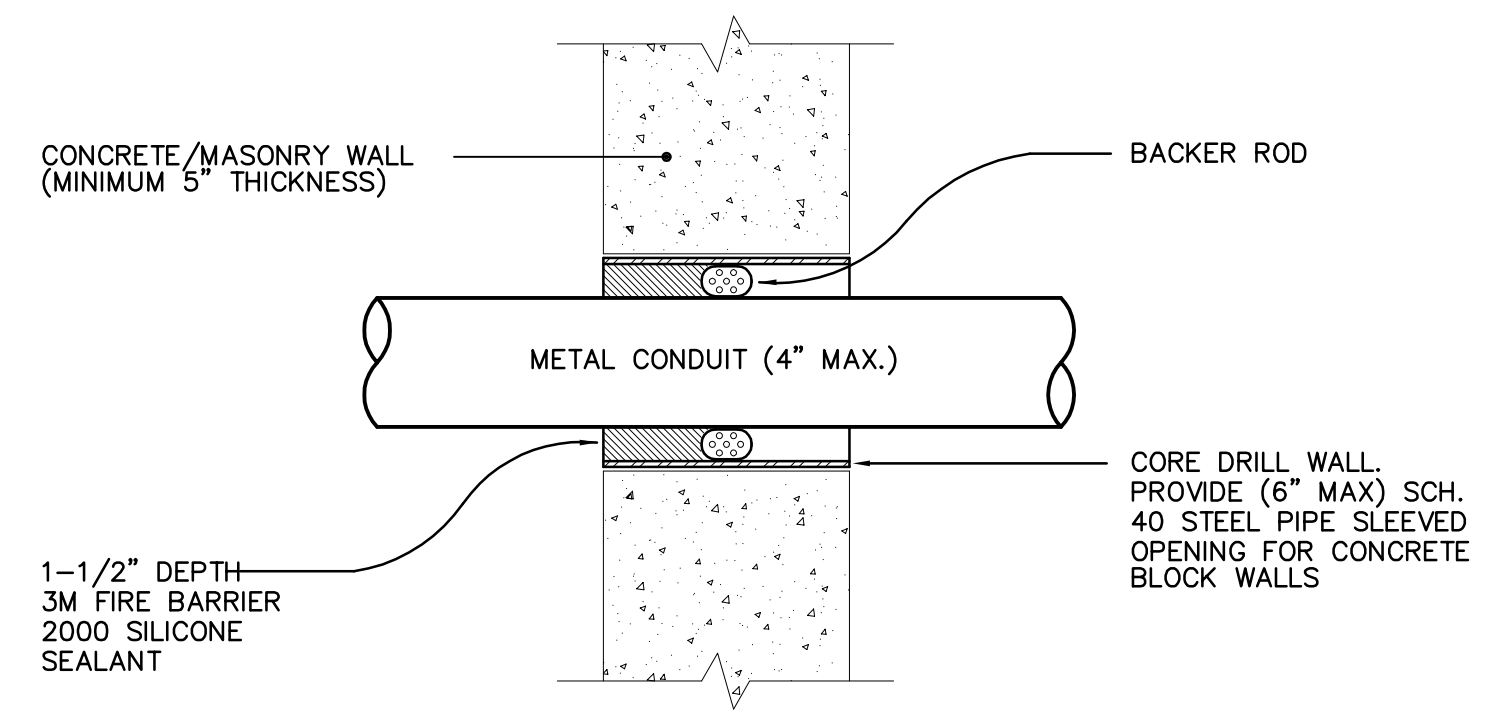


1 CONDUIT PENETRATION THROUGH RATED GYPSUM WALL

(UL #W-L-1010) SCALE: NONE

CONDUIT PENETRATION NOTES (GYPSUM):

1. MAXIMUM 3/4" ANNULAR SPACE.
2. INSTALL 3M FIRE BARRIER 2000 SILICONE SEALANT TO COMPLETELY FILL THE ANNULAR SPACE BETWEEN THE PIPE AND THE WALL ASSEMBLY. FILL TO THE FULL THICKNESS OF THE GYPSUM WALL (MINIMUM 1-1/4 INCH SEALANT THICKNESS) PLUS AN ADDITIONAL 1/4 INCH CROWN AROUND THE PERIMETER OF THE CONDUIT.

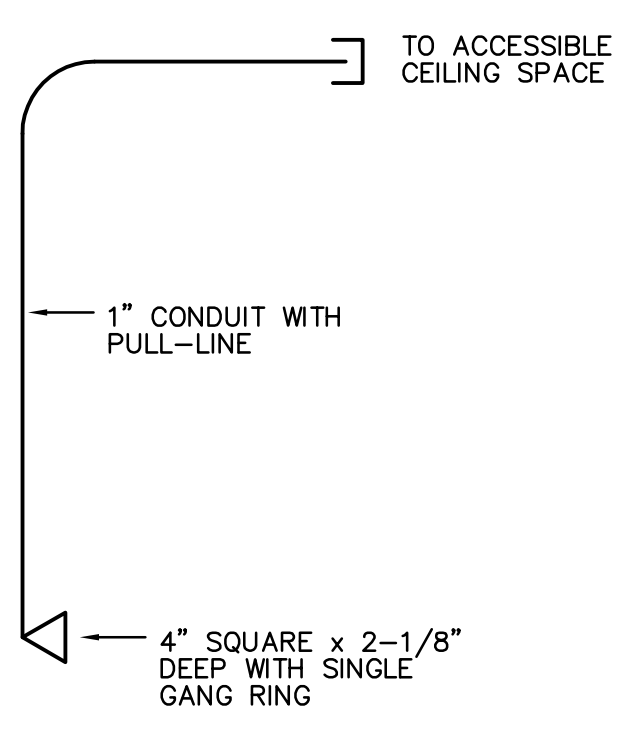


2 CONDUIT PENETRATION THROUGH RATED CONCRETE/MASONRY WALL

(UL #C-AJ-1014) SCALE: NONE

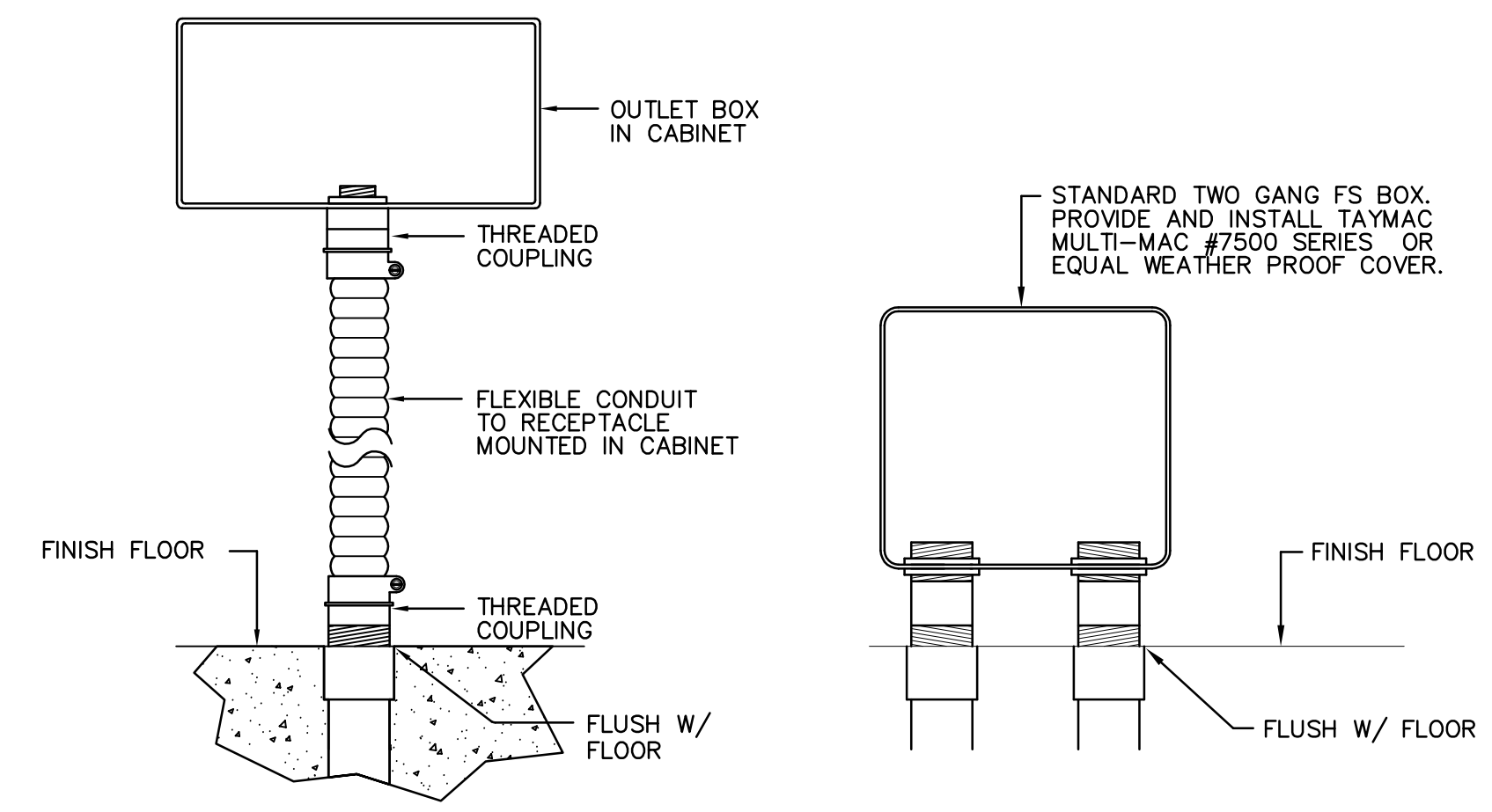
CONDUIT PENETRATION NOTES (CONCRETE/MASONRY):

1. CORE DRILL FOR A MAXIMUM 6 INCH DIAMETER OPENING WITH MAXIMUM 6 INCH SCHEDULE 40 STEEL PIPE SLEEVED OPENING FOR CONCRETE BLOCK OR BRICK WALLS OR MAXIMUM 3/4 INCH ANNULAR SPACE.
2. INSTALL OPEN CELL POLYURETHANE BACKER ROD IN OPENING. RECESS 1-1/2 INCHES FROM WALL SURFACE.
3. INSTALL A MINIMUM OF 1-1/2 INCHES OF 3M FIRE BARRIER 2000 SILICONE SEALANT OVER BACKER ROD.



3 DATA OUTLET

(E5.1) SCALE: NONE



4 OUTLET DETAILS

(E5.1) SCALE: NONE

Comm. No: 16025.18
 Date: 07/23/2020
 Drawn: SL

Revisions		
No.	Date	Note

TO THE BEST OF MY KNOWLEDGE, THE PLANS AND SPECIFICATIONS COMPLY WITH THE MINIMUM BUILDING CODES.

Certification Number 0059
 Charles C. Gallesman, P.E. 61926
 Kyle B. Lortzow, P.E. 80028



ATTACHMENT D

WARFIELD ELEMENTARY SCHOOL

15260 SW 150th Street, Indiantown, FL 34956

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**PROJECT MANUAL
SPECIFICATIONS**



OWNER:
**MARTIN COUNTY SCHOOL
DISTRICT**

Warfield Elementary School
Enhanced Security Project A2
15260 SW 150th Street, Indiantown, Florida 34956

HJ COMM. NO: 16025.21

DATE OF ISSUE: JULY 30, 2020

HARVARD JOLLY, INC.

2047 VISTA PARKWAY, SUITE 100
WEST PALM BEACH, FLORIDA 33411
561-478-4457

HARVARD • JOLLY
ARCHITECTURE

PROJECT MANUAL SPECIFICATIONS

Martin County School District

Warfield Elementary School

Enhanced Security Project A2

15260 SW 150th Street, Indiantown, Florida 34956

HJ PROJECT. NO: 16025.21

DATE OF ISSUE: JULY 30, 2020

ARCHITECT:

HARVARD JOLLY ARCHITECTURE

2047 Vista Parkway, Suite 100
West Palm Beach, Florida 33411
Phone: 561-478-4457

MECHANICAL/ELECTRICAL/PLUMBING/FIRE PROTECTION ENGINEERS:

JOHNSON, LEVINSON, RAGAN, DAVILA, INC.

1450 Centrepark Blvd., Suite 350
West Palm Beach, Florida 33401
Phone: 561-689-2303

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NO SECTIONS IN THIS DIVISION.....	0
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DIVISION

1

GENERAL CONDITIONS

SECTION 01 25 13
PRODUCT SUBSTITUTION PROCEDURES

PART 1 GENERAL

1.1 SCOPE OF WORK

- A. Administrative and procedural requirements for consideration of request for substitution during the design and construction phases.
- B. Substitution Request Form.

1.2 REFERENCES

- A. Section 01 33 00 – Submittal Procedures.
- B. Section 01 42 00 – References.
- C. Section 01 45 00 – Quality Control.
- D. Section 01 78 00 – Closeout Submittals.

1.3 SUBMITTAL PROCEDURES

- A. Transmit each substitution request on company letterhead with completed Form 01 25 00 A. Form is as indicated in Para. 3.02.
 - 1. During bidding phase, substitution requests shall be directed to Project Architect.
 - 2. During construction phase substitution requests shall be directed to Contractor/CM.
- B. Substitution Form shall identify project, Contractor/CM and Architect during bidding phase plus Subcontractor or supplier during construction phase indicating Specification Section and Paragraph number of specified material and pertinent drawing and detail numbers, as appropriate.
- C. Include complete information as required in the Substitution Form. Incomplete information will result in automatic rejection of the substitution request.
- D. Apply contractor's stamp, signed or initialed certifying that review, approval, verification of products required, field dimensions, adjacent construction work, and coordination of information are in accordance with the requirements of the work and contract documents.
- E. Schedule submittals to expedite the project, and deliver to Architect or Contractor/CM at business address. Coordinate submission of related items.
- F. For each submittal for review, allow 15 days excluding delivery time to and from Architect or CM/Contractor.
 - 1. Identify variations from contract documents and product or system limitations, which may be detrimental to successful performance of the completed work.
 - 2. Provide space for Contractor/CM and Architect review stamps.
 - 3. When revised for resubmission, identify all changes made since previous submission.
 - 4. Distribute copies of reviewed submittals as appropriate. Instruct parties to promptly report any inability to comply with requirements.
 - 5. Submittals not requested will not be recognized or processed.

1.4 SUBSTITUTION REQUESTS

- A. Requests for substitutions shall be made not later than ten (10) calendar days prior to bid date by prospective bidders, or time set by Owner for receipt of GMP (Guaranteed Maximum Price) from CM. Requests received after the above dates may not be considered.

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Warfield Elementary School
Enhanced Security Project A2

PART 2 PRODUCTS

2.1 Not Used.

PART 3 EXECUTION

3.1 FORM EXECUTION

- A. Contractor/CM shall submit Product Substitution Request on Form 01 25 00A on following page with transmittal letter and self-addressed stamped envelope for Architect's use in returning response to substitution request.

3.2 SUBSTITUTION FORM 01 25 13A - PRODUCT SUBSTITUTION REQUEST

A. Specified Product _____

B. Sheet No./Specification Section and Paragraph _____

C. Contractor/CM has reviewed and approved proposed substitution?

Yes _____ No _____

D. Requested Product Substitution: _____

E. Does Product Meet or Exceed Specified Product Requirements? Yes ___ No ___
(If answer is no, explain.) _____

F. Does Product Substitution affect dimensions shown on Drawings? Yes ___ No ___
(If answer is no, explain.) _____

G. Reason for Requested
Substitution: _____

H. Cost Difference between Product Specified and Product Proposed:
Add \$ _____ Subtract \$ _____

I. Electrical Requirements equal to Specified Product: Yes ___ No ___ N/A ___
(If No or N/A,
explain): _____

J. Plumbing Requirements equal to Specified Product: Yes ___ No ___ N/A ___
(If No or N/A,
explain): _____

K. Mechanical Requirements equal to Specified Product: Yes ___ No ___ N/A ___
(If No or N/A,
explain): _____

L. Does the Product Substitution have any effect on other trades? Yes ___ No ___
(If yes, explain): _____

M. Contractor/CM agrees to pay for changes in building design, including engineering and
detailing costs, caused by requested product substitution. Yes ___ No ___

N. Signature of Bidder/Contractor/CM shall indicate function, appearance and quality of proposed
substitution is equivalent or superior to specified item.

O. Contractor/CM assumes responsibility for delay or claims arising from review and evaluation of
requested product substitution.

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Warfield Elementary School
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P. Approval of proposed substitution shall have no effect on coordination and installation of work in accord with contract documents.

Submitted by:

For Use by the Architect and Owner:

Contractor/CM

_____ Received Too Late

Firm

_____ Not Accepted

_____ Approved As Noted

Submittal of Information in
Accord with this Section

_____ Approved For Bidding Only,
Final Approval Contingent Upon Address

Date

Architect

Date

Owner

Date

END OF SECTION

SECTION 01 29 00
PAYMENT PROCEDURES

PART 1 GENERAL

1.1 SCOPE OF WORK

- A. Procedures for preparation and submittal of Applications for Payment.
- B. Unit pricing shall be in conformance with 2007 Edition of AIA A201 General Conditions of the Contract and as amended by Owner on July 13, 2009. Copy is included in Division 1, Section 00 72 00 – General Conditions.

1.2 RELATED SECTIONS

- A. Section 01 22 00 – Unit Prices.
- B. Section 01 33 00 – Submittal Procedures.
- C. Section 01 78 00 – Closeout Submittals.

1.3 FORMAT

- A. Payment format shall in accord with AIA G702 - Application and Certificate for Payment and AIA G703 - Continuation Sheets.
- B. Contractor/CM's AIA G702/703 equivalent forms including continuation sheets may be substituted for AIA Payment Forms if preapproved by Owner's Project Manager.

1.4 PREPARATION OF APPLICATIONS

- A. Present handwritten pre-application draft payment forms to Owner for review before submitting applications for payment.
- B. After revising draft payment forms, prepare and submit six typewritten copies or on electronic media printout Pay Application as preapproved by Owner.
- C. Execute certification by signature of authorized officer.
- D. Use data from Owner preapproved Schedule of Values. Provide dollar value in each column for each line item for portion of work performed and for stored products.
- E. List each authorized Change Order as extension on AIA G703 - Continuation Sheet, listing Change Order number and dollar amount as for original item of Work.
- F. Prepare Application for Final Payment as specified in Section 01 78 00 – Closeout Submittals.

1.5 SUBMITTAL PROCEDURES

- A. Submit six copies of each Application for Payment.
- B. Submit an updated construction schedule with each Application for Payment.
- C. Payment Period: Submit at monthly intervals not later than the fifteenth of the month unless otherwise stipulated in the Agreement.
- D. Submit Release of Liens waivers with each Application for Payment.

1.6 SUBSTANTIATING DATA

- A. When Architect or Owner requires substantiating information, submit data justifying dollar amounts.
- B. Provide one copy of data with cover letter for each copy of submittal. Show application number and date, and line item by number and description.
- C. Include following data with application.
 - 1. Partial release of liens from major subcontractors and vendors.
 - 2. Affidavits attesting to off-site stored products.
 - 3. Construction progress schedule, revised and corrected to reflect project status at time of payment application.

1.7 PAYMENTS

- A. Payments may be made for materials stored off-site if preapproved by Owner's Project Manager and off-site facility is insured and bonded air conditioned warehouse, and only if project site doesn't allow storage or protection for equipment and supplies.
- B. Payments will normally be made to Contractor/CM by 10th of each month, if copies are preapproved by Owner's Project Manager and received by 25th of previous month, unless otherwise stipulated in Agreement.

PART 2 PRODUCTS (Not Used)

PART 3 EXECUTION (Not Used)

END OF SECTION

SECTION 01 31 00
PROJECT MANAGEMENT AND COORDINATION

PART 1 GENERAL

1.1 SCOPE OF WORK

- A. Project management, coordination of construction activities, interface with Owner's staff for existing facilities and project conditions related to project for new and existing facilities.
- B. Meetings for field engineering and project coordination, preconstruction, construction procedures, pay application and progress meetings, pre installation and project closeout meetings.
- C. Site mobilization, materials and equipment storage, site cleanup and demobilization.

1.2 RELATED SECTIONS

- A. Section 01 25 13 – Product Substitution Procedures.
- B. Section 01 29 00 – Payment Procedures.
- C. Section 01 33 00 – Submittal Procedures.
- D. Section 01 35 53 – Security.
- D. Section 01 42 00 – References.
- E. Section 01 45 00 – Quality Control.
- F. Section 01 66 00 – Project Storage and Handling Requirements.
- G. Section 01 78 00 – Closeout Submittals.
- H. Section 01 91 00 – Commissioning.

1.3 COORDINATION AND PROJECT CONDITIONS

- A. Coordinate scheduling, submittals, and to ensure efficient and orderly sequence of installation of interdependent construction elements, with provisions for accommodating Owner's occupancy of completed portions of project or existing building on site, and items to be furnished or installed by Owner.
- B. Verify utility requirements and characteristics of operating equipment are compatible with building utilities. Coordinate work of various sections having interdependent responsibilities for installing, connecting to, and placing in service, such equipment.
- C. Coordinate space requirements, supports and installation of mechanical and electrical work that is indicated diagrammatically on Drawings. Follow routing shown for pipes, ducts, and conduit, as closely as practicable; place runs parallel with line of building. Utilize spaces efficiently to maximize accessibility for other installations, for maintenance, and for repairs.
- D. In finished areas, except as otherwise indicated, conceal pipes, ducts, and wiring within the construction. Coordinate locations of fixtures and outlets with finish elements.
- E. In finished areas with exposed ceilings, piping and conduits shall either concealed or be run at right angles and be attached to underside of floor or deck above. Wiring shall not be exposed. Exposed ductwork shall be painted spiral duct.
- E. Coordinate completion and clean up of Work of separate sections in preparation for Substantial Completion and for portions of Work designated for Owner's partial occupancy.
- F. After Owner occupancy of premises, coordinate access to site for correction of defective Work and Work not in accord with Contract Documents, to minimize disruption of Owner's activities.

- G. Owner will not consider change orders for extra work required by Contractor due to his inadequate coordination.

1.4 FIELD ENGINEERING FOR PROJECT LAYOUT

- A. Employ Land Surveyor registered in State of Florida acceptable to Owner's Project Manager.
- B. Locate and protect survey control and reference points.
- C. Control datum for survey is that established by Owner's provided survey.
- D. Verify setbacks and easements; confirm drawing dimensions and elevations.
- E. Provide field engineering services. Establish elevations, lines, and levels, utilizing recognized engineering survey practices.
- F. Submit copy of site drawing and certificate signed by Land Surveyor that elevations and locations of Work are in accord with Contract Documents.

1.5 FLOOR SLAB VERIFICATION SURVEY

- A. Separate from Field Engineering noted above, Contractor/CM shall provide topographic survey of building floor slabs on grade to indicate that finish floor elevations and slab locations are per contract documents, water management and building department requirements.
- B. Survey shall be submitted upon completion of slabs on grade. Remaining work shall not proceed until Owner's Project Manager has reviewed survey information and verified that floor slabs are constructed at proper elevation and locations.
- C. Survey shall be prepared, signed and sealed by Florida licensed surveyor, other than the surveyor noted in Para. 1.04 Field Engineering.
- D. Surveyor shall be selected from one of Owner's annual surveying vendors. List may be obtained from Owner's Project Manager.

1.6 PRECONSTRUCTION MEETING

- A. Owner's Project Manager will schedule pre construction conference after Notice to Proceed.
- B. Attendance Required: Owner, Architect, and Contractor/CM.
- C. Agenda:
 - 1. Execution of Owner-Contractor Agreement, if not executed.
 - 2. Submission of executed bonds and insurance certificates.
 - 3. Distribution of Contract Documents.
 - 4. Submission of list of Subcontractors, list of Products, schedule of values, and progress schedule.
 - 5. Designation of personnel representing the parties in Contract, and Architect.
 - 6. Procedures and processing of field decisions, submittals, substitutions, applications for payments, proposal request, Change Orders and Contract closeout procedures.
 - 7. Scheduling.
 - 8. Scheduling activities of Geotechnical Engineer.
 - 9. Issuance of Notice to Proceed.
- D. Record minutes and distribute copies within two days after meeting to participants, with copies to Architect, Owner, participants, and those affected by decisions made.

1.7 SITE MOBILIZATION MEETING

- A. Owner will schedule meeting at Project site prior to Contractors start of work.

- B. Attendance Required: Owner, Architect, Special Consultants, and Contractor, Contractor's Superintendent, and major Subcontractors.
- C. Agenda:
 - 1. Use of premises by Owner and Contractor.
 - 2. Owner's requirements and partial occupancy.
 - 3. Construction facilities and controls provided by Owner.
 - 4. Temporary utilities provided by Owner.
 - 5. Survey and building layout.
 - 6. Security and housekeeping procedures.
 - 7. Schedules.
 - 8. Application for payment procedures.
 - 9. Procedures for testing.
 - 10. Procedures for maintaining record documents.
 - 11. Requirements for start-up of equipment.
 - 12. Inspection and acceptance of equipment put into service during construction period.
- D. Record minutes and distribute copies within two days after meeting to participants, with copies to Architect, Owner, participants, and those affected by decisions made.

1.8 PROGRESS MEETINGS

- A. Schedule and administer meetings throughout progress of work at weekly intervals. Less frequent meetings may be requested for projects or work stages if requested in writing to the Owner's Project Manager.
- B. Make arrangements for meetings, prepare agenda with copies for participants, and preside meetings.
- C. Attendance Required: Job superintendent, major Subcontractors and suppliers, Owner's Project Manager, Architect, as appropriate to agenda topics for each meeting.
- D. Agenda:
 - 1. Review minutes of previous meetings.
 - 2. Review previous Work progress.
 - 3. Field observations, problems, and decisions.
 - 4. Identification of problems that impede planned progress.
 - 5. Review of submittals schedule and status of submittals.
 - 6. Review of off-site fabrication and delivery schedules.
 - 7. Maintenance of progress schedule.
 - 8. Corrective measures to regain projected schedules.
 - 9. Planned progress schedule during succeeding work period.
 - 10. Coordination of projected progress.
 - 11. Maintenance of quality and work standards.
 - 12. Effect of proposed changes on progress schedule and coordination.
 - 13. Other business relating to work.
- E. Record minutes and distribute copies within two days after meeting to participants, with copies to Architect, Owner, participants, and those affected by decisions made.

1.9 PREINSTALLATION MEETINGS

- A. When required in individual specification section, convene pre-installation meeting at site prior to commencing work of section.
- B. Require attendance of parties directly affecting, or affected by, work of specific section.
- C. Notify Owner and Architect five working days in advance of meeting date.

- D. Prepare agenda and preside at meeting:
 - 1. Review conditions of installation, preparation and installation procedures.
 - 2. Review coordination with related work.
- E. Record minutes and distribute copies within two days after meeting to participants, with copies to Architect, Owner, participants, and those affected by decisions made.

PART 2 PRODUCTS

2.1 EQUIPMENT ELECTRICAL CHARACTERISTICS AND COMPONENTS

- A. Motors: Refer to Electrical Sections for specific motor types.
- B. Wiring Terminations: Provide terminal lugs to match branch circuit conductor quantities, sizes, and materials indicated. Size terminal lugs to NFPA 70, include lugs for terminal box.
- C. Cord and Plug: Provide minimum 6' cord and plug including grounding connector for connection to electric wiring system. Cord of longer length is specified in individual specification sections.

PART 3 EXECUTION

3.1 EXISTING BUILDING PROJECT PROCEDURES

- A. Materials: As specified in Product sections; match existing Products and work for patching and extending work.
- B. Employ skilled and experienced installer to perform alteration work.
- C. Close openings in exterior surfaces to protect existing work from weather and extremes of temperature and humidity.
- D. Remove, cut and patch Work in manner to minimize damage and to provide means of restoring Products and finishes to original or specified condition.
- E. Refinish existing visible surfaces to remain in renovated rooms and spaces, to specified condition for each material, with neat transition to adjacent finishes.
- F. Where new Work abuts or aligns with existing, provide smooth and even transition. Patch Work to match existing adjacent Work in texture and appearance.
- G. When finished surfaces are cut so that a smooth transition with new Work is not possible, terminate existing surface along a straight line at natural line of division and submit recommendation to Architect for review.
- H. Where change of plane of 1/4" or more occurs, submit recommendation for providing a smooth transition to Architect for review.
- I. Patch or replace portions of existing surfaces, which are damaged, lifted, discolored, or showing other imperfections.
- J. Work that penetrates fire or smoke rated partitions or floors shall be repaired to provide original fire or smoke rating.
- K. Finish surfaces as specified in individual Product Specification Sections.

END OF SECTION

SECTION 01 32 16
CONSTRUCTION PROJECT SCHEDULE

PART 1 GENERAL

1.1 SCOPE OF WORK

- A. Preparation of preliminary Construction Schedule, Contractor's/CM/GC final master Construction Schedule, hereinafter called the Construction Schedule, Short Interval Schedules (look ahead), and monthly updates.
- B. Scope of work and project completion are as indicated. Bidders shall include with their bid, a proposed project schedule indicating each item of work in CSI numbering format showing each work division in CPM (Critical Path Method) work sequencing. Schedule shall base critical path on Owner's providing pre purchase of long lead items, and assuming that those products and services are delivered to the Contractor/CM on time for meeting proposed project schedule.

1.2 SUBMITTALS

- A. Submit schedule in accord with Section 01 33 00 – Submittal Procedures.
- B. Preliminary Project Schedule:
 - 1. Purpose of preliminary schedule is to determine Bidder's intent as to how work can be prosecuted to allow project completion in specified time frame.
 - 2. Bidder's shall comply with "The Use of CPM in Construction – A Manual for General Contractors" published by Associated General Contractors of America, Inc. Schedules shall utilize nationally recognized scheduling format such as Primavera or Microsoft Project. Software version selected shall be compatible with Owner's Microsoft Word or Office software so that schedule can be reviewed and saved in Owner's computer system.
 - 3. Schedule shall be on 11" x17" paper indicating project activities, duration, start and finish dates of each activity, float or slack time, critical path, and total number of days for project.
 - 4. Include float or slack time in Schedule. Float is defined as amount of time between earliest start date and latest start date or days between earliest end date and latest end date.
 - 5. Construction schedule shall begin based on Owner's intent to issue Notice to Proceed Letter to Contractor/CM and be completed within "x" Calendar Days from NTP. Substantial Completion is "date", with "x" calendar days to Final Completion or "date".
 - 6. Preliminary Project Schedule shall be submitted with Bid Proposal. Failure to do so will be grounds for rejection of the Bid Proposal.

1.3 COORDINATION AND PROJECT CONDITIONS

- A. Bidders are responsible for verification of existing conditions to the extent that they are observable and can be inferred by visual inspection.
- B. Verify utility requirements and characteristics of operating equipment are compatible with building utilities. Coordinate work of various sections having interdependent responsibilities for installing, connecting to, and placing in service, such equipment.

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- C. Coordinate space requirements, supports and installation of mechanical and electrical work that is indicated diagrammatically on Drawings. Follow routing shown for pipes, ducts, and conduit, as closely as practicable; place runs parallel with line of building. Utilize spaces efficiently to maximize accessibility for other installations, for maintenance, and for repairs.
- D. In finished areas, except as otherwise indicated, conceal pipes, ducts, and wiring within the construction. Coordinate locations of fixtures and outlets with finish elements.
- E. In finished areas with exposed ceilings, piping and conduits shall either concealed or painted and be run at right angles, and attached to underside of floor or deck above. Wiring shall not be exposed. Exposed ductwork shall be painted.
- F. Coordinate scheduling to allow time for submittals, Owner's approval, Building Dept. review, permitting and inspections to ensure efficient and orderly sequence of installation of interdependent construction elements. Schedule shall provide for accommodating Owner's occupancy of other buildings on site, and items to be furnished or installed by Owner.
- G. Owner will not consider change orders for extra work required by Contractor due to his inadequate coordination.

PART 2 NOT USED

PART 3 NOT USED

END OF SECTION

SECTION 01 33 00
SUBMITTAL PROCEDURES

PART 1 GENERAL

1.1 SCOPE OF WORK

- A. Administrative and procedural requirements for processing of submittals during construction process. Submittals may include the following:
1. Proposed Products Lists.
 2. Proposed Vendor List.
 3. Product Data.
 4. Shop Drawings.
 5. Samples.
 6. Design Data.
 7. Field Test Reporting.
 8. Quality Control Reporting.
 9. Certificates.
 10. Manufacturer's Installation, Handling and Storage Instructions.
 11. Manufacturer's Field Reports.
 12. Erection Drawings.
 13. Closeout Documents
 14. Warranties.
 15. Scheduling of Work.
 16. Construction Progress Schedule.
 17. Submittals Schedule.
 18. Survey and Layout Data.
 19. Construction Progress Reporting.
 20. Periodic Work Observation.
 21. Photographic Documentation.
 22. Purchase Order Tracking.
 23. Operation and Maintenance Documentation.

1.2 RELATED SECTIONS

- A. Section 01 29 00 – Payment Procedures.
- B. Section 01 31 12 – Project Coordination.
- C. Section 01 42 00 – References.
- D. Section 01 45 00 – Quality Control.
- E. Section 01 66 00 – Product Storage and Handling Requirements.
- F. Section 01 78 00 – Closeout Submittals.

1.3 SUBMITTAL PROCEDURES

- A. Submittal Procedures shall be in conformance with AIA A201 General Conditions of the Contract and as amended by Owner on July 13, 2009. Copy is included in Division 1, Section 00 72 00 – General Conditions.
- B. Transmit each submittal with AIA Form G810-2001 or Owner's Standard Transmittal form.
- C. Sequentially number each transmittal forms. Revise submittals with original number and a sequential alphabetic suffix.

- D. Identify project, Contractor/CM, subcontractor or supplier pertinent drawing and detail number, and specification section number, as appropriate.
- E. Apply Contractor/CM's stamp, signed or initialed certifying that review, approval, verification of products required, field dimensions, adjacent construction work, and coordination of information are in accord with requirements of the work and contract documents.
- F. Schedule submittals to expedite the project and deliver to Engineer and Contractor/CM at business address. Coordinate submission of related items.
- G. For each submittal for review, allow 15 days excluding delivery time to and from the Contractor/CM.
- H. Identify variations from contract documents and product or system limitations, which may be detrimental to successful performance of the completed work.
- I. Provide space for Contractor/CM and Engineer review stamps.
- J. When revised for resubmission, identify all changes made since previous submission.
- K. Distribute copies of reviewed submittals as appropriate. Instruct parties to promptly report any inability to comply with requirements.
- L. Submittals not requested will not be recognized or processed.

1.4 PROPOSED PRODUCTS LIST

- A. Within 15 work days after date of Notice to Proceed, submit list of major products proposed for use, with name of manufacturer, trade name, and model number of each product.
- B. For products specified only by reference standards, give manufacturer, trade name, model or catalog designation, and reference standards.

1.5 PRODUCT DATA

- A. Product Data for Review:
 - 1. Submit to Engineer for review for purpose of checking for conformance with information given and design concept expressed in Contract Documents.
 - 2. After review, provide copies and distribute per Submittal Procedures article above and for record documents purposes described in Section 01 78 00 – Closeout Submittals.
- B. Product Data for Information:
 - 1. Submittal for Engineer's knowledge as contract administrator or for Owner.
- C. Product Data for Project Close-out:
 - 1. Submit for Owner's benefit during and after project completion.
- D. Submit number of copies required by Contractor/CM plus two copies for transmittal to Engineer and two copies for transmittal to Owner's Project Manager.
- E. Mark each copy to identify applicable products, models, options, and other data.
- G. Supplement manufacturers' standard data to provide information unique to project.
- H. Indicate product utility and electrical characteristics, utility connection requirements, and location of utility outlets for service for functional equipment and appliances.
- I. After review, distribute in accord with Submittal Procedures article above and provide copies for record documents described in Section 01 78 00 - Closeout Documents.

1.6 CONSTRUCTION SUBMITTALS

- A. Submit one copy of Building Permit, Site Permits, Environmental Permits, or other permits required for construction of work.
- B. Submit Payment Applications to Engineer for review for purpose of checking conformance with information given and design concept expressed in Contract Documents.

- C. Shop Drawings: Provide following information:
1. Fabrication and installation Drawings and details.
 2. Template placement diagrams.
 3. Manufacturer's installation instructions.
 4. Product patterns and colors.
 5. Coordination Drawings.
 6. Schedules.
 7. Product mix formulae.
 8. Product design or engineering calculations.
 9. Other information as required by project.
 10. After review, produce copies and distribute per Submittal Procedures article above and for record documents purposes described in Section 01 78 00 – Closeout Submittals.
 11. Submit to Engineer for purpose of checking conformance with information given and design concept and Owner's Project Manager.
- D. Project Closeout Documents:
1. Indicate special utility and electrical characteristics, utility connection requirements, and location of utility outlets for service for functional equipment and appliances.
 2. Submit number of copies required by Contractor, plus one copy for Engineer and two copies for Owner.
 3. Submit to Engineer for Owner's benefit during and after project completion.
 - a. Indicate special utility and electrical characteristics, utility connection requirements, and location of utility outlets for service for functional equipment and appliances.
 - b. Submit one copy and one reproducible copy required by Contractor/CM, plus one copy for Engineer and two copies for Owner.
- E. Product Samples
1. Submit to Engineer for purpose of checking conformance with information given and design concept expressed in the documents.
 2. After review, Engineer shall submit color board to Owner's Project Manager per Submittal Procedures.
 3. Sample finishes and colors shall be from full range of manufactures' standard colors, textures, and patterns for Engineer's selection and preparation of color board for Owner's approval.
 4. After review and approval by Owner, provide duplicates and distribute per Submittal Procedures.
 5. Submit samples to illustrate functional and aesthetic characteristics of the product, with integral parts and attachment devices. Coordinate sample submittals for interfacing work.
 6. Include identification on each sample, with full project information.
 - a. Submit number of samples specified in specification, one of which Engineer shall retain.
 - b. Reviewed samples may be used in work, if indicated.
- F. Product Design Data and Test Reports:
1. Submit to Engineer as contract administrator and for Owner's Project Manager for purpose of checking conformance with information given and completed work on project.
- G. Certificates:
1. When specified, submit certification by manufacturer, installation/application subcontractor, or contractor to Engineer, in quantities specified for Product Data.
 2. Indicate material or Product conforms to or exceeds specified requirements.
 3. Submit supporting reference date, affidavits, and certifications as appropriate.
 4. Certificates may be recent or previous test results on material or Product, but must be acceptable to Engineer.

H. Manufacturer's Instructions:

1. When specified, submit printed instructions for delivery, storage, assembly, installation, start-up, adjusting, and finishing, to Engineer for delivery to Owner in quantities specified for Product Data.
2. Indicate special procedures, perimeter conditions requiring special attention, and special environmental criteria required for application or installation.
3. Refer to Section 01 45 00 – Quality Control for quality assurance requirements.

J. Manufacturer's Field Reports:

1. Submit reports to Engineer and Owner's Project Manager.
2. Submit report within 30 days of observation to Engineer.
3. Submit for information for purpose of assessing conformance with information given and design concept expressed in Documents.

K. Erection Drawings:

1. Submit drawings to Engineer and Owner's Project Manager.
2. Submit for information for purpose of assessing conformance with information given and design concept expressed in Documents.
3. Data indicating inappropriate or unacceptable work is subject to rejection by Engineer or Owner.

PART 2 PRODUCTS (Not Used)

PART 3 EXECUTION (Not Used)

END OF SECTION

SECTION 01 35 53
SECURITY PROCEDURES

PART 1 GENERAL

1.1 SCOPE OF WORK

- A. Development of site security program, project entry control procedures, personnel screening and identification in compliance with Florida Statute FS1012.465 – Jessica Lunsford Act for vendors, and Contractor/CM's.

1.2 RELATED SECTIONS

- A. Section 01 31 00 – Project Management and Coordination.
- B. Section 01 33 00 – Submittal Procedures.
- C. Section 01 56 00 – Temporary Barriers and Enclosures.

1.3 JESSICA LUNSFORD ACT

- A. Contractor/CM, his subcontractors, vendors and suppliers who are to be permitted access to school grounds while students are present, or have direct contact with students or have access to or control of school funds shall obtain Level 2 background screening in accord with Florida Statute FS1012.465 – Jessica Lunsford Act.
 - 1. Level 2 screening excludes personnel working on school district property where students are present who have criminal records that include sexual offender, sexual misconduct with developmentally disabled or mental health patients, terrorism, murder, kidnapping, lewd, lascivious or indecent acts or exposure, incest, child abuse or neglect.
 - 2. Persons screened as noted above with other types of criminal history may be allowed on school grounds provided under following conditions:
 - a. Contractor/CM, subcontractors, vendors and suppliers shall be under continuous direct supervision of school district employee or Level 2 screened and cleared employee as noted above.
 - b. Contractor/CM, subcontractors, vendors and suppliers may be allowed on a student occupied site if area of construction is isolated from students by continuous six foot high chain link fence separating work area and school.
 - c. Persons with current Level 2 clearance who are subsequently arrested for disqualifying offenses shall be disqualified from access to school sites and shall immediately surrender their Photo ID Badge to their employer who shall be responsible for returning badge to Martin County School District's Department of Human Resources within 48 hours of arrest or notice of arrest or criminal offense.
 - d. Persons failing to notify their employer and Martin County School District's Department of Human Resources within 48 hours of arrest will be charged with 3rd degree felony, punishable by up to five years imprisonment and \$1,000 fine.
 - e. Employers of persons having been arrested for disqualifying offenses who subsequently allows said employee to continue working on school property may also be charged with 3rd degree felony, punishable by up to five years imprisonment and \$1,000 fine.
- B. Contractor/CM, his subcontractors, vendors and suppliers working on school board sites shall be fingerprinted and obtain work badges.
 - 1. Contractor/CM, his subcontractors, vendors and suppliers have worked and obtained in other school districts must be screened to obtain new badges.

2. Questions regarding fingerprinting or identification badge processing may be directed to District Personnel Department at (772)219-1200, Ext. 30296.
 3. Fingerprinting services are provided by private vendor through Florida Dept. of Education. DOE sponsored website will direct individuals to nearest fingerprinting location.
 4. Cost of fingerprinting is (Check with the School District) per person and shall be prepaid either by money order to (Check with the School District) or by credit card payment via Internet. Website is <http://www.flprints.com>. For information, telephone (877) 357-7456.
 5. Money orders shall be made out to 3M Cogent. Money order must be brought to appointment.
 6. Individuals shall register online prior to their appointment:
 - a. Navigate to https://www.cogentid.com/fl/index_fdoe.htm and select "register online".
 - b. For County select Martin County from pull-down box.
 - c. For CRI Literal select: FL931392Z Contractors & Vendors.
 - d. Fill out remaining information and submit.
 - e. Use Internet Explorer.
 7. Individuals being fingerprinted shall provide valid, government issued driver's license, identification card or passport.
 8. After fingerprinting and criminal background check is complete, individuals shall make appointment for photo ID's by making appointments at Martin County School District Personnel Department located in Building 20 at School District Administration Center, 500 E. Ocean Blvd., Stuart, FL 34994.
 9. Appointments for ID photo badges shall be made after completion of fingerprinting with Martin County School District Personnel Department by phone at (772) 219-1200, Ext. 30296
 10. Photo ID applicants shall have registration confirmation receipt with them when they arrive for appointment.
 11. Cost of Photo ID's is (Check with the School District). Payment may be made with company check, money order or personal check. Checks shall be made payable to Martin County School District.
- C. Non-Instructional Contractors with current Martin County School District ID Photo Badges shall update their badges to the State Uniform Badge required by Florida Statute 1012.467, effective July 1, 2014.
1. There is no cost for individuals with current Martin County School District ID Photo Badges to upgrade their badges.
 2. Badges from other individual School Districts are no longer accepted on school sites in Florida.
 3. New state wide badges are accepted in any School District regardless of where it was issued.
 4. Non-Instructional Contractors and their employees working on School sites shall apply for State-Wide Badges as noted above.
 5. Non-Instructional Contractors shall submit lists of their badged employees via email to Eileen Loreti at the Martin County School District Personnel Department at loretie@martin.k12.fl.us.

1.4 SECURITY PROGRAM

- A. Protect new work, existing facilities and grounds from damage, theft, vandalism, and unauthorized entry.
- B. Initiate security program in coordination with Owner's existing security system at time of project mobilization to ensure safety of students, faculty and visitors to the unaffected portions of the school facilities.

- C. No student contact is permitted between the Contractor's personnel and students. Any breach of this requirement will result in the immediate removal of the personnel from the job site upon direction by the Owner.
- D. Smoking is not allowed on School Board property. Any breach of this restriction will result in immediate removal of personnel from the site upon direction by Owner's Project Manager.
- E. Maintain security program throughout construction period until Owner's project acceptance.

1.5 ENTRY CONTROL

- A. Restrict entrance of persons and vehicles into Project site and existing facilities as indicated by Owner approved security plan.
 - 1. Allow entrance only to authorized persons with proper identification.
 - 2. Maintain log of workers and visitors, make available to Owner on request.
 - 3. Coordinate access of Owner's personnel to site in coordination with Owner's security forces.

1.6 PERSONNEL IDENTIFICATION

- A. Contractor/CM on-site staff, subcontractors and vendors on site shall wear identification badges at all times on site.
- B. Identification badges shall be current at time of project and shall be reverified and reissued yearly if project extends past original badge expiration date.

1.7 SUBMITTALS

- A. Comply with Section 01 33 00 – Submittal Procedures.
- B. Provide list of personnel proposed to be used on project for fingerprinting and background checks (only required for existing school projects).
- C. Contractor/CM shall submit initial list of accredited persons and provide monthly updated lists to Owner.
- D. Provide security plan to Owner indicating how construction site is to be secured and separated from existing school and its operations including normal and emergency egress and exiting from the operational portion of school and for new additions and existing portion under construction.

PART 2 PRODUCTS

2.1 Not Used.

PART 3 EXECUTION

3.1 Not Used.

END OF SECTION

SECTION 01 42 00
REFERENCE STANDARDS

PART 1 GENERAL

1.1 REFERENCE STANDARDS

- A. Reference and design standards referenced in Florida Building Code and Florida Fire Prevention Code, 6th Editions are applicable.
- B. Documents listed shall be standard references currently in effect at time of project building permitting.
- C. American Society of Testing Materials (ASTM):
 - 1. See individual product specification sections for applicable ASTM standards.
- D. American National Standards Institute (ANSI)/Underwriters Laboratories (UL):
 - 1. See individual product specification sections for applicable ANSI standards.
- E. Underwriters Laboratories (UL) – Fire Resistance Directory.
- F. Warnock-Hersey – Product Directory.
- G. Building Industry Consulting Services International (BICSI):
 - 1. BICSI-568-2001: Installing Commercial Building Telecommunications Cabling.
 - 2. BICSI Telecommunications Distribution Methods Manual (TDMM).
 - 3. BICSI Telecommunications Cabling Installation Manual (TCIM).
 - 4. BICSI Outside Plant Design Reference Manual, 5th Edition.
- H. FCC (Federal Communications Commission) Rules.
- I. National Electrical Code (NEC):
 - 1. NFPA 70 National Electrical Code, 2008 Edition.
- J. National Fire Protection Association (NFPA):
 - 1. NFPA 101: Life Safety Code - National Fire Protection Association (NFPA).
 - 2. NFPA 70: National Electrical Code - National Fire Protection Association (NFPA).
- K. Occupational Health and Safety (OSHA): State and Federal Requirements.
- L. Telecommunications Industry Association (TIA)/Electronics Industry Association (EIA):
 - 1. TIA/EIA-568-B.1 and addenda: Commercial Building. Telecommunications Cabling Standard - Part 1: General Requirements.
 - 2. TIA/EIA-568-B.2 and addenda: Commercial Building Telecommunications Cabling Standard - Part 2: Balanced Twisted-Pair.
 - 3. TIA/EIA-568-B.2-1: Transmission Performance Specifications for 4-Pair 100 Ohm Category 6 Cabling.
 - 4. TIA/EIA-568-B.3 and addenda: Commercial Building Telecommunications Cabling Standard - Part 3: Optical Fiber Cabling and Components Standard.
 - 5. TIA/EIA-568-B.3-1: Additional Transmission Performance Specifications for 50/125 ohm Optical Fiber Cables.
 - 6. TIA/EIA-569-A and Addenda: Commercial Building Standard for Telecommunications Pathways and Spaces, CSA T530.
 - 7. TIA/EIA-606-A and Addenda: Administration Standard for Telecommunications Infrastructure of Commercial Buildings, CSA T528.
 - 8. ANSI-J-STD-607-A and Addenda: Commercial Building Grounding (Earthing) and Bonding Requirements for Telecommunications, CSA T530.
 - 9. TIA/EIA-526-7 and Addenda: Measurement of Optical Power Loss of Installed Single-Mode Fiber Cable Plant.
 - 10. TIA/EIA-526-14A and Addenda: Optical Power Loss Measurements of Installed Multimode Fiber Cable Plant.

11. TIA/EIA-758: Customer Owned Outside Plant Telecommunications Cabling Standard.
- M. International Electrical Code (IEC):
 1. TR3 61000-5-2 - Ed. 1.0 and amendments: Electromagnetic compatibility (EMC) - Part 5: Installation and mitigation guidelines – Section 2: Earthing and Cabling”.
 2. ISO/IEC 11801: 2000 Edition, 1.2 and amendments: Information Technology – Generic cabling for customer premises.
- N. International Standards Organization (ISO/IEC): 11801: 2000 Ed. 1.2 and amendments: Information technology - Generic cabling for customer premises.
- O. NACE (National Association of Corrosion Engineers) - Industrial Maintenance Painting.
- P. NPCA (National Paint and Coatings Association) - Guide to U.S. Government Paint Specifications.
- Q. PDCA (Painting and Decorating Contractors of America) - Painting - Architectural Specifications Manual.
- R. SSPC (Steel Structures Painting Council) - Steel Structures Painting Manual.
 1. SSPC-SP 1 – Solvent Cleaning.
 2. SSPC-SP 2 – Hand Tool Cleaning.
 3. SSPC-SP 3 – Power Tool Cleaning.
 4. SSPC-SP 13 – Nace No 6 Surface Preparation for Concrete.
- S. WDMA (Window and Door Manufacturer’s Association) I.S. 1-A-2004.

1.2 DEFINITIONS

- A. Communication Definitions:
 1. ITS: Information Transport System: Copper cabling or optical fiber for transmission of information on School District property. Transmission includes data, video, voice, fire alarm, security, access control, and other low-voltage networks. Information Transport System is not limited to School District-owned cabling, but includes copper and optical fiber, and equipment owned by outside providers carrying School District’s information. Pathways are not limited by School District’s ownership, but include those owned by third parties. Information Transport System may be referred to as “the network” within project documents.
 2. ICP: Inside Cable Plant: Part of Information Transport System running within buildings. ICP elements include workstation outlet assembly, cabling to the workstation from network rooms, backbone cabling within building, backbone cabling running between physically contiguous buildings, network racks and hardware (routers, switches, hubs, firewalls, etc.), patch panels, punch blocks, fiber distribution panels, patch cords, and cross-connect cables/wires.
 3. OCP: Outside Cable Plant: Part of Information Transport System running between buildings, from building to definable exterior point, between definable exterior points, or from non-School District source to School District building or definable exterior point. OCP includes termination punch blocks, fiber distribution panels, interior splices for outside to inside optical fiber transition, and other initial device into which outside cable attaches. OCP does not include backbone cable running between physically contiguous buildings unless cabling enters OSP pathway element (e.g. OSP conduits, maintenance holes, etc.). OCP includes underground cabling and aerial cabling.
 4. Cable: An assembly of one or more insulated conductors or optical fibers, within an enveloping sheath.
 5. DP: Dead pairs: Unused copper pairs terminating within splice case, but without being splices to outgoing cable.

6. GP: Grounding electrode: Conductor (rod, pipe or plate or group of conductors) in direct contact with earth for purpose of providing low-impedance connection to earth.
 7. GEC: Grounding electrode conductor: Conductor used to connect grounding electrode to equipment grounding conductor, or to grounded conductor of circuit at service equipment, or at source of separately derived system.
 8. Handbox: Rectangular or square underground pathway element similar to small maintenance hole, which cannot be fully entered, that allows for pulling point or splice point in power, security or communications pathway.
 9. Handhole: A round underground pathway element similar to a handbox, which cannot be fully entered, that allows for a pulling point in a pathway.
 10. Identifier: An item of information that links a specific element of the Information Transport System infrastructure with its corresponding record.
 11. Infrastructure (Information Transport System): A collection of those Information Transport System components, excluding equipment, that together provides the basic support for the distribution of all information within a building or campus.
 12. Linkage: A connection between a record and an identifier or between records.
 13. Maintenance (man) holes: Underground pathway element large enough for person to fully enter work, used to provide access to underground cable to pull, splice, and maintain.
 14. Media (Information Transport System): Wire, cable, or conductors used for Information Transport System.
 15. OB: Outlet box: Metallic or nonmetallic box used to hold Information Transport System outlets/connectors or transition devices.
 16. Outlet (Connector) (Information Transport System): Connecting device in work area on which horizontal cable or outlet cable terminates.
 17. Pathway: Facility for the placement of Information Transport System cable.
 18. Record: Collection of detailed information related to specific element of Information Transport System infrastructure.
 19. Report: Presentation of collection of information from various records.
 20. Space (Information Transport System): Area used for housing installation and termination of Information Transport System equipment and cable, e.g., equipment rooms, network rooms, work areas, and maintenance holes/handboxes/handholes.
 21. Splice: Joining of conductors in splice closure, meant to be permanent.
 22. Splice box: Box, located in pathway run, intended to house cable splice.
 23. Splice closure: Device used to protect splice.
 24. Termination position: Discrete element of termination hardware where information Transport System conductors are terminated.
 25. Work Area (work station): Building space where occupants interact with Information Transport System terminal equipment.
- B. Painting Definitions:
1. ASTM D16 - Definitions of Terms Relating to Paint, Varnish, Lacquer, and Related Products for interpretation of terms used herein.

1.3 ABBREVIATIONS AND ACRONYMS

- A. Abbreviations noted in Florida Building Code, Chapter 2 are applicable.
- B. General Abbreviations:
 1. AC: Above Counter/Air Conditioning.
 2. ACR: Attenuation-to-Crosstalk Ratio.
 3. ADA: Americans with Disabilities Act.

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4. AFF: Above finished floor.
5. AFG: Above finished grade.
6. ANSI: American National Standards Institute.
7. ARCH: Architect or Architectural.
8. ASTM: American Society for Testing and Materials (ASTM International).
9. AWG: American Wire Gauge.
10. BD: Building distributor (replacing main-cross connect and MDF as “building service” room identifiers).
11. BICSI®: Building Industry Consulting Service International, Inc.
12. BTU: British Thermal Unit.
13. CAT6: Category 6 cable.
14. CATV: Community Antenna Television (cable television).
15. CD: Campus distributor (replacing main-cross connect and MDF as “campus-wide service” room identifiers). Also, compact disk for storage of audio or video information.
16. CO: Communications Outlet.
17. COAX: Coaxial Cable.
18. CP: Communications Panel.
19. dB: Decibel.
20. EMS: Energy Management System or Emergency Management System.
21. EMT: Electrical metallic tubing.
22. ENT: Electrical nonmetallic tubing.
23. EDPM: Ethylene-polypropylene-diene membrane.
24. EF: Entrance Facility.
25. EIA: Electronic Industries Alliance.
26. ELFEXT: Equal Level Far-End Crosstalk.
27. EMC: Electromagnetic Compatibility.
28. EMI: Electromagnetic Interference.
29. ER: Equipment Room. Replacing “TR”
30. FMC: Flexible metallic conduit.
31. FCC: Federal Communications Commission.
32. FD: Floor distributor (replacing network room, intermediate and horizontal cross-connect, and telecommunications as “building service” room identifiers). Also, Floor Drain as part of building plumbing system.
33. FDDI: Fiber Distribution Data Interface.
34. FEXT: Far-End Crosstalk.
35. FO: Fiber Optic.
36. Freq: Frequency.
37. GE: Grounding equalizer (replacing TBBIBC).
38. Gnd: Ground.
39. HB: Handbox. Also, hose bibb for water supply part of plumbing system.
40. HC: Horizontal Cross-Connect (replaced by floor distributor “FD”).
41. HH: Handhole.
42. HVAC: Heating, Ventilation, and Air Conditioning.
43. Hz: Hertz.
44. IC: Intermediate Cross-Connect (replaced by building distributor “BD”).
45. IDC: Insulation Displacement Connectors.
46. IDF: Intermediate Distribution Frame (replaced by “BD” or “FD”).
47. IEEE: Institute of Electrical and Electronics Engineers.
48. IMC: Intermediate metal conduit.
49. IN: Inches.

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50. ISO: International Organization for Standardization.
51. ISP: Inside Cable Plant.
52. JB: Junction Box.
53. LBS: Pounds.
54. LED: Light Emitting Diode.
55. LFMC: Liquidtight flexible metal conduit.
56. LFNC: Liquidtight flexible nonmetallic conduit.
57. Mbps: Megabits per second.
58. MC: Main Cross-Connect (replaced by campus distributor “CD”).
59. MDF: Main Distribution Frame (replaced by “CD” or “BD”).
60. MER: Main Equipment Room.
61. MH: Maintenance Hole.
62. MHz: Megahertz.
63. NBR: Acrylonitrile-butadiene rubber.
64. NEC: National Electrical Code, NFPA 70.
65. NEMA: National Electrical Manufacturers Association.
66. NESC: National Electric Safety Code, C2-1997.
67. NFPA: National Fire Protection Association.
68. NIC: Not in Contract.
69. NR: Network Room.
70. #: Number.
71. OFCI: Owner Furnished Contractor Installed.
72. OFOI: Owner Furnished Owner Installed.
73. OSHA: Occupational Safety and Health Administration.
74. OCP: Outside Cable Plant.
75. OTDR: Optical Time Domain Reflectometer.
76. PR: Pair.
77. PVC: Polyvinyl Chloride.
78. RCDD®: Registered Communications Distribution Designer.
79. RFI: Radio Frequency Interference.
80. RGC or GRC: Rigid Galvanized Conduit.
81. RH: Relative Humidity.
82. RNC: Rigid nonmetallic conduit.
83. SCS: Structured Cabling System.
84. SS: Stainless Steel.
85. SM: Single Mode.
86. TIA/EIA: Telecommunications Industry Association/Electronic Industry Association.
87. TBB: Telecommunication Bonding Backbone.
88. TBBIBC: Telecommunication Bonding Backbone Interconnecting Bonding Conductor (replaced by grounding equalizer “GE”).
89. TE: Telephone Equipment (Wall Mounted Equipment Rack).
90. TEL: Telephone.
91. TGB: Telecommunications Grounding Buss bar.
92. TMGB: Telecommunications Main Grounding Buss bar.
93. TR: Telecommunications Room. (Replaced with Main-MDF or Intermediate-IDF Distribution Frame Locations).
94. TYP: Typical.
95. UL: Underwriters Laboratory.
96. UPS: Uninterruptible Power Supply.
97. UTP: Unshielded Twisted Pair.

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- 98. V: Volt.
- 99. WAO: Work Area Outlet.

1.4 UNITS OF MEASURE

- A. Weights and Measures shall be as identified by Weights and Measures Division, NIST, U. S. Department of Commerce, 100 Bureau Dr., Stop 2600, Gaithersburg, MD 20899-2600.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION

SECTION 01 45 00
QUALITY CONTROL

PART 1 GENERAL

1.1 SCOPE OF WORK

- A. Quality assurance procedures to control labor and product installation including tolerances, adherence to references and standards.
- B. Construction of mockups and field samples to set standard of quality for product installation.
- C. Independent inspecting and testing laboratory services for quality control and adherence to contract documents.
- D. Manufacturers' field services for quality control and adherence to contract documents.
- E. Work shall be in conformance with 2007 Edition of AIA A201 General Conditions of the Contract and as amended by Owner on July 13, 2009. Copy is included in Division 1, Section 00 72 00 – General Conditions.

1.2 RELATED SECTIONS

- A. Section 01 22 00 – Unit Prices.
- B. Section 01 29 00 – Payment Procedures.
- C. Section 01 31 00 – Project Management and Coordination.
- D. Section 01 33 00 – Submittal Procedures.
- E. Section 01 42 00 – References.
- F. Section 01 66 00 – Product Storage and Handling Requirements.
- G. Section 01 78 00 – Closeout Submittals.
- H. Section 01 91 00 – Commissioning.
- I. Section 23 05 93 – Testing, Adjusting and Balancing of HVAC.
- J. Section 23 08 00 – Commissioning of HVAC.

1.3 COORDINATION AND PROJECT CONDITIONS

- A. Coordinate scheduling, submittals, and work to ensure efficient and orderly sequence of installation of interdependent construction elements, with provisions for accommodating items installed later.
- B. Verify utility requirements and characteristics of operating equipment are compatible with building utilities. Coordinate work of various sections having interdependent responsibilities for installing, connecting to, and placing in service, such equipment.
- C. Coordinate space requirements, supports and installation of mechanical and electrical work that is indicated diagrammatically on Drawings. Follow routing shown for pipes, ducts, and conduit, as closely as practicable; place runs parallel or perpendicular with line of building. Conduits and piping shall be spaced neatly, consistently and uniformly when in groupings. Utilize spaces efficiently to maximize accessibility for other installations, for maintenance, and for repairs.
- D. In finished areas, except as otherwise indicated, conceal pipes, ducts, and wiring within the construction. Coordinate locations of fixtures and outlets with finish elements.
- E. Coordinate completion and clean up of Work of separate sections in preparation for Substantial Completion and for portions of Work designated for Owner's partial occupancy.

- F. After Owner occupancy of premises, coordinate access to site for correction of defective Work and Work not in accordance with Contract Documents, to minimize disruption of Owner's activities.
- G. Owner will not consider change orders for extra work required by Contractor/CM due to improper or untimely coordination.

1.4 FIELD ENGINEERING

- A. Employ a Land Surveyor registered in the State of Florida, acceptable to Architect and Owner for construction layout.
- B. Contractor/CM shall locate and protect survey control and reference points.
- C. Control datum for survey is that established by Owner provided survey.
- D. Verify setbacks and easements; confirm drawing dimensions and elevations.
- E. Provide field engineering services. Establish elevations, lines, and levels, utilizing recognized engineering survey practices.
- F. Upon completion of project, surveyor noted above, shall prepare and submit copy of site drawing and certificate signed by Land Surveyor that elevations and locations of Work are in accord with Contract Documents.

1.5 QUALITY ASSURANCE

- A. Monitor quality control over suppliers, manufacturers, products, services, site conditions, and workmanship, to produce work of specified quality.
- B. Comply fully with manufacturers' instructions, including each step in sequence.
- C. Should manufacturers' instructions conflict with contract documents, request clarification from Architect before proceeding, and document any instructions or directions that may invalidate warranty.
- D. Comply with specified standards as a minimum quality for work except when more stringent tolerances, codes, or specified requirements indicate higher standards or more precise workmanship.
- E. Perform work by persons qualified to produce workmanship of specified quality.
- F. Verify that field measurements are as indicated on shop drawings or as instructed by manufacturer.
- G. Secure products in place with positive anchorage devices designed and sized to withstand stresses, vibration, physical distortion or disfigurement.
- H. Schedule work so no absorbent materials are installed and no concealed areas are closed up until building is dried-in and permanent doors and windows are installed to prevent development of mold or entrapment of mold or moisture inside concealed spaces or moisture absorption into interior materials.
- I. See Section 01 31 00 – Project Management and Coordination for services of Florida licensed land surveyor to verify locations and elevation of floor slabs after floor slab placement and before continuation of construction activities.

1.6 TOLERANCES:

- A. Monitor fabrication and installation tolerance control of products to produce acceptable work. Do not permit tolerances to accumulate.
- B. Comply with manufacturers' tolerances. Should manufacturers' tolerances conflict with contract documents, most stringent tolerance shall prevail.
- C. Adjust products to appropriate dimensions; position before securing products in place.

1.7 REFERENCES AND STANDARDS:

- A. Comply with Section 01 42 00 – References for reference standards, definitions, abbreviations and acronyms applicable to project.
- B. Workmanship shall comply with requirements of standards specified by product or trade association, or other consensus standards of specified products, except when applicable code requirements are more stringent.
- C. Use current reference standard(s) in effect at time of contract execution.
- D. Obtain copies of standards where required by product specification sections.
- E. Contractual relationships, duties, nor responsibilities of parties in Contract nor those of Architect shall be altered from contract documents by mention or inference otherwise in reference documents.

1.8 MOCKUPS AND FIELD STANDARDS:

- A. Comply with Section 01 43 39 – Mockups general requirements and individual product sections for specific requirements. Construct mockups as indicated for review by Architect and Owner's Project Manager.
- B. Assemble and erect specified items with required attachment and anchorage devices, flashings, seals, and finishes.
- C. Accepted mock-ups shall be basis of work quality standard for work.
- D. Where Architect accepts mockups as quality standard of work required, maintain mockups until work is complete.
- E. Upon Architect's approval mockups and work samples may be incorporated in completed work. Otherwise, remove mock-up and clear area.

1.9 TESTING SERVICES:

- A. Owner will appoint and pay for services specified for independent firm to perform testing.
- B. Independent firm will perform tests and other specified services as outlined in individual specification sections and as required by Owner.
- C. Testing and quality control may occur on or off project site.
- D. Independent firm shall submit reports to Owner and Architect and Contractor/CM, indicating observations and results of tests and compliance or non-compliance with contract documents.
- E. Cooperate with independent firm; furnish samples of materials, design mix, equipment, tools, storage, safe access, and assistance by incidental labor as requested.
 - a. Notify Owner, Architect and independent firm 24 hours prior to expected time for operations requiring services.
 - b. Make arrangements with independent firm and pay for additional samples and tests required for Contractor's use.
 - c. Testing does not relieve Contractor to perform work per contract requirements.
 - d. As directed by Architect, independent testing firm shall re-test as result of non-conformance with requirements. Contractor shall pay for re-testing cost by deducting testing charges from the Contract Sum/Price.

1.10 BUILDING INSPECTION SERVICES:

- A. Owner will employ in-house Building Official, or hire independent Building Official and Construction Inspectors as required to perform Document review and approval, and on-site building inspections in accord with Florida Building Code, Section 423 State Requirements for Educational Facilities and other applicable codes.
- B. Building Official and Inspectors will perform code interpretation, document review, project inspections, and other services specified and required in individual specification sections, and shall be paid by Owner.
- C. Inspections firm will conduct inspections and observations of work, indicate compliance or non-compliance with applicable codes and contract documents, and will submit reports to Architect, Contractor/CM and Owner.
- D. Cooperate with inspection firm; provide safe access and assistance by incidental labor as requested.
- E. Notify Owner and Architect and inspection firm 24 hours prior to expected time for operations requiring services.
- F. Inspection of work does not relieve Contractor of performing work in accord with contract requirements.

1.11 MANUFACTURERS' FIELD SERVICES:

- A. Where specified, require material or product suppliers or manufacturers to provide qualified staff personnel to observe site conditions, conditions of surfaces and installation, quality of workmanship, start-up of equipment, test, adjust and balance of equipment and as applicable, and to initiate instructions when necessary.
- B. Submit qualifications of observer to the Architect 30 days in advance of required observations, the observer is subject to Owner's approval.
- C. Report observations and site decisions or instructions given to applicators or installers that are supplemental or contrary to manufacturers' written instructions.
- D. Comply with Section 01 33 00 – Submittal Procedures.

1.12 COMMISSIONING

- A. Comply with Section 01 91 00 – Commissioning for training of Owner's personnel in operation and maintenance of equipment identified in this Section.

PART 2 PRODUCTS (Not Used)

PART 3 EXECUTION

3.1 EXAMINATION:

- A. Verify that existing site conditions and substrate surfaces are acceptable for subsequent work, beginning new work means acceptance of existing conditions.
- B. Verify that existing substrate is capable of structural support or attachment of new work.
- C. Examine and verify specific conditions described in individual specification sections. Immediately notify AE or Owner's Project Manager of conditions that would prevent meeting contractual requirements.
- D. Verify that utility services are available, of correct characteristics, and in correct locations.

3.2 PREPARATION:

- A. Clean substrate surfaces prior to applying next material or substance.
- B. Seal cracks or openings of substrate prior to applying next material or substance in manner approved by product manufacturer.
- C. Apply manufacturer's required or recommended substrate primer, sealer, or conditioner prior to applying any new material or substance in contact or bond.

3.3 CLEANING AND WASTE MANAGEMENT

- A. Comply with Section 01 74 00 – Cleaning and Waste Management.

END OF SECTION

SECTION 01 66 00
PRODUCT STORAGE AND HANDLING REQUIREMENTS

PART 1 GENERAL

1.1 SCOPE OF WORK

- A. Packaging and transportation, delivery and receiving, product handling, storage, conditions and location, maintenance, protection, repair and replacement of products damaged while handling or in storage.

1.2 RELATED DOCUMENTS

- A. Section 01 31 00 – Project Management and Coordination.
- B. Section 01 33 00 – Submittal Procedures.
- C. Section 01 35 53 – Security Procedures.
- D. Section 01 45 00 – Quality Control.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION

3.1 TRANSPORTATION AND HANDLING

- A. Packaging and Transportation:
 - 1. Supplier shall package finished products in boxes or crates to provide protection during shipment, handling and storage at site.
 - 2. Products shall be protected against exposure to outside storage against damage due to weather conditions.
 - 3. Protect products sensitive to damage against impact, abrasion, puncture and other damage during handling and transport to project.

3.2 DELIVERY AND RECEIVING

- A. Arrange deliveries of products in accord with project schedule to allow installation and project completion per approved project schedule.
- B. Prior to project commencement, Contractor's personnel shall meet with Owner's Project Manager and School staff for renovation and new construction to delineate areas for materials storage lay-down areas.
- C. Restrict access of persons to storage areas in accord with Section 01 35 33 – Security Procedures.
- D. Material deliveries to Owner occupied sites shall be coordinated with Owner's Project Manager to ensure availability of personnel and handling equipment for safe and secure unloading and storage of equipment.
- E. Deliver products in undamaged, dry condition, in original unopened containers or packaging with identifying labels intact and legible.
- F. Clearly mark partial deliveries of component parts of equipment to identify equipment and contents, to permit easy accumulation of parts, and to facilitate assembly.
- G. Upon delivery, Contractor/CM shall inspect shipments for following items:
 - 1. Products received match reviewed submittals and Contract Documents.

2. Correct quantities.
 3. Accessories and installation hardware are included.
 4. Containers and packages are intact and labels are legible.
 5. Products are adequately protected for conditions and are undamaged.
- H. Product Handling:
1. Provide equipment and personnel to handle products to prevent product damage.
 2. Handle products to avoid bending, flexing or overstressing.
 3. Lift large or heavy components by using designated lifting points in accord with manufacturers written directions.

3.3 STORAGE AND PROTECTION

- A. General Requirements:
1. Store products immediately upon delivery in accord with manufacturers written directions.
 2. Arrange for storage location to allow access, maintenance and inspection of products.
 3. Stored products shall not conflict with work conditions. construction is contiguous to or within existing school, Provide demising walls to physically separate new or renovation work from existing on-going school operations.
- B. Enclosed Storage:
1. Store products subject to damage by weather in weathertight enclosure.
 2. Maintain temperature and humidity within ranges stated in manufacturer's instructions.
 4. Provide temperature and humidity control within ranges stated in manufacturer's instructions.
 5. Store unpacked or loose products on shelves, in bins, or in neat groups of like items.
- C. Exterior Storage:
1. Provide platforms, blocking or skids to support fabricated products above ground, and sloped to allow drainage.
 2. Protect products to avoid soiling or staining.
 3. Provide product cover to prevent water or condensation on product while allowing ventilation.
 4. Store loose granular materials on clean, solid surfaces such as pavement or on rigid sheet materials to prevent mixing with foreign matter.
 5. Provide for surface drainage to prevent humidity, mold or algae growth.
- D. Maintenance of Storage:
1. Periodically inspect stored products on scheduled basis.
 2. Verify storage facilities and environmental conditions are in compliance with manufacturer's written requirements.
 3. Verify that product surfaces exposed to weather are undamaged, stolen, or have otherwise been adversely affected.
- E. Maintenance of Equipment Storage:
1. Stored mechanical and electrical equipment shall comply with manufacturer's written service instructions for each item, with notice of instructions attached to each item of equipment.
 2. Stored equipment shall be serviced on regular basis, maintaining log of services, and submitted to Architect in accord with Section 01 78 00 – Submittal Procedures as part of Project Record Documents.
- F. Storage of Owner's Salvaged Furnishings and Equipment:
1. Contractor/CM shall provide temporary storage facilities for items to be salvaged and reinstalled.

3.4 PROTECTION OF FINISHED WORK

- A. Protect finished surfaces, including doors, door jambs, soffits of openings used as passageways, through which equipment and materials are handled.
- B. Protect finished floor surfaces in traffic areas prior to allowing equipment or materials to be moved.
- C. Keep finished surfaces clean, unmarked, and suitably protected until Owner's project acceptance.

3.5 REPAIRS AND REPLACEMENTS

- A. Promptly replace or repair damaged equipment or building surfaces caused by moving equipment at no additional cost to Owner.
- B. Additional time required to repair or replace damaged equipment or building surfaces shall not be grounds for Contract time extension or Contractor's additional expense, unless Owner specifically authorizes time extension or additional costs.

END OF SECTION

SECTION 01 74 00
CLEANING AND WASTE MANAGEMENT

PART 1 GENERAL

1.1 SCOPE OF WORK

- A. Administrative and procedural requirements for waste management and cleaning during construction and final cleaning at Substantial Completion.
- B. Development and implementation of Waste Management Plan to indicate following procedures:
 - 1. Limiting amount of project waste through planning, scheduling, and project management.
 - 2. Recycling demolished structures and construction and waste materials, and reuse of recycled or salvaged materials whenever possible.
 - 3. Procedures to reduce construction noise, fumes, vibration, dust or other airborne contaminants.
 - 4. Adherence to Federal, State and local environmental and anti-pollution regulations and ordinances.
 - 5. Waste materials shall be suitably disposed off site in approved landfill sites.
 - 6. Development of contamination containment plan to include procedures for addressing volatile and hazardous materials or their waste products, cleaning materials and residue.
- C. Cleaning and Protection:
 - 1. Development of daily and periodic construction cleaning and protection of products stored on site or erected in project, and shall include sequence and frequency policy and schedule for project duration.
 - 2. Development of evacuation, fire and life safety plan, staff training procedures in handling and disposal of materials deleterious to human contact or exposure.
 - 3. Final cleaning leaving project ready for Owner's acceptance.

1.2 RELATED SECTIONS

- A. Section 01 31 00 – Project Management and Coordination.
- B. Section 01 33 00 – Submittal Procedures.
- C. Section 01 42 00 – References.
- D. Section 01 66 00 – Product Storage and Handling Requirements.
- E. Section 01 78 00 – Closeout Submittals.

1.3 SUBMITTALS

- A. Comply with Section 01 33 00 – Submittal Procedures.
- B. Submit MSDS sheets for products requiring special care or handling in storage, application or cleanup.
- C. Submit Waste Management and Cleaning Plans identifying and providing operational procedures for each item noted in Scope of Work.

1.4 COORDINATION

- A. Coordinate scheduling and implementation of Waste Management and Cleaning Plans with each trade on site.

- B. Ensure enforcement to promote efficient and orderly sequence of installation of interdependent construction elements, with intent to reduce waste maximize efficient and safe work environment.
- C. Coordinate periodic and final clean up of Work of each trade in preparation for Substantial Completion and for portions of Work designated for Owner's partial occupancy.

1.5 QUALITY ASSURANCE

- A. Monitor each trade, product suppliers, product deliveries, waste generation, site conditions, and workmanship, to minimize waste and maximize recycled materials and reuse of retained materials.

PART 2 PRODUCTS

NOT USED (See individual product specifications for cleaning products recommended by manufacture.)

PART 3 EXECUTION

NOT USED (See individual product specifications for written cleaning procedures and instructions recommended by manufacture.)

END OF SECTION

SECTION 01 78 00
CLOSEOUT SUBMITTALS

PART 1 GENERAL

1.1 SCOPE OF WORK

- A. Closeout procedures.
- B. Final cleaning.
- C. Adjusting.
- D. Project record documents.
- E. Operation and maintenance data.
- F. Spare parts and maintenance Products.
- G. Warranties and bonds.
- H. Maintenance service.
- I. Training.

1.2 RELATED SECTIONS

- A. Section 01 29 00 – Payment Procedures.
- B. Section 01 33 00 – Submittal Procedures.
- C. Section 01 91 00 – Commissioning.
- D. Section 27 60 00 – Integrated Audio System.

1.3 CLOSEOUT PROCEDURES

- A. Submit written certification that contract documents were reviewed, work inspected, and that work is complete in accord with contract documents and ready for Owner's Project Manager and AE's review.
- B. Provide submittals to AE and Owner's Project Manager that are required by building and fire authorities.
 - 1. Submit final application for payment identifying total adjusted contract sum, previous payments, and sum remaining due.
 - 2. Owner may opt to occupy all or portions of completed facilities upon substantial completion of those portions of work.
 - 3. Contractor/CM shall provide punch list to AE identifying items remaining to be completed.
 - 4. AE shall inspect project to determine completion of punch list and project compliance with Contract Documents.

1.4 FINAL CLEANING

- A. Execute final cleaning prior to final project assessment.
- B. Clean interior and exterior surfaces exposed to view; remove temporary labels, stains and foreign substances.
- C. Clean equipment and fixtures to sanitary condition with cleaning materials per manufacturer's written recommendations.
- D. Remove waste and surplus materials, rubbish, and construction facilities from the site.

1.5 ADJUSTING

- A. Adjust operating products and equipment to ensure smooth and unhindered operation.

1.6 PROJECT RECORD DOCUMENTS

- A. Maintain on site one set of record documents, recording accurate field revisions to contract documents to include:
 - 1. Drawings/specifications and addenda.
 - 2. Change orders and other modifications to work.
 - 3. Reviewed shop drawings, product data, and samples.
 - 4. Manufacturer's instruction for assembly, installation, and adjusting.
- B. Ensure entries are complete and accurate, enabling ready access and reference by Owner's Project Manager.
- C. Store record documents separate from documents used for construction.
- D. Record information concurrent with construction progress.
- E. Specifications shall be legibly marked and recorded for each product used indicating the following:
 - 1. Manufacturer's name, product model and number.
 - 2. Product substitutions or alternates utilized.
 - 3. Changes made by addenda and modifications.
- F. Record drawings and shop drawings shall be legibly marked with each item recorded to indicate actual construction as follows:
 - 1. Measured depths of foundations in relation to finish first floor datum.
 - 2. Measured horizontal and vertical locations of underground utilities and appurtenances, referenced to permanent surface improvements.
 - 3. Measured locations of internal utilities and appurtenances concealed in construction, referenced to visible and accessible features of the work.
 - 4. Field changes of dimension and details.
 - 5. Details not on original contract drawings.
- H. Upon project completion, transfer project record drawing information to Autocad (2010 or later format) files and provide four copies of CD's to Architect for review and transmitted to Owner, prior to claim for final Application for Payment.
 - 1. Contractor/CM shall also submit two hard copies of record drawings and project manual maintained during project to Owner's Project Manager.
 - 2. Owner will be responsible for making prints from CD's and for their distribution to Owner's user groups.

1.7 OPERATION AND MAINTENANCE DATA

- A. Submit documentation as noted in individual product specifications and as noted herein.

1.8 SPARE PARTS AND MAINTENANCE PRODUCTS

- 1. Provide spare parts, maintenance, and extra products in quantities specified in specification.
- 2. Deliver to Owner; obtain receipt prior to final payment.

1.9 WARRANTIES

- A. Submit documentation as noted in individual product specifications and as noted herein.
- B. Provide duplicate notarized copies.
- C. Execute and assemble transferable warranty documents from subcontractors, suppliers, and manufacturers.
- D. Provide Table of Contents and assemble in D-side 3-ring white binders with typed title sheet of contents inside durable plastic front cover.
- E. Submit prior to final application for payment.
- F. For items of work delayed beyond date of substantial completion, provide updated submittal within ten days after acceptance, listing date of acceptance as start of warranty period.

1.10 MAINTENANCE SERVICE

- A. Furnish service and maintenance of components indicated in specification sections for one-year from date of project substantial completion.
- B. Examine, clean, adjust, and lubricate system components as required for reliable operation.
- C. Include systematic examination, adjustment, and lubrication of components repairing or replacing parts as required with parts produced by the manufacturer of the original component.
- D. Owner shall approve in writing of transfers or reassignments of maintenance service tasks.

1.11 ASBESTOS CERTIFICATION

- A. Provide notarized letter from Contractor/CM certifying that “to the best of his/her knowledge no asbestos containing building materials were used as a building material in the project”, per FS 255.40.

1.12 PROJECT CLOSE-OUT PROCEDURES

- A. Items are to be submitted to the School District’s Construction Manager’s Office once the request for final payment has been submitted.
 - 1. ____ 4 Copies: AIA Application For Payment, Signed and Sealed, Noted as Final Payment.
 - 2. ____ Consent of Surety to make final payment.
 - 3. ____ Release of Lien from all Sub-Contractors or Laborers who have filled an Intent to Lien.
 - 4. ____ Warranty/Guarantee from Construction Manager for one-year from the date of Substantial Completion.
 - 5. ____ Warranty/Guarantee from each Sub-Contractor for one-year from the date of Substantial Completion.
 - 6. ____ Copy of the approval by the Architect-Engineer and the transmittal to the end user of manuals, shop drawings, as-builds, brochures, warranties, list of sub-contractors with phone numbers, addresses and contact persons.
 - 7. ____ Verification that all applicable district personnel have been trained in the operation of their new equipment (per system: HVAC, controls, etc.)

8. ____ Executed Roof Warranty in the name of the Martin County School District.
9. ____ 4 Copies: OEF Form 209, Certificate of Final Inspection.
10. ____ 4 Copies: Completed Punch-list.
11. ____ SREF 4.2(3)(e) Architect's Certificate of Specification of Asbestos Containing Materials.
12. ____ SREF 4.2(3)(e) Contract's Certificate of Asbestos Use.
13. ____ SREF 4.2(3)(d) Threshold inspector's statement that building complies with Threshold Plan.
14. ____ 4 Copies: OEF Form 110B, Certificate of Occupancy.
15. ____ OEF Form 564 for new construction or additions to existing schools only (Return to Director's Secretary)
16. ____ Inspection Log Book

PART 2 PRODUCTS

2.1 APPROVED PRODUCTS

- A. Use only cleaning and maintenance products approved for use in Florida Educational Facilities.

PART 3 EXECUTION

- 3.1 Not used.

END OF SECTION

SECTION 01 91 00
COMMISSIONING

PART 1 GENERAL

1.1 SCOPE OF WORK

- A. Administrative and procedural requirements for commissioning facilities and facility systems.
- B. Demonstration and training.
- C. Starting systems.
- D. Demonstration and instructions.

1.2 RELATED SECTIONS

- A. Section 01 31 00 – Project Coordination.
- B. Section 01 78 00 – Closeout Documents.
- C. Section 23 05 93 – Testing, Adjusting, and Balancing HVAC.
- D. Section 23 08 00 – Commissioning of HVAC.

1.3 STARTING SYSTEMS

- A. Coordinate schedule for start-up of various equipment and systems.
- B. Notify Architect and Owner seven days prior to startup of each item.
- C. Verify that each piece of equipment or system has been checked for proper lubrication, drive rotation, belt tension, control sequence, or other conditions which may cause damage.
- D. Verify that tests, meter readings, and specified electrical characteristics agree with those required by the equipment or system manufacturer.
- E. Verify wiring and support components for equipment are complete and tested. Execute startup under supervision of responsible Contractors' personnel in accordance with manufacturers' instructions.
- F. When specified in individual specification sections, require manufacturer to provide authorized representative to be present at site to inspect, check and approve equipment or system installation prior to startup, and to supervise placing equipment or system in operation.
- G. Submit written reports per section 01 78 00 - Execution and Closeout Documents that equipment or system is installed and functioning correctly.

1.4 DEMONSTRATION AND INSTRUCTIONS

- A. Demonstrate operation and maintenance of Products to Owner's personnel two weeks prior to date of Substantial Completion.
- B. Demonstration of equipment shall be performed by qualified manufacturers' representative who is knowledgeable about the Project and equipment.
- C. For equipment or systems requiring seasonal operation, perform demonstration for other season within six months.
- D. Utilize operation and maintenance manuals as basis for instruction. Review contents of manual with Owners' personnel in detail to explain all aspects of operation and maintenance.
- E. Demonstrate start-up, operation, control, adjustment, trouble-shooting, servicing, maintenance, and shutdown of each item of equipment at agreed-upon times, at equipment location.
- F. Prepare and insert additional data in operations and maintenance manuals when need for additional data becomes apparent during instruction.

- G. Amount of time required for instruction in each piece of equipment and system is indicated in individual equipment and system specification sections.

1.5 TESTING, ADJUSTING, AND BALANCING

- A. Contractor/CM shall employ, and pay for commissioning services other than TAB firm to perform testing, adjusting and balancing of other systems as indicated or require for fully functional systems
- B. Independent TAB firm shall perform services specified in section 23 05 93 – Testing, Adjusting, and Balancing for HVAC system(s).
- C. The Contractor/CM shall submit reports to Architect indicating observations, results of tests and compliance or non-compliance with specified requirements and with requirements of contract documents.

PART 2 PRODUCTS

- 2.1 Not Used.

PART 3 EXECUTION

3.1 LIST OF EQUIPMENT TO BE COMMISSIONED:

- A. Communications System
- B. Fire Alarm System
- C. Intercom System
- D. Kitchen Equipment
- E. HVAC Equipment.
- F. Gymnasium Equipment including bleachers, scoreboards, basketball backstops, sound system, playcourt surface, equipment with floor inserts
- G. Lighting Systems
- H. Stage, Auditorium, Gym and Instructional Spaces Sound Reinforcement Systems
- I. Irrigation System
- J. Fire Protection System
- K. Movable Interior Partitions
- L. Emergency Generator

3.2 EQUIPMENT COMMISSIONING REQUIREMENTS

- A. Comply with individual specification sections for equipment start-up, operation and training.

END OF SECTION

SECTION 01 91 01
COMMISSIONING OF HVAC

PART 1 GENERAL

1.1 SCOPE OF WORK

- A. Independent commissioning of heating, ventilation, and air conditioning in accord with project documents and include:
 - 1. Evaluate proposed HVAC and electrical systems design and control system documents.
 - 2. Review and document HVAC and Electrical control interface systems interface.
 - 3. Coordinate start-up of HVAC and Electrical systems.
 - 4. Coordinate and review operation, training procedures, demonstration and instructions for HVAC equipment use by Owner.
 - 5. Review, evaluate, and document HVAC equipment operation and performance.
- B. Work with TAB contractor for testing, adjusting, and balancing to ensure HVAC system performance is maximized for operational efficiency.
- C. Coordinate HVAC Commissioning scheduling and activities with GC/CM.
- D. Commissioned Systems Include:
 - 1. HVAC components and equipment.
 - 2. HVAC interaction of cooling, heating, and comfort delivery systems.
 - 3. Building Automation System (BAS): control hardware and software, sequences of operation, and integration of factory controls with BAS.
 - 4. Plumbing: Domestic hot water systems.
 - 5. Lighting Control System with interface with daylighting.

1.2 RELATED SECTIONS

- A. Section 01 31 00 – Project Coordination.
- B. Section 01 33 00 – Submittal Procedures.
- C. Section 01 42 00 – References.
- D. Section 01 45 00 – Quality Control.
- E. Section 01 78 00 – Closeout Submittals.
- F. Section 01 91 00 – Commissioning
- G. Section 23 05 93 – Testing, Adjusting and Balancing For HVAC.

1.3 REFERENCES

- A. See Section 01 42 00 – References for additional reference standards, definitions, abbreviations and acronyms.
- B. American Society of Heating, Refrigeration and Air Conditioning Engineers (ASHRAE):
 - 1. ASHRAE Guideline 0-2005 with Amendments a, b, c & d - The Commissioning Process.
 - 2. ASHRAE Guideline 1.1-2007, The HVAC Commissioning Process.
 - 3. ASHRAE 110-95 – An Introduction to Laboratory Fume Hood Performance Testing.
- C. NEBB Whole Building Systems Commissioning of New Construction, 2009 (3rd Edition).
- D. American National Standards Institute/American Industrial Hygiene Association/American Society of Safety Engineers (ANSI/AIHA/ASSE):
 - 1. ANSI/AIHA/ASSE Z9.5-2012 – American National Standard for Laboratory Ventilation.

1.4 DEFINITIONS

A. Definition of terms used are as follows:

1. Acceptance Phase: Phase of construction after initial start-up and check-out when functional performance testing, operational training, and operating and maintenance documentation development and review occurs.
2. Basis of Design: Documentation of primary thought processes and assumptions for design decisions made to meet Owner's Project Requirements as reflected in construction documents (drawings and specifications). Basis of design describes intent of project, systems, components, conditions, and methods chosen to meet Owner's Project Requirements. Design professionals (Architect and Engineer) are responsible for interpretation of the basis of design.
3. Commissioning Provider: Independent entity, not otherwise associated with design team or Contractor/CM, who directs and coordinates day-to-day commissioning activities. Commissioning Provider does not have construction oversight or design role.
4. Commissioning Plan: Overall plan providing structure, schedule, and coordination planning for commissioning process.
5. Commissioning Team: Group responsible for accomplishing commissioning process.
6. Data Logging: Monitoring flows, currents, status, and pressures of equipment using stand-alone recording equipment, separate from control system. Additional monitoring may be provided through capabilities of control system.
7. Deferred Functional Performance Tests: Functional tests performed after date of substantial completion due to partial occupancy, equipment and seasonal testing requirements, design or other site conditions precluding testing of system or piece of equipment during normal commissioning sequence.
8. Owner's Project Requirements: Documents prepared by Owner providing explanation of concepts, criteria, and work scope critical to Owner's expectations.
9. Factory Testing: Testing of equipment at factory (or on-site) by factory personnel in Owner's representative and commissioning agent's presence.
10. Functional Performance Tests: Tests of dynamic function and operation of equipment and systems using manual (direct observation) or monitoring methods. Functional testing is dynamic testing of systems (rather than just components) under full operation. Systems are tested under various modes, such as during low cooling or heating loads, high loads, component failures, unoccupied modes, varying outside air temperatures, fire alarm modes, and power failure. Systems are run through control system's sequences of operation and components are verified to respond properly. Commissioning Provider develops Functional Performance Test procedures in sequential written form, coordinates, oversees and documents actual testing performed by GC/CM. Functional Performance Tests are performed after Test and Balance, pre-functional checklists and start-up is complete.
11. Indirect Indicators: Indicators of response or condition, such as reading from control system screen reporting damper to be 100% closed.
12. Manual Tests: Using hand-held instruments, immediate control system read-outs or direct observation to verify performance (contrasted to analyzing monitored data taken over time to make observations).
13. Monitoring: Recording of parameters (flow, current, status, or pressure) of equipment operation using data loggers or trending capabilities of control systems.

14. Over-written Value: Writing over sensor value in control system to determine response of system (e.g., changing outside air temperature value from 50°F to 75°F to verify economizer operation). See “Simulated Signal.
15. Owner-contracted Tests: Tests paid by Owner outside GC/CM’s contract and for which Commissioning Provider does not oversee. Tests shall not be repeated during functional testing if properly documented.
16. Phased Commissioning: Commissioning completed in phases (by floors, for example) due to size of structure or other scheduling issues, to minimize total construction time.
17. Pre-functional Checklists: Lists of items to inspect and elementary component tests to conduct to verify proper installation of equipment, provided by GC/CM to Commissioning Authority who shall review and approve scope of tests. Pre-functional checklists are primarily static inspections and procedures to prepare equipment or system for initial operation (e.g., belt tension, oil levels, labels affixed, gauges in place, sensors calibrated). Some pre-functional checklist items may entail simple testing of function of components, piece of equipment or systems. Pre-functional refers to testing to be accomplished prior to formal functional testing of installed equipment. Pre-functional checklists augment and may be combined with manufacturer’s start-up checklist. GC/CM shall execute checklists.
18. Sampling: Functional Performance Testing of fraction of total number of identical or near identical pieces of equipment. Sampling population is at discretion of commissioning firm and is subject to modification based upon sampling results (i.e. will be expanded if initial results warrant).
19. Simulated Condition: Condition created for purpose of testing response of system (e.g., blowing hair dryer on space sensor to determine response of variable volume terminal unit).
20. Simulated Signal: Disconnecting sensor and using signal generator to send amperage, resistance or pressure to transducer and control system to simulate sensor value.
21. Start-up: Initial starting or activating of dynamic equipment, including executing pre-functional checklists.
22. Test, Adjust, and Balance: Process of measuring actual flows of air and hydronic systems, adjusting flows to required values, and documenting results.
23. Trending: Monitoring of equipment performance over time, using data logging equipment or building control system.

1.5 QUALITY ASSURANCE

- A. Supervision, coordination, and documentation of commissioning process shall be responsibility of Commissioning Provider.
- B. Commissioning Provider shall become familiar with Owner's Project Requirements, Basis of Design documentation, project documents, and shall assume responsibility for overall system commissioning effort.
- C. Acceptable Commissioning Firms:
 1. OCI Associates, Inc., 181 Melody Lane, Ft. Pierce, FL 34905; Tel: 772-465-1165; Fax: 772-466-1134; Website: www.ociassociates.com
 2. Johnson, Levinson, Ragan, Davila, Inc., 1450 Centrepark Blvd., Suite 350, West Palm Beach, FL 33401; Tel: 561-689-2303; Fax: 561-689-2302; Website: www.jlrdinc.com.
 3. TLC Engineering, 874 Dixon Blvd., Cocoa, FL 32922; Tel: 321-636-0274; Fax: 321-639-8986; Website: www.tlc-eng.com.

1.6 COORDINATION:

- A. Commissioning Provider will be hired by Owner. Commissioning Provider shall direct and coordinate activities of commissioning team.
- B. Commissioning team shall consist of Commissioning Provider, Owner, GC/CM, and associated subcontractors.
- C. Scheduling: Commissioning Provider shall schedule commissioning activities of and shall coordinate schedule with GC/CM. Commissioning Provider shall generally provide not less than two (2) weeks notice to GC/CM of commissioning activities, except where retesting is required or commissioning activities have been delayed by no fault of commissioning firm.

1.7 COMMISSIONING PROCESS:

- A. Commissioning Provider shall develop and coordinate execution of commissioning plan; observe and document installation, check-out, start-up, and equipment and system testing to establish that equipment and systems are functioning in accord with project requirements, and to assist in developing correct and complete documentation of construction effort.
- B. Commissioning Provider shall not be responsible for design concept, design criteria, compliance with codes, design, construction scheduling, cost estimating, construction management, or construction supervision.
- C. Commissioning Provider may assist design team with problem-solving, or GC/CM with correction of non-conformance items or deficiencies.
- D. Commissioning Provider is not responsible for providing tools required to start, check-out and perform functional tests of equipment and systems, except for specified testing with supplemental portable data-loggers, which shall be supplied and installed by Commissioning Provider.
- E. Work Required during Construction Phase:
 - 1. Ensure compliance with construction documents, and achieve following objectives:
 - 2. Review the engineer of records basis of design as well as the project design documents and make comments pertaining to the execution of commissioning.
 - 3. Develop commissioning plan and distribute to GC/CM, Owner and Engineer.
 - 4. Coordinate commissioning activities during construction with GC/CM and ensure that commissioning activities are included in master project schedule.
 - 5. Review submittals applicable to systems being commissioned, including GC/CM proposed detailed start-up procedures, concurrent with Engineer's reviews and provide review comments to Engineer and Owner.
 - 6. Commissioning provider's review shall be for compliance with commissioning needs, and to aid in development of functional testing procedures and only secondarily to review for compliance with equipment specifications. Design professional remains responsible for interpretation of compliance with contract requirements.
 - 7. Request and review additional information as required to perform assigned commissioning tasks, including review of operations and maintenance materials, and GC/CM's start-up and check-out procedures.
 - 8. Develop specific Functional Performance Test procedures and forms to document proper operation of equipment and system.
 - 9. Submit proposed functional tests to Engineer for review and general conformance to requirements of contract documents and provide copy of proposed functional

- performance test procedures to GC/CM who shall review proposed tests for feasibility, safety, equipment and warranty protection.
10. Required performance testing includes control system trending, stand-alone data logger monitoring, or manual logging of system operation to demonstrate proper operation. Functional Performance Test forms shall include following information:
 - a. Date.
 - b. Project name.
 - c. System and equipment or component name(s).
 - d. Equipment location and identification number.
 - e. Test identification number, and reference to pre-function checklist and start-up documentation identification numbers for each piece of equipment.
 - f. Participating parties.
 - g. Reference to specification describing specific sequence of operations or parameters being tested or verified.
 - h. Formulae used in calculations.
 - i. Required pre-test field measurements.
 - j. Instructions for setting up test.
 - k. Special cautions or alarm limits.
 - l. Specific step-by-step procedures to execute test, in clear, sequential, and repeatable format.
 - m. Acceptance criteria of proper performance with provisions for clearly indicating whether or not proper performance of each part of test was achieved.
 - n. Section for comments.
 - o. Signature and date block for Commissioning Provider and participating parties.
 11. Review GC/CM start-up and pre-functional testing reports and provide on-site observation of start-up and pre-functional testing as specified herein.
 12. Review proposed testing, adjusting, and balancing execution plan for completeness and requirements of commissioning process and provide comments to GC/CM, Engineer, and Owner.
 13. Perform site visits, monthly until pre-functional testing of equipment and systems begins, and then weekly throughout Project, to review component and system installations. Concurrently, schedule and conduct commissioning planning and coordination meetings to review construction progress and to assist in resolving discrepancies or issues relating to commissioning process.
- F. Acceptance Phase: Demonstrate that performance of equipment and systems installed during construction phase meets requirements of construction documents. Notify Owner and Engineer of deficiencies in results or procedures. Commissioning activity shall achieve following objectives:
1. Coordinate, witness, and approve functional tests of equipment and systems performed by GC/CM. Review functional test reports and analyze trend logs, data logger reports, and other monitoring data to evaluate equipment and system performance.
 2. Document performance of functional testing and provide comparison to required performance, as defined by project documents.
 3. Coordinate retesting as necessary until satisfactory performance is demonstrated.
 4. Maintain master deficiency and resolution log, separate testing record log, and provide written progress reports and test results with recommended corrective actions for observed deficiencies.
 5. Compile and submit commissioning report to Owner and Engineer documenting results

- of the Start-Up, Pre-Functional Performance Testing, and Functional Performance Testing.
- 6. Review GC/CM's proposed training of Owner's operating personnel and provide comments to Engineer and Owner.
- 7. Coordinate and attend GC/CM provided training sessions. Verify approved training has been properly completed.
- G. Warranty period: assist Owner in identifying defects in installed equipment or system operation to accomplish following objectives:
 - 1. Review equipment warranties to ensure that Owner's responsibilities are clearly defined.
 - 2. Verify that warranty items have been corrected properly.
 - 3. Coordinate and supervise required seasonal or deferred testing and deficiency corrections, as specified or required by commissioning plan.
 - 4. Return to site, approximately 10 months into warranty period and review with Owner building operation and condition of outstanding issues related to original and seasonal commissioning.
 - 5. Assist Owner in reviewing failure and repair records of equipment during warranty period and in evaluation of GC/CM's corrective actions. Identify areas that may come under warranty or under original construction contract.
 - 6. Interview Owner and identify problems or concerns regarding operating building as originally intended and shall make suggestions for improvements.
 - 7. Assist the Owner in developing reports, documents, and requests for services to remedy outstanding problems.

PART 2 PRODUCTS

- 2.1 Not Used.

PART 3 EXECUTION

3.1 REPORTING:

- A. Provide final commissioning report to Owner with following reports:
 - 1. Copies of periodic commissioning reports.
 - 2. Copies of Pre-Functional Performance Test reports.
 - 3. Copies of Functional Performance Test reports.
 - 4. Copies of the Training Report.

3.2 SYSTEMS TO BE COMMISSIONED:

- A. As defined previously herein under item 1.1, F.

3.3 START-UP, PREFUNCTIONAL CHECKLISTS, AND INITIAL CHECK-OUT:

- A. GC/CM shall be responsible for initial check-out and pre-functional testing of installed equipment and systems.
- B. Commissioning Provider shall monitor activities of parties responsible for executing required start-up, and pre-functional testing, as identified in commissioning plan.
- C. Commissioning Provider shall review GC/CM furnished documentation of start-up, initial check-out, and pre-functional test procedures for equipment and systems to ensure that there

- is written documentation that each manufacturer-recommended procedure has been completed.
- D. Observe first pre-functional test procedures for each type and size equipment to ensure that approved procedures are being followed.
 - 1. For lower-level components of equipment, (e.g., variable volume terminal units, sensors, controllers), observe sampling of pre-functional and start-up procedures.
 - 2. In no case, shall number of units witnessed be less than 20% of total number of identical or very similar units.

3.4 FUNCTIONAL PERFORMANCE TESTING:

- A. Functional Performance Testing of equipment or systems shall be conducted only after pre-functional testing and start-up has been satisfactorily completed. Schedule functional tests with GC/CM. Direct, witness, and document Functional Performance Testing of equipment and systems to be commissioned. GC/CM shall be responsible for execution of Functional Performance Tests.
- B. Functional Performance Testing shall demonstrate that each item of equipment and each system is operating according to requirements of construction documents as defined by A/E. Each item of equipment and system undergoing Functional Performance Testing shall be operated through all modes of operation where there is required system response. Verify each action required in sequences of operation has been accomplished according to requirements, or A/E shall revise sequences as deemed appropriate.
- C. Functional Performance Testing shall proceed from components to subsystems to systems. When proper performance of interacting individual systems has been achieved, interface or coordinated responses between systems shall be tested.
- D. Proper and accurate operation of control system shall be proven by functional testing and approved by Commissioning Provider before it may be used for testing, adjusting and balancing activities or to verify performance of other components or systems. If authorized by Commissioning Provider, portions of control system may be tested and approved before functional testing of the entire system is completed.
- E. Air and water balancing shall be completed and corrected as necessary before Functional Performance Testing of air-related or water-related equipment or systems.
- F. Test Methods:
 - 1. Functional Performance Testing and verification shall be achieved by manual testing (direct manipulation of equipment and observation of its response and performance) or by monitoring performance using control system's trend log capabilities.
 - 2. Functional Performance Test procedures shall specify which methods shall be used for each test. Determine which method is most appropriate for tests that do not have method specified.
 - 3. Commissioning Provider may substitute specified methods or require additional method to be executed, other than that specified, if required to demonstrate proper operation of equipment or system being tested.
 - 4. Develop Functional Performance Testing plans that define allowable sampling procedures and that specify procedures to be followed in case of observed discrepancies or failures in sample chosen for functional testing.
 - 5. AHU operation (leaving air temperature, VFD speed) shall be trend logged with VAV box and air valve flow rates, as well as space temperatures to demonstrate modulation of system components with changing loads, as well as occupied/non-occupied status and

control strategies such as optimum static pressure reset and temperature set-up/set-back.

6. Sampling: Multiple identical pieces of non-life-safety or otherwise non-critical equipment may be functionally tested using sampling strategy, as defined in functional test procedures.
 - a. Significant application differences and significant sequence of operation differences in otherwise identical equipment invalidates their common identity.
 - b. Small size or capacity difference, alone, does not constitute difference.
 - c. The following equipment may be sample tested: Reheat coils, terminal boxes, occupancy sensors, and lighting controls.
7. If 10% or 3 or more identical pieces of equipment (size alone does not constitute a difference) fail to perform to requirements of project documents (mechanically or substantively) due to manufacturing defects or application error not allowing it to meet performance specifications, identical units may be considered unacceptable by Commissioning Provider. In such case, GC/CM shall provide Commissioning Provider with the following:
 - a. Within 1 week of notification from Commissioning Provider, GC/CM or manufacturer's representative shall examine other identical units making record of findings. Findings shall be provided to Commissioning Provider within 2 weeks of original notice.
 - b. Within 2 weeks of original notification, GC/CM shall provide signed and dated, written explanation of problem, cause of failures, and proposed solution, including full equipment submittals for corrective or replacement equipment, if appropriate. Proposed solutions shall meet requirements of original installation.
 - c. Commissioning Provider shall evaluate proposed solution and submit recommendation of approval or disapproval to Owner and Engineer.
 - d. When approved, 2 examples of proposed solution shall be installed by GC/CM and Commissioning Provider shall schedule and conduct functional testing of proposed solution. Upon completion of functional testing of proposed solution, Commissioning Provider shall recommend acceptance or disapproval of proposed solution to Owner.
 - e. Upon acceptance of proposed solution by Owner, GC/CM shall replace or repair identical items and extend warranty accordingly, if original equipment warranty had begun. Replacement/repair work shall proceed with reasonable speed beginning within 2 weeks of approval of proposed solution.
8. Ensure that each Functional Performance Test is performed under conditions that simulate actual operating conditions as closely as is practically possible.
9. Simulation of operating conditions (not by overwritten value) may be allowed, at Commissioning Provider's discretion. Simulation of conditions shall be accomplished by subjecting the equipment to actual operating conditions by artificial means whenever possible.
10. Where actually achieving simulated operating condition is impractical, as determined by Commissioning Provider or as identified in Functional Performance Test procedure, use of signal generators to create simulated signal may be used to test and calibrate transducers and DDC constants instead of using sensor to act as signal generator via simulated conditions or overwritten values. Signal generators or simulators shall be provided by GC/CM.
11. Overwriting sensor values to simulate conditions, such as overwriting outside air temperature reading in control system to be different than it really is, may be allowed if approved by Commissioning Provider. Simulation of operating conditions is preferable.

12. Altering setpoints: rather than overwriting sensor values, and when simulating conditions is difficult, altering setpoints shall be used to test sequences.
13. Indirect indicators: relying on indirect indicators for responses or performance may be allowed only after the Commissioning Provider has visually and directly verified that indirect readings represent actual conditions and responses over range of test parameters.

3.5 RETESTING OF EQUIPMENT AND/OR SYSTEMS:

- A. Prior to retesting of functional performance tests found to be deficient, submit data indicating that deficient items have been completed and corrected to Commissioning Provider.
- B. After review of submitted data, if corrective measures are acceptable, Commissioning Provider shall schedule and conduct recheck.
- C. If during retesting it becomes apparent that deficient items have not been completed and corrected as indicated in data provided by GC/CM, retesting shall be stopped. Costs for commissioning team to further supervise retesting of Functional Performance Test shall be the responsibility of GC/CM.

3.6 DOCUMENTATION, NONCONFORMANCE, AND APPROVAL OF TESTS:

- A. Documentation: Witness and document results of functional tests using specific procedural forms developed for that purpose. Deficiencies or nonconformance issues shall be noted and reported with test results. Include completed test forms in final commissioning report.
- B. As Functional Performance Testing progresses and deficiencies are identified, discuss issues and attempt to resolve discrepancies with GC/CM.
- C. Approval: Note each satisfactorily demonstrated function on functional test form. Formal approval of functional tests shall be made after review of test reports by Commissioning Provider and Owner. Recommend acceptance of each test to the Owner using standard form. Owner shall give final approval on each test using same form, providing signed copy to Commissioning Provider and GC/CM.

3.7 DEFERRED TESTING:

- A. Deferred testing: If required pre-functional or functional test cannot be completed as scheduled, execution of checklists and functional testing may be delayed upon approval of Commissioning Provider and Owner. Deferred tests shall be conducted in same manner as seasonal tests as soon as possible.
- B. Schedule and coordinate any required seasonal testing, tests delayed until weather or other conditions are suitable for demonstration of equipment or system's performance. Seasonal testing shall be executed, documented, and deficiencies corrected as specified herein for functional testing. Adjustments or corrections to operations and maintenance manuals and record documents due to test results of shall be made before seasonal testing process is considered complete. Schedule deferred testing with GC/CM and Owner.

3.8 OPERATION AND MAINTENANCE MANUALS:

- A. Prior to beginning specified training programs, review draft operations and maintenance manuals, equipment documentation, and as-installed drawings for systems that were commissioned and verify compliance with documents. Communicate deficiencies in documents to Owner and Contractor. When identified deficiencies have been corrected, recommend approval and acceptance of operations and maintenance manuals to Owner. Review equipment warranties and verify that requirements needed to keep warranty valid are clearly identified.
- B. Ensure that Owner's Project Requirements, basis of design, are included in the first section of operations and maintenance manuals. Narrative sections shall be updated by responsible parties to record status.

END OF SECTION

DIVISION

2

SITE CONSTRUCTION

SECTION 02 41 13
SELECTIVE DEMOLITION

PART 1 GENERAL

1.1 RELATED DOCUMENTS

- A. The provisions of the General Conditions, Supplementary Conditions, Drawings, Specifications and the Sections included under Division 1, General Requirements and References are included as a part of this Section as though bound herein.

1.2 SECTION INCLUDES

- A. Provide labor, materials, services, and equipment necessary to furnish and install work as indicated and as specified herein, which includes, but is not limited to:
 - 1. Required demolition of designated existing elements
 - 2. Salvage of designated items

1.3 REFERENCES

- A. Comply with NFPA 1 – Chapter 29 and NFPA 241 Standard for Safeguarding Construction Alteration and Demolition Operation 2000 Edition
- B. Florida Building Code – FBC

1.4 NOTIFICATION OF OWNERS OF UTILITY LINES AND EQUIPMENT

- A. Notify the Owner or local authority owning any conduits, wires, pipes, or equipment affected by demolition work.
- B. Arrange for removal or relocation of affected items and pay fees or costs in conjunction with removal or relocation, except as otherwise noted.

1.5 PROTECTION

- A. Prior to starting any work on site, provide a safety plan as outlined in Section 453 FBC to the Building Department for approval.
- B. Coordinate the implementation of the safety plan with the Building Department, Campus Police, School Representative, and Program Management.
- C. Prior to starting demolition operations, provide necessary protection of existing spaces and items to remain.
- D. Owner may be continuously occupying areas of the building immediately adjacent to areas of selective demolition. If Owner continues to occupy the facility comply with the following:
 - 1. Conduct demolition work in a manner that will minimize need for disruption of the Owners normal operations.
 - 2. Provide protective measures as required to provide free and safe passage of Owner's personnel and public to and from occupied portions of the facilities.
 - 3. Provide minimum of 72 hours advance notice to Owner of demolition activities that will impact Owners normal operations.
 - a. Obtain specific approval from Owner for impact.
- E. Owner assumes no responsibility for actual condition of items to be demolished.
 - 1. Owner will maintain conditions at time of commencement of contract insofar as practical.

- F. Protect any exposed existing finish work that is to remain during demolition operations.
- G. Erect and maintain dust proof partitions, closures, and ventilator system as required preventing the spread of dust or fumes to occupied portions of the building.
 - 1. Take whatever precautions necessary to minimize impact on occupied areas.

1.6 REGULATORY REQUIREMENTS

- A. Conform to applicable codes for demolition of structures, safety of adjacent structures, dust control, runoff, and erosion control, and disposal of demolished materials.
- B. Obtain required permits from authorities having jurisdiction.
- C. Notify affected utility companies before starting work and comply with their requirements.
- D. Do not close or obstruct roadways, sidewalks, and hydrants, without permits.
- E. Conform to applicable regulatory procedures when discovering hazardous or contaminated materials.
 - 1. Contact the Architect and Owner immediately.
- F. Test soils around buried tanks for contamination.
- G. No demolition will occur during school hours without the written permission of the Owner.

1.7 EXPLOSIVES

- A. The use of explosives is strictly prohibited.

PART 2 PRODUCTS - (Not applicable)

PART 3 EXECUTION

3.1 PREPARATION

- A. Verify the proper disconnection and capping of all abandoned utilities.
- B. Verify that required barricades and other protective measures are in place.
- C. Provide necessary shoring, bracing, and other precautions required for proper support of existing structure during cutting and demolition operations.
- D. Photograph existing conditions of structure, surfaces, equipment and surrounding spaces that could be misconstrued as damage resulting from selective demolition work; submit photographs and written report of existing damage to Architect prior to starting work.
 - 1. Contractor shall repair damage caused to existing facilities at no cost to Owner unless they can provide documentation is indicating pre-existing damage.

3.2 DEMOLITION OPERATIONS

- A. Cut and remove elements and equipment as designated on Drawings.
 - 1. Remove elements in their entirety unless otherwise indicated.
- B. Execute demolition in a careful and orderly manner with least possible disturbance or damage to adjoining surfaces and structure.
- C. Exercise extreme caution in cutting and demolition of portions of existing structure.
 - 1. Obtain approval of Architect prior to cutting or removing structural members for any reason.
- D. Avoid excessive vibrations in demolition procedures that may transmit through existing structure and finish materials.

- E. If hazardous materials are encountered during demolition operations, comply with applicable regulations, laws, and ordinances concerning assessment, removal, handling, and protection against exposure or environmental pollution and immediately contact the District's ECO.

3.3 DISPOSAL

- A. Materials, equipment, and debris resulting from demolition operations shall become property of Contractor.
 - 1. Remove demolition debris at least once each day in accordance with applicable City, State, and Federal Laws.
- B. Cover debris in trucks with approved netting to prevent spillage during transportation.
- C. Do not store except in approved containers or burn materials on site.
 - 1. Remove combustible waste materials in a manner approved by local Fire Department.
 - 2. Remove, handle, and dispose of any hazardous waste and debris in accordance with applicable City, State, and Federal Laws.
- D. Transport demolition debris to off-site disposal area and legally dispose of debris.
- E. Use street routes specifically designated by City for hauling debris.
- F. When possible dispose of material to recycling centers.

3.4 CLEANING AND REPAIR

- A. Leave building broom clean and free of debris, ready to receive new work.
- B. Repair demolition performed in excess of that required.
 - 1. Return structures and surfaces to remain to condition existing prior to commencement of selective demolition.

END OF SECTION

DIVISION

5

METALS

SECTION 05 40 00
COLD FORMED METAL FRAMING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. The provisions of the General Conditions, Supplementary Conditions, and the Sections included under Division 1, General Requirements, are included as a part of this Section as though bound herein.

1.2 SECTION INCLUDES

- A. Provide labor, materials, services, and equipment necessary to furnish and install work as indicated and as specified herein, which includes, but is not limited to:
 - 1. Load bearing formed steel stud interior wall.
 - 2. Miscellaneous framing not for exterior walls or roof structures.
 - 3. Formed steel joist, purlins, slotted channel
 - 4. Miscellaneous framing and bridging

1.3 SUMMARY

- A. Types of cold-formed metal framing units include the following:
 - 1. Exterior wall, fascia, soffit and ceiling studs.
 - 2. Exterior hat channels.
 - 3. Exterior angles, bent plates and miscellaneous units necessary to support the architectural finishes.

1.5 REFERENCES

- A. AISI - American Iron and Steel Institute - Cold-Formed Steel Design Manual.
- B. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
- C. ASTM A645/A645M - Standard Specification for Pressure Vessel Plates, Five Percent Nickel Alloy Steel, Specially Heat Treated.
- D. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process
- E. ASTM A1011/A1011M - Standard Specification for Steel, Sheet and Strip, Hot-Rolled, Carbon, Structural, High-Strength Low-Alloy and High-Strength Low-Alloy with Improved Formability
- F. ASTM C955 - Standard Specification for Load-Bearing (Transverse and Axial) Steel Studs Runners (Track), and Bracing or Bridging for Screw Application of Gypsum Board and Metal Plaster Bases
- G. AWS D1.1/D1.1M - Structural Welding Code
- H. ANSI/AWS D1.3 - Light Steel Welding Code
- I. SSPC (Steel Structures Painting Council) - Steel Structures Painting Manual.
- J. FBC - Florida Building Code
- K. MFMA (Metal Framing Manufacturers Association) - Guidelines for the Use of Metal Framing
- L. ASCE 7 – Wind loads

1.6 SUBMITTALS

- A. Submit in accordance with Division 1 requirements.
- B. Product data and installation instructions for each item of cold-formed metal framing and accessories.
- C. Shop drawings for special components and installations not fully dimensioned or detailed in manufacturer's product data.
 1. Include engineered placing drawings for framing members showing size and gage designations, number, type, location, and spacing. Indicate supplemental strapping, bracing, splices, bridging, accessories, and details required for proper installation. Submittals shall bear the signature and seal of the Florida professional engineer who was in responsible charge of their preparation.
- D. Product Data: Provide data describing standard framing member materials and finish, product criteria, load charts and limitations. Unless otherwise indicated, submit the following for each type of product provided under work of this Section:
 1. Recycled Content:
 - a. Indicate recycled content; indicate percentage of pre-consumer and post-consumer recycled content per unit of product.
 - b. Indicate relative dollar value of recycled content product to total dollar value of product included in project.
 - c. If recycled content product is part of an assembly, indicate the percentage of recycled content product in the assembly by weight.
 - d. If recycled content product is part of an assembly, indicate relative dollar value of recycled content product to total dollar value of assembly.
 2. Local/Regional Materials: *(Provide materials extracted/harvested and manufactured within a 500 mile radius from the project site).*
 - a. Sourcing Location(s): Indicate location of extraction, harvesting, and recovery; indicate distance between extraction, harvesting, and recovery and the project site.
 - b. Manufacturing Location(s): Indicate location of manufacturing facility; indicate distance between manufacturing facility and the project site.
 - c. Product Value: Indicate dollar value of product containing local/regional materials; include materials cost only.
 - d. Product Component(s) Value: Where product components are sourced or manufactured in separate locations, provide location information for each component. Indicate the percentage by weight of each component per unit of product.

1.7 SYSTEM DESCRIPTION

- A. Design wall system to provide for movement of components without damage, failure of joint seals, undue stress on fasteners, or other detrimental effects when subject to seasonal or cyclic day/night temperature ranges.
- B. Design system to accommodate construction tolerances, deflection of building structural members, and clearances of intended openings.

1.8 QUALITY ASSURANCE

- A. Component Design: Calculate structural properties of studs and joists in accordance with American Iron and Steel Institute (AISI) "Specification for Design of Cold-Formed Steel Structural Members."

- B. Welding: Use qualified welders and comply with American Welding Society (AWS) D1.3, "Structural Welding Code - Sheet Steel."
 - 1. Field welding of studs shall not be permitted.
- C. Fire-Rated Assemblies: Where framing units are components of assemblies indicated for a fire-resistance rating, including those required for compliance with governing regulations, provide units that have been approved by governing authorities that have jurisdiction.
- D. Pre-Installation Conference: Prior to start of installation of metal framing systems, meet at project site with installers of other work. Review areas of potential interference and conflicts, and coordinate layout and support provisions for interfacing work.

1.9 REGULATORY REQUIREMENTS

- A. Design light gage metal framing in accordance with the FBC, and AISI "Specifications for the Design of Cold-Formed Steel Structural Members."
- B. Wind loads shall be in accordance with ASCE 7.
- C. Design interior partitions for a minimum of 5 PSF with no stress increase.

1.10 QUALIFICATIONS

- A. Manufacturer: Company specializing in manufacturing the Products specified in this section with minimum 5-years documented experience.
- B. Installer: Company specializing in performing the work of this section with minimum 3-years documented experience.
- C. Design structural elements under direct supervision of a Professional Structural Engineer experienced in design of this Work and licensed in the State of Florida.

1.11 FIELD MEASUREMENTS

- A. Verify that field measurements are as indicated on shop drawings.

1.12 COORDINATION

- A. Coordinate with the placement of components within the stud framing system.

1.13 DELIVERY AND STORAGE

- A. Protect metal framing units from rusting and damage. Deliver to project site in manufacturer's unopened containers or bundles, fully identified with name, brand, type, and grade. Store off ground in a dry ventilated space or protect with suitable waterproof coverings.

PART 2 - PRODUCTS

2.1 STRUCTURAL DESIGN

- A. Design, analysis, and computation of section properties shall be in conformance with the Specification for the Design of Cold-Formed Steel Structural Members of the American Iron and Steel Institute.
- B. Technical tabulations of section properties and load capacities shall indicate dimensions, steel characteristics, and allowable stresses upon which computations are based.

- C. Structural calculations of the specific members required to provide a complete assembly shall be performed based upon the wind load pressures and suctions as indicated in the drawings in addition to well established and documented dead loads as required for the specific situations. Deflections shall be limited to L/360 for stucco finishes and L/240 for EIFS finishes. Submittals shall be prepared based upon the finishes as indicated in the architectural drawings and the available structure to attach to as indicated in the structural drawings.

2.2 MANUFACTURERS

- A. Manufacturer shall be the following however products of other manufacturers will be considered for acceptance provided they equal or exceed the material requirements and functional qualities of the specified product.
1. Dale Industries, Inc., Dearborn, Michigan
 2. Consolidated Systems, Inc., Columbia, South Carolina
 3. Gold Bond Building Products Div., National Gypsum Co., Charlotte, North Carolina
 4. Marino/Ware Industries, South Plainfield, New Jersey
 5. Unimast Inc., Franklin Park, Illinois
 6. Dietrich Industries, Inc., Pittsburgh, Pennsylvania

2.3 STUD FRAMING MATERIALS

- A. Studs in interior partitions of at least 1 $\frac{5}{8}$ " x 3 $\frac{5}{8}$ " may be, 22-ga (less than 16' high), 20-ga or heavier (more than 16' high), ASTM C645 "Specification for Design of Cold-Formed Steel Structural Members.
- B. Steel Joists and Purlins: Manufacturer's standard C-shaped steel joists and purlins, unpunched, of web depths indicated, with lipped flanges, and complying with the following:
1. Design Uncoated Steel Thickness: As indicated or required for performance.
 2. Flanged Width: 1-5/8 inches, minimum.
- C. Steel Joist Track: Manufacturer's standard U-shaped steel joist track, unpunched, of web depths indicated, with straight flanges, and complying with the following:
1. Design Uncoated Steel Thickness: As indicated or required for performance.
- D. Flange Width: 1-5/8 inches, minimum.
- E. Provide minimum double 16-ga studs at window and door opening.
- F. Steel Rigid Furring Channels: ASTM C645, hat-shaped, depth of 7/8 inch, and 0.0179 inch thick, unless otherwise indicated.
- G. Z-Furring Members: Manufacturer's standard Z-shaped furring members with slotted on non-slotted web, fabricated from steel complying with ASTM A 653; with a minimum base metal (uncoated) thickness of 0.0179 inch, face flange of 1-1/4 inch, wall attachment flange of 7/8 inch, and a depth required to fit insulation thickness indicated.
- H. Deflection Track: Manufacturer's top runner complying with the requirements of ASTM C645 and with 2-inch deep flanges.
- I. Floor and Ceiling Runners:
1. Channel type metal runners, formed from 22-ga. galvanized steel, ASTM C645.
 2. Provide and install extended leg retainer on ceiling runners.
 3. Provide same gauge runners as studs.
- J. Studs and furring to be 16" O.c.

2.4 SOFFIT FRAMING MATERIALS

- A. Exterior Soffit Support: Shall be 16 gauge galvanized cold rolled stud, 6 inches deep with 2” flange and with a 50 ksi yield strength. Protective coating shall be G90 hot-dip galvanized coating per ASTM A525.
- B. Interior Soffit Support Carrying Channels: Shall be 16 gauge galvanized carrying channels cold rolled channels 1-1/2 inches deep. Protective coating shall be G40 hot-dip galvanized coating per ASTM A525.

2.4 ACCESSORIES

- A. Bracing, Furring, Bridging: Formed sheet steel, thickness determined for conditions encountered
- B. Plates, Gussets, Clips: Formed sheet steel, thickness determined for conditions encountered
- C. Shop and Touch-up Primer: SSPC - Paint 15, Type Type-1, red oxide
- D. Touch-Up Primer for Galvanized Surfaces: SSPC - Paint 20 Type-I Inorganic

2.5 FASTENERS

- A. Self-drilling, Self-tapping Screws, Bolts, Nuts, and Washers, use ASTM A123/A123M, hot dip galvanized to 1.25 oz/sq ft.
- B. Anchorage Devices: Power-actuated, drilled expansion bolts and screws with sleeves.
- C. Welding: In conformance with AWS D1.1/D1.1M and AWS D1.3

2.6 FABRICATION

- A. Fabricate assemblies of framed sections of sizes and profiles required; with framing members fitted, reinforced, and braced to suit design requirements.
- B. Fit and assemble in largest practical sections for delivery to site, ready for installation.

2.7 FINISHES

- A. Studs: Galvanize to G40 coating class, interior studs and G60 coating class, for studs in contact with cementitious materials.
- B. Tracks and Headers: Galvanize to G40 coating class.
- C. Joists and Purlins: Galvanize to G60 coating class.
- D. Bracing, Furring, Bridging: Same finish as framing members, prime paint.
- E. Plates, Gussets, Clips: Same finish as framing members, prime paint.
- F. Plates, Gussets, Clips: Same finish as framing members, prime paint.
- G. Steel:
 - 1. Recycled Content: Provide post-consumer recycled and pre-consumer recycled content.

2.8 FABRICATION

- A. General: Framing components may be prefabricated into assemblies before erection. Fabricate panels plumb, square, true to line, and braced against racking with joints welded. Perform lifting of prefabricated units to prevent damage or distortion.
- B. Fabricate units in jig templates to hold members in proper alignment and position and to assure consistent component placement.

- C. Fastenings: Attach similar components by shop welding or field installed screw fasteners. Attach dissimilar components by shop welding or field bolting/screwing, as standard with manufacturer.
- D. Wire tying of framing components is not permitted.
- E. Fabrication Tolerances: Fabricate units to a maximum allowable tolerance variation from plumb, level, and true to line of 1/8 inch in 10 feet.

2.9 ENVIRONMENTAL

- A. Recycled Content: Minimum total recycled content equal to 25 percent with 23 percent post-consumer recycled content or minimum 7 percent pre-consumer recycled content at Contractor's option.

PART 3 - EXECUTION

3.1 INSPECTION

- A. Pre-installation Conference: Prior to start of installation of metal framing systems, meet at project site with installers of other work including ceiling grid systems and mechanical and electrical work. Review areas of potential interference and conflicts and coordinate layout and support provisions for interfacing work.

3.2 INSTALLATION

- A. Install metal framing systems in accordance with manufacturer's printed or written instructions and recommendations and in conformance with the engineered and approved submittals.
- B. Runner Tracks: Install continuous tracks sized to match studs. Align tracks accurately to layout at base and tops of studs. Secure tracks as recommended by stud manufacturer for type of construction involved, except do not exceed 24 inches o.c. spacing for nail or power-driven fasteners or 16 inches o.c. for other types of attachment. Provide fasteners at corners and ends of tracks. All runner tracks shall be at least the same gauge metal as the steel stud it attaches to. All attachments of the runner tracks to the building construction shall be designed to withstand dead and wind loads. Steel studs shall be attached to runner tracks on both faces of runner track. Deflection track to be used at all locations where studs extend to bottom of structure that will deflect under loading.
- C. Installation of Studs: Secure studs to runner tracks at both inside and outside flanges. Secure studs to each other at intersections. Secure studs to the structure.
- D. Hat Channels: Secure hat channels to studs and to the structure.
- E. Set studs plumb, except as needed for diagonal bracing or required for non-plumb walls or warped surfaces and similar requirements.
- F. Where stud system abuts structural columns or walls, including masonry and/or tilt-up concrete walls, anchor ends of stiffeners to supporting structure.
- G. Install supplementary framing, blocking, and bracing in metal framing system wherever walls or partitions are indicated to support fixtures, equipment, services, casework, heavy trim and furnishings, and similar work requiring attachment to the wall or partition. Where type of supplementary support is not otherwise indicated, comply with stud manufacturer's recommendations and industry standards in each case, considering weight or loading resulting from item supported.

- H. Frame wall openings larger than 2 feet square with double stud at each jamb of frame except where more than two are either shown or indicated in the engineered submittals. Install runner tracks and jack studs above and below wall openings. Anchor tracks to jamb studs with stud shoes or by welding, and space jack studs same as full-height studs of wall. Secure stud system wall opening frame in manner indicated.
 - 1. Contractor's Option to reduce or eliminate multiple studs at jambs and headers: JamStud™ as manufactured by The Steel Network, Inc. ASTM A653/A653M, Grade 50 (340), 50ksi (340MPa), minimum yield strength, 65ksi (450 MPa), minimum tensile strength, G-60 (Z180) hot-dipped galvanized coating.
 - 2. Approved Engineered Connections for attachment of jambs to headers: StiffClip® HE and StiffClip® AL as manufactured by The Steel Network, Inc.
- I. Frame both sides of expansion and control joints with separate studs; do not bridge the joint with components of stud system.
- J. Install horizontal stiffeners in stud system, spaced (vertical distance) at not more than 54 inches o.c.
- K. Erection Tolerances: Bolt or weld wall panels (at both horizontal and vertical junctures) to produce flush, even, true-to-line joints.
 - 1. Maximum variation in plane and true position between prefabricated assemblies should not exceed 1/16 inch.
- L. Field Painting: Touch-up damaged shop-applied protective coatings. Use compatible primer for prime-coated surfaces; use galvanizing repair system for galvanized surfaces.

3.3 WASTE MANAGEMENT

- A. Waste Management: Collect cutoffs and scrap and place in designated areas for recycling.

END OF SECTION

SECTION 05 50 00
METAL FABRICATIONS

PART 1 GENERAL

1.1 RELATED DOCUMENTS

- A. The provisions of the General Conditions, Supplementary Conditions, Drawings, Specifications and the Sections included under Division 1, General Requirements and References are included as a part of this Section as though bound herein.

1.2 SECTION INCLUDES

- A. Provide labor, materials, services, and equipment necessary to furnish and install work as indicated and as specified herein, which includes, but is not limited to:
 - 1. Shop fabricated ferrous metal items.
 - 2. Shop fabricated aluminum items.
 - 3. Hatch access ladders
 - 4. Stair treads
 - 5. Low partition supports

1.3 REFERENCES

- A. AAMA 2603 - Voluntary Specification, Performance Requirements and Test Procedures for Pigmented Organic Coatings on Aluminum Extrusions and Panels
- B. AAMA 204 - Voluntary Specification, Performance Requirements and Test Procedures for High Performance Organic Coatings on Aluminum Extrusions and Panels
- C. AAMA 606.1 - Voluntary Guide Specifications and Inspection Methods for Integral Color Anodic Finishes for Architectural Aluminum
- D. AAMA 607.1 - Voluntary Guide Specification and Inspection Methods for Clear Anodic Finishes for Architectural Aluminum
- E. AAMA 608.1 - Voluntary Guide Specifications and Inspection Methods for Electrolytically Deposited Color Anodic Finishes for Architectural Aluminum
- F. ANSI A14.3 - American National Standard for Ladders - Fixed - Safety Requirements
- G. ASTM A36/A36M - Standard Specification for Carbon Structural Steel
- H. ASTM A53 - Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-coated Welded and Seamless
- I. ASTM A123/A123M - Standard Specification for Zinc (Hot-Galvanized) Coatings on Iron and Steel Products
- J. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware
- K. ASTM A283 - Carbon Steel Plates, Shapes, and Bars
- L. ASTM A307 - Standard Specification for Carbon Steel Bolts and Studs, 60,000 psi Tensile Strength
- M. ASTM A500 - Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Round and Shapes.
- N. ASTM A501 - Standard Specification for Hot-Formed Welded and Seamless Carbon Steel Structural Tubing.
- O. ASTM B26 - Standard Specification for Aluminum-Alloy Sand Castings
- P. ASTM B85 - Standard Specification for Aluminum-Alloy Die Castings

- Q. ASTM B177 - Standard Guide for Engineering Chromium Electroplating
- R. ASTM B209 - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate
- S. ASTM B210 - Standard Specification for Aluminum-Alloy Drawn Seamless Tubes
- T. ASTM B211 - Standard Specification for Aluminum-Alloy Bar, Rod and Wire
- U. ASTM B221 - Standard Specification for Aluminum-and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles and Tubes
- V. AWS A2.4 - Standard Symbols for Welding, Brazing, Nondestructive Examination
- W. AWS D1.1/D1.1M - Structural Welding Code Bundled Set B
- X. FBC - Florida Building Code
- Y. SSPC - Steel Structure Painting Council - Steel Structures Painting Council

1.4 SUBMITTALS FOR REVIEW

- A. Shop Drawings: Indicate profiles, sizes, connection attachments, reinforcing, anchorage, size, and type of fasteners, and accessories.
 - 1. Include erection drawings, elevations, and details.
- B. Indicate welded connections using standard AWS A2.0 welding symbols.
 - 1. Indicate net weld lengths.
- C. Submit complete Shop and Erection drawings for review before starting work. Include plans, sections, elevations, details and all connection details and fabrication details.
- D. Submit manufacturer's data and specifications indicating compliance with specified requirements.
- E. Submit templates for anchors and bolts to be installed by other trades.
- F. Product Data: Provide data on standard framing members; describe materials and furnish product criteria and limitations. Unless otherwise indicated, submit the following for each type of product provided under work of this Section.
 - 1. Recycled Content:
 - a. Indicate recycled content: indicate percentage of pre-consumer and post-consumer recycled content per unit of product.
 - b. Indicate relative dollar value of recycled content product to total dollar value of product included in project.
 - c. If recycled content product is part of an assembly, indicate the percentage of recycled content product in the assembly by weight.
 - d. If recycled content product is part of an assembly, indicate relative dollar value of recycled content product to total dollar value of assembly.
 - 2. Local/Regional Materials: *Provide materials extracted/harvested and manufactured within a 500 mile radius from the project site.*
 - a. Sourcing location(s): Indicate location of extraction, harvesting, and recovery; indicate distance between extraction, harvesting, and recovery and the project site.
 - b. Manufacturing location(s): Indicate location of manufacturing facility; indicate distance between manufacturing facility and the project site.
 - c. Product Value: Indicate dollar value of product containing local/regional materials; include materials cost only.
 - d. Product Component(s) Value: Where product components are sourced or manufactured in separate locations, provide location information for each component. Indicate the percentage by weight of each component per unit of product.

1.5 QUALITY STANDARDS

- A. American Society for Testing and Materials (ASTM): As referenced, latest editions.
- B. American National Standards Institute (ANSI) A14.3 for fixed ladders.

- C. American Institute of Steel Construction (AISC).
- D. American Welding Society (AWS).
- E. Occupational Safety and Health Administration (OSHA).

1.6 QUALIFICATIONS

- A. Prepare Shop Drawings under direct supervision of a Professional Structural Engineer experienced in design of this work and licensed in the State of Florida.
- B. Welders' Certificates: Submit under provisions of Section – Submittals Procedures, certifying welders employed on the Work, verifying AWS qualification within the previous 12-months.
- C. Fabricator shall have minimum 5 years previous experience of successfully completed comparable work.

PART 2 PRODUCTS

2.1 MATERIALS - STEEL

- A. Steel Sections: ASTM A36/A36M
- B. Steel Tubing: ASTM A500, Grade B
- C. Plates: ASTM A283
- D. Pipe: ASTM A53, Type E or S, Grade B, Schedule 40 minimum
- E. Steel Tubing, hot-formed, welded or seamless: ASTM A501.
- F. Bolts, Nuts, and Washers: ASTM A325 or A307 galvanized to ASTM A153/A153M for galvanized components
- G. Welding Materials: AWS D1.1; type required for welded materials

2.2 MATERIALS - ALUMINUM

- A. Extruded Aluminum: ASTM B221, Alloy 6063, Temper T5
- B. Sheet Aluminum: ASTM B209, Alloy, Temper
- C. Aluminum-Alloy Drawn Seamless Tubes: ASTM B210, Alloy 6063, Temper T6
- D. Aluminum-Alloy Bars: ASTM B211, Alloy 6063, Temper T6
- E. Aluminum-Alloy Sand Castings: ASTM B26, Alloy
- F. Aluminum-Alloy Die Castings: ASTM B85, Alloy
- G. Bolts, Nuts and Washers: Stainless steel
- H. Welding Materials: AWS D1.1/D1.1M; type required for welded materials

2.3 MISCELLANEOUS MATERIALS

- A. Concrete Inserts: Phillips Redhead.
- B. Hot Dip Galvanizing: Where specified or indicated, hot dip galvanize ferrous items according to ASTM A385 and ASTM A123, minimum 2.0 ounces per square foot.
- C. Stainless Steel Fasteners: Type 304
- D. Isolation Coating: Zinc chromate paint or acceptable non-conductive tape.
- E. Fastenings, Anchors and Bolts:
 - 1. Provide required cast-in-place or built-in anchor bolts for miscellaneous metal items of galvanized steel, complete with matching washers and nuts. Select fasteners for the type, grade and class required.
 - 2. Where not practical to pre-locate bolts, provide self-drilling or toggle type concrete anchors.
 - 3. Bolts and Nuts: regular hexagon-head type, ASTM A307, grade A.

4. Lag Bolts: square head type, Fed. Spec. FF-B-561.
5. Machine Screws: Cadmium plated steel, Fed. Spec. FF-S-92.
6. Wood Screws: Flat head carbon steel, Fed. Spec. FF-S-111.
7. Plain Washers: round, carbon steel, Fed. Spec. FF-W-92.
8. Masonry Anchorage Devices: Expansion shields, Fed. Spec. FF-S-325.
9. Toggle Bolts: Tumble wing type, Fed. Spec FF-B-588, type, class and style as required.
10. Lock Washers: Helical spring type, carbon steel, Fed. Spec. FF-W-84

2.4 ALUMINUM LADDERS

- A. Fabricate ladders for the locations shown, with dimensions, spacings, details, and anchorages as indicated. Comply with requirements of ANSI A14.3 and OSHA.
- B. Siderails: Continuous aluminum, 2 1/2 by 2 1/2 by 0.125" extruded tube spaced 18 inches apart.
- C. Rungs: Aluminum 1 1/2 by 1 1/2 by 0.125" extruded tube spaced 12 inches o.c.
- D. Fit rungs in centerline of side rails, plug weld and grind smooth on outer rail faces.
- E. Support each ladder at top and bottom and at intermediate points spaced not more than 5 feet o.c. with welded or bolted steel brackets.
- F. Size brackets to support design dead and live loads indicated and to hold centerline of ladder rungs clear of the wall surface by not less than 7 inches.
- G. Provide non-slip surfaces on top of each rung, either by coating the rung with aluminum-oxide granules set in epoxy-resin adhesive, or by using a type of manufactured rung that is filled with aluminum-oxide grout or corrugated slip resistant surface

2.5 STAIR TREAD:

- A. Manufacturer shall the following however products of other manufacturers will be considered for acceptance provided they equal or exceed the material requirements and functional qualities of the specified product.
 1. Wooster products, Inc.
- B. Tread: Cast-in-Concrete extruded aluminum safety tread "Spectra" Model No. WP3C with abrasive filler.
- C. Color: As selected by the Architect from manufacturer's full range.

2.6 LOW PARTITION SUPPORTS

- A. Provide 3" dia. schedule 40 steel pipe full height of low partition to be installed within the partition and to be secured to studs to provide bracing. Provide 3" x 6" x 3/16" steel mounting plate welded to pipe and secured to floor. Provide supports at 72" o.c.

2.7 FABRICATION TOLERANCES

- A. Square: 1/8" maximum difference in diagonal measurements.
- B. Maximum Offset between Faces: 1/16"
- C. Maximum Misalignment of Adjacent Members: 1/16"
- D. Maximum Bow: 1/8" in 48"
- E. Maximum Deviation from Plane: 1/16" in 48"

2.8 FINISHES - STEEL

- A. Prepare surfaces to be primed in accordance with SSPC SP 2.

- B. Clean surfaces of rust, scale, grease, and foreign matter prior to finishing.
- C. Do not prime surfaces in where field welding is required.
- D. Prime paint items with one coat.
- E. Structural Steel Members:
 - 1. Galvanize after fabrication to ASTM A123/A123M.
 - 2. Provide minimum 1.25 oz/sq ft galvanized coating.
- F. Non-structural Items:
 - 1. Galvanize after fabrication to ASTM A123/A123M.
 - 2. Provide minimum 1.25 oz/sq ft galvanized coating.
- G. Chrome Plating: ASTM B177, weight, nickel-chromium alloy, satin finish.
- H. Shop and Touch-Up Primer: SSPC 15, Type 1, red oxide
- I. Touch-Up Primer for Galvanized Surfaces: SSPC 20, Type I Inorganic zinc rich
- J. Galvanized Metal Repair Compound:
 - 1. Hot Applied: Federal Specifications O-G-93.
 - 2. Cold Applied: Galvaneal, Galvicon, or Z.R.C.
- K. Shop Prime Coat: Zinc chromate primer.

2.9 FINISHES - ALUMINUM

- A. Exterior Aluminum Surfaces: Exterior, hard coat, two step anodized to clear color to 0.0007" thickness organic coating to color selected.
- B. Interior Aluminum Surfaces: Interior, hard coat, two-step anodized to clear color to 0.0007" thickness organic coating to color selected.
- C. Apply one coat of bituminous paint to concealed aluminum surfaces in contact with cementitious or dissimilar materials.

2.10 ENVIRONMENTAL

- A. Recycled Content: Minimum total recycled content equal to 25 percent with 23 percent post-consumer recycled content or minimum 7 percent pre-consumer recycled content at Contractor's option.

2.11 MISCELLANEOUS FRAMING, SUPPORTS AND ROUGH HARDWARE

- A. Provide miscellaneous steel framing and supports which are not part of the structural steel framework, as required to complete the work.
- B. Provide bent or otherwise custom fabricated bolts, plates, anchors, hangers, dowels and other miscellaneous steel and iron shapes as required for framing, supporting, anchoring or securing itself or other work, to concrete and other structures.
- C. Equip units with integrally welded anchors for casting into concrete or building into masonry and furnish inserts if units must be installed after concrete is placed.

2.12 FABRICATION

- A. Fabricate miscellaneous items according to AISC Specifications and approved shop drawings. Provide mitered joints for field connections unless otherwise indicated. Grind and buff smooth rough edges, sharp corners, and welded joint of exposed steel and miscellaneous ferrous items.
- B. Fabricated miscellaneous units to sizes, shapes, and profiles shown, or if not shown, of required dimensions to receive adjacent other work to be retained by the framing.
- C. Cut, drill and tap units to receive hardware.

- D. Vertical ladders: fabricate to configurations and dimensions indicated, including size of members. Rungs shall extend full size through rails and all connections shall be welded. Bolts for attachment to masonry or concrete shall be expansion type unless otherwise indicated.
- E. Repair to galvanized surfaces: Repair damaged galvanized surfaces with hot or cold applied compound.
- F. Shop painting of ferrous metal items: Provide 1 coat of shop primer unless indicated or specified to be hot dip galvanized.
- G. Contact with dissimilar materials. Provide isolation coating where dissimilar metals are in contact or where aluminum contacts masonry, concrete, plaster, or mortar.
- H. Fit and shop assemble in largest practical sections for delivery to site.
- I. Fabricate items with joints tightly fitted and secured.
- J. Continuously seal joined members by continuous welds.
- K. Grind exposed joints flush and smooth with adjacent finish surface.
 - 1. Make exposed joints butt tight, flush, and hairline.
 - 2. Ease exposed edges to small uniform radius.
- L. Exposed Mechanical Fastenings: Provide flush countersunk screws or bolts unobtrusively located consistent with design of component except as noted otherwise
- M. Supply components required for anchorage of fabrications.
 - 1. Fabricate anchors and related components of same material and finish as fabrication, except as noted otherwise.

2.13 GROUT

- A. Nonshrink Nonmetallic Grout: Premixed, factory-packaged, nonstaining, noncorrosive, nongaseous grout complying with ASTM C1107. Provide grout specifically recommended by manufacturer for interior and exterior applications of type specified in this Section.
- B. Nonshrink Metallic Grout: Factory packaged, ferrous aggregate grout complying with ASTM C1107, specifically recommended by manufacturer for heavy duty loading applications.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that field conditions are acceptable and are ready to receive work.

3.2 PREPARATION

- A. Clean and strip primed steel items to bare metal and aluminum where site welding is required.
- B. Supply required items for casting into concrete or embedded in masonry with setting templates to appropriate sections.

3.3 INSTALLATION

- A. Install items plumb and level, accurately fitted, free from distortion or defects.
- B. Provide for erection loads and for sufficient temporary bracing to maintain true alignment until completion of erection and installation of permanent attachments.
- C. Field weld components indicated on shop drawings.
- D. Perform field welding in accordance with AWS D1.1.
- E. Obtain approval prior to site cutting or making adjustments not scheduled.

- F. After erection, prime welds, abrasions and surfaces not shop primed or galvanized, except surfaces to be in contact with concrete
- G. Provide isolation coatings where dissimilar metals are in contact or where aluminum is in contact with concrete.
- H. Coordination: Coordinate miscellaneous metal items, including field dimensions where required with masonry openings and various other trades as applicable so items fit and function as intended.
- I. Erect and install miscellaneous metal items at proper locations and elevations, plumb, level, in alignment and not distorted by fastenings, according to approved shop and erection drawings, manufacturer's directions, and as specified. Provide adequate temporary supports to allow field connections of members without misalignment.
- J. Supplementary Parts: Furnish and install necessary to complete each item.
- K. Conform to best quality and accepted standard practice.
- L. Weld on back or bottom side so welds are not visible.
- M. Provide acceptable fasteners, inserts, and expansion anchors for supports placed in shear position where possible.
- N. Install stair treads as per manufacturer's instructions.

3.4 ERECTION TOLERANCES

- A. Maximum Variation from Plumb: $\frac{1}{4}$ " per story, non-cumulative
- B. Maximum Offset from True Alignment: $\frac{1}{4}$ "
- C. Maximum Out-of-Position: $\frac{1}{4}$ "

3.5 FIELD QUALITY ASSURANCE

- A. Touch up abrasions to shop prime surfaces and welds with specified primer after erection and installation operations are complete.

3.6 WASTE MANAGEMENT

- A. Waste Management: Collect cut offs and scrap and place in designated areas for recycling.

END OF SECTION

DIVISION

6

WOODS, PLASTICS AND COMPOSITES

SECTION 06 41 00
CUSTOM CASEWORK

PART 1 GENERAL

1.1 RELATED DOCUMENTS

- A. The provisions of the General Conditions, Supplementary Conditions, and the Sections included under Division 1, General Requirements, are included as a part of this Section as though bound herein.

1.2 SECTION INCLUDES

- A. Provide labor, materials, services, and equipment necessary to furnish and install work as indicated and as specified herein, which includes, but is not limited to:
 - 1. Millwork and custom casework including cabinetry, countertops, and shelving
 - 2. Millwork and casework hardware and accessories

1.3 REFERENCES

- A. ASTM E84 – Standard Test Method for Surface Burning Characteristics of Building Materials
- B. AWI – Quality Standards
- C. BHMA A156.9 – Cabinet Hardware
- D. FED MMM-A-130 – Adhesive, Contact
- E. NEMA (National Electric Manufacturer’s Association) LD3 – High Pressure Decorative Laminates
- F. PS 1 – Construction and Industrial Hardwood
- G. PS 20 – American Softwood Lumber Standard
- H. Voluntary Product Standards PS 20-70
- I. Grading rules of Southern Pine Inspection Bureau (SPIB)
- J. Forest Stewardship Council (FSC)
- K. Sustainable Forestry Initiative (SFI)
- L. Canadian Standards Association (CSA):
- M. FBC – Florida Building Code

1.4 SUBMITTALS

- A. Shop Drawings: Submit Shop Drawings in accordance with Specifications.
 - 1. Indicate quality grade, materials, species, construction, sizes, shapes, quantities, locations, and conditions of adjoining work.
 - 2. Indicate items in related or dimensional position with sections or details shown either full size or 3" = 1'-0" scale.
 - 3. Indicate required field measurements beyond control of mill.
 - 4. Indicate the allowable uniformly distributed loads for shelving.
- B. Samples: Submit manufacturer's full range of sample colors, textures, and patterns of plastic laminate for Architect's selection.
- C. Installation Instruction: Provide installation instructions and lists of replacement parts for all hardware and accessories.

- D. Product Data: Provide product data for all hardware and accessories. Product data. Unless otherwise indicated, submit the following for each type of product provided under work of this Section:
1. Recycled Content:
 - a. All interior wood lumber shall be formaldehyde free.
 - b. Salvaged Lumber: Provide documentation certifying products are from salvaged lumber sources.
 - c. Recovered Lumber: Provide documentation certifying products are from recovered lumber sources.
 2. Local/Regional Materials:
 - a. Sourcing Location(s): Indicate location of extraction, harvesting, and recovery; indicate distance between extraction, harvesting, and recovery and the project site.
 - b. Manufacturing Location(s): Indicate location of manufacturing facility; indicate distance between manufacturing facility and the project site.
 - c. Product Value: Indicate dollar value of product containing local/regional materials; include materials cost only.
 - d. Product Component(s) Value: Where product components are sourced or manufactured in separate locations, provide location information for each component. Indicate the percentage by weight of each component per unit of product.
 3. VOC Data:
 - a. Adhesives:
 - i) Submit manufacturer's product data for adhesives. Indicate VOC limits of the product. Submit MSDS highlighting VOC limits.
 - ii) Submit Green Seal Certification to GS-36 and description of the basis of certification.
 - iii) Submit manufacturer's certification that products comply with SCAQMD #1168.
 4. Submit environmental data in accordance with Table 1 of ASTM E2129 for products provided under work of this Section.
- E. Letter of Certification(s) for Sustainable Forestry:
1. Forest Stewardship Council (FSC): Provide letter of certification signed by lumber supplier. Indicate compliance with FSC "Principles for Natural Forest Management" and identify certifying organization.
 - a. Submit FSC certification numbers; identify each certified product on a line-item basis.
 - b. Submit copies of invoices bearing the FSC certification numbers.
 2. Sustainable Forestry Board: Provide letter of certification signed by lumber supplier. Indicate compliance with the Sustainable Forestry Board's "Sustainable Forestry Initiative" (SFI) and identify certifying organization.
 - a. Submit SFI certification numbers; identify each certified product on a line-item basis.
 - b. Submit copies of invoices bearing the SFI certification numbers.
 3. Canadian Standards Association (CSA): Provide letter of certification signed by lumber supplier. Indicate compliance with the CSA and identify certifying organization.
 - a. Submit CSA certification numbers; identify each certified product on a line-item basis.
 - b. Submit copies of invoices bearing the CSA certification numbers.
- F. Key Schedule:
1. Provide lock and key schedule for lockable cabinets.
 2. Coordinate key schedule with Specification Section - Door Hardware.
- G. Certification: Submit certifications by treating plant that pressure treatment materials comply with governing ordinances.

1.5 QUALITY ASSURANCE

- A. Millwork and casework fabricator shall have a minimum 5-years previous experience of successfully completed comparable work.
- B. Lumber Grading:
 - 1. Lumber Grading Rules and Wood Species in accordance with Voluntary Product Standards PS 20-70
 - 2. Grading rules of Southern Pine Inspection Bureau (SPIB) apply to materials furnished.
- C. Fire Hazard Classification: Comply with required NFPA, ANSI, and UL surface burning characteristics for plastic laminates, lumber, and plywood.
- D. Perform work in compliance with AWI standards.
- E. Sustainably Harvested Wood: Certification Organizations shall be accredited by the Forest Stewardship Council, Sustainable Forestry Board, or Canadian Standards Association.

1.6 MOCK-UP

- A. Prepare mock-up under provisions as specified.
- B. Provide full size base cabinet and upper cabinet of each type indicated, in specified finish with hardware installed. Contractor to coordinate with Architect for all required locations.
- C. Owner shall inspect units to ascertain quality and conformity to AWI Standards.
- D. Units will establish a minimum standard of quality for this work.
- E. Vendor may use undamaged approved units as part of the work.

1.7 FIELD MEASUREMENTS

- A. Design and fabricate units based upon field conditions and measurements.
- B. Verify field measurements are included in shop drawings.

1.8 PRE-INSTALLATION CONFERENCE

- A. Convene a pre-installation conference after site inspection and prior to commencement of work.
- B. Discuss any items that may alter fabrications or intended installation and determine acceptable conclusions.

1.9 COORDINATION

- A. Coordinate work with plumbing, mechanical, electrical, and other trades for rough-in work and installation of adjacent and associated components.

1.10 ENVIRONMENTAL REQUIREMENTS AND PROTECTION

- A. Specification Section - Material Equipment and Approved Equals: Environmental conditions affecting products on site.
- B. Immediately prior to, during and after installation of work of this section, maintain the same temperature and humidity conditions in building spaces as will occur after occupancy.
- C. Protect work from damage until final acceptance.

PART 2 PRODUCTS

2.1 QUALITY GRADE

- A. Materials and Fabrication: Provide premium grade construction and finishing in accordance with AWI "Quality Standards", conforming to Section 400B - Laminate Clad Cabinets.
- B. Design Type: Reveal overlay design in accordance with AWI Architectural Casework - General Details, except as otherwise specified and detailed.

2.2 CABINET MATERIALS

- A. Sub-base Material:
 - 1. Provide millwork or casework plywood cores of Hardwood Plywood "veneer core" with no-added-Urea Formaldehyde adhesives.
 - 2. Use ¾" thick, 9-ply closed-grain hardwood plywood typical unless noted otherwise.
 - 3. Use ¼" thick hardwood plywood at cabinet backs and drawer bottoms.
- B. Adhesive: Provide type II, CS 35 or as recommended by plastic laminate manufacturer.
 - 1. Adhesives shall be low VOC meeting USGB LEED for Schools requirements for low VOC.
- C. Plastic Laminate: High-pressure laminate, General Purpose Grade, NEMA LD3, GP-50 by Formica or Nevamar.
 - 1. Exposed horizontal surfaces: Use 0.050" thick, matte finish.
 - 2. Exposed vertical surfaces: Use 0.030" thick, matte finish.
 - 3. Provide GP 42 for post forming: Use 0.042" thick, matte finish.
 - 4. BK 20 for concealed backing: Use 0.020" thick, matte finish, vertical grade, white unless otherwise indicated.
 - 5. Architect and the District's Design Coordinator shall select the Color and pattern, which may determine the laminate manufacturer.
- D. Finish Hardware Items: Provide following items of finish hardware with millwork:
 - 1. Drawer Glides: No. 8400 Extension Slides by Knape & Vogt Mfg. Co.
 - a. Equal products to Knape & Vogt produced by Accuride and Blum are acceptable.
 - 2. Shelf Standards and Supports (recessed in cabinets): No. 255 Standard and No. 256 Supports by Knape & Vogt Mfg. Co., Natural aluminum finish.
 - a. Equal products to Knape & Vogt produced by Accuride and Blum are acceptable.
 - 3. Doors: 1 pair heavy-duty institutional hinges, Stanley HT1592, US28.
 - a. 1 catch, Stanley 41 Series.
 - b. 1 pull, Stanley 4483, US28.
 - c. Equal products to Stanley produced by Grant and Hettich America are acceptable.
 - 4. Drawer Pulls: Stanley 4483, US28. Equal products to Stanley produced by Grant and Hettich America are acceptable.
 - 5. Drawer Locks: Schlage CL 888R or Olympus 888IC cabinet drawer lock, US26D, complete with strike plate.
 - a. Provide locks with Interchangeable Core Schlage cylinders keyed to the existing Facility Master Key System as directed by Owner.
 - 6. Door Locks: Schlage CL 777R or Olympus 777IC cabinet door lock, US26D, complete with strike plate.
 - a. Provide locks with Interchangeable Core Schlage cylinders keyed to the existing Facility Master Key System as directed by Owner.
 - b. Provide one elbow catch per pair doors.

7. Cabinet locks keyed to the facility shall be coordinated with the Hardware Supplier of section 08 71 00 who shall provide the locks.
8. Master key:
 - a. Master key doors and drawers of cabinetry in each room with each other and the main entrance room door.
 - b. Use a Schlage Everest D245 or Schlage 1456 restricted keyway as directed by owner.
 - c. Equal products to Schlage produced by Olympus are acceptable.
9. Silencers: Use neoprene type with self-adhesive at all cabinet doors.
- E. Glazing: Provide clear, tempered glass for glazed doors and openings in cabinetwork, ¼" thick unless otherwise indicated, or approved.
 1. Alternate glazing: Varia – Organics Collection by 3Form to be provided as scheduled.
 - a. Provide gauge as recommended by manufacturer.
 - b. Finish and color to be selected by architect.
 - c. Provide all required hardware to secure panels per manufacturer's recommendations.
- F. Accessories: Provide adhesives, concealed fasteners, nuts, bolts, screws, pins, washers, and etc. of type and size to suit application and severity of use. Provide finish washers at all exposed screw locations.
 1. Provide finished grommets for holes and cut-outs and escutcheons at pipe penetration.
- G. Miscellaneous: Provide shims, blocking, etc. as required for complete installation.

2.3 FABRICATION

- A. General:
 1. All exposed cabinet edges shall be beveled or rounded to prevent sharp edges or corners.
 2. All counter tops exposed to room or student access have beveled or rounded edges, and exposed corners rounded with minimum ½" radius.
- B. Fabrication Workmanship:
 1. Construct millwork items in accordance with specified quality grade of reference standards, except as otherwise specified or detailed.
 2. Construct millwork items using materials specified for plastic laminate finish.
- C. Milling:
 1. Fabricate and assemble work at mill as complete as practicable.
 2. Deliver ready to assemble and set in place.
 3. Machine sand all work at mill and deliver free of machine or tool marks or defects that will show through finish.
- D. Plastic Laminate Tops, Panels, Cabinet Shelving, and All Exposed Surfaces:
 1. Use plywood substrate as specified.
 - a. Particleboard, hardboard, and flake-board are not acceptable.
 2. Glue tops and panels under pressure using Type II water- resistant adhesive.
 - a. Glue plastic, core, and backing sheet in one operation after applying edge bands.
 3. Plastic Laminate shall be applied to the top of all tall cabinets and scribed to wall.
- E. Fabricate finished tops and edges from one continuous sheet of plastic laminate.
 1. Make corners and joints hairline.
 2. Slightly bevel arises.
- F. Ease the edges of millwork as required to eliminate sharp edges.
- G. Backsplash and Aprons:
 1. Square edge, direct bond cover, and full returns.
 2. Make corners and joints hairline.
- H. Door and Drawer fronts shall be ¾" thick.

- I. Provide plastic laminate finish on all exposed surfaces of doors, drawers, countertops, splashes, etc. of cabinets.
 - 1. Shelves shall be finished on all sides and edges.
- J. Construction: Construct each unit or cabinet in one section where practical, or construct in largest practical sections to facilitate ease of handling and installation.
 - 1. Cabinet constructed in more than one section, ship trim and scribe strips loose at field joints.
 - 2. Locate counter butt joints minimum 2' from sink cutouts.
- K. Finish Hardware: Fit drawer guides and cabinet-mounted shelf standards at mill.
 - 1. Ship other finish hardware items loose for installation at job site.
- L. Glazing: Install glazing at mill to the greatest extent practical.
 - 1. Field glazing shall be with dry type glazing gaskets sized to eliminate gaps and prevent loose glazing installations.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Examine surfaces for conditions that would prevent quality installation of millwork.
- B. Verify that grounds and blocking are in place to support millwork.
- C. Do not install on defective conditions, doing so shall indicate acceptance of site conditions and require you to correct any defects.

3.2 INSTALLATION

- A. General:
 - 1. Install all millwork items, plumb, level and true (within 1/16" in 10'), in accordance with drawing details and shop drawings.
 - 2. Do not install trim until backs and unexposed edges have been back primed.
 - 3. Provide cutting, fitting, fabricating, erecting, wedging, bracing, blocking, nailing, and securing of items of rough woodwork throughout, including miscellaneous furring, grounds, blocking, and nailers.
 - a. Build-in items where indicated on Drawings or where required for attachment of finish and other work.
 - 4. Provide 4" high backsplash and end splashes at all locations where countertops abut walls.
 - 5. Fully bed backsplashes and end splashes to top and each other with Dow Corning #786 mildew resistant silicone sealant.
 - 6. Offsets: Offsets in plane on work surfaces and counters shall be negligible and no more than 1/32" at other abutting materials.
- B. Cabinets:
 - 1. Install cabinets plumb with countertops level to within 1/16" in 10'.
 - 2. Level the base cabinets to within allowable tolerances.
 - 3. Accurately scribe and fit scribe strips, trim strips, and filler panels to irregularities of adjacent surfaces, maximum gap opening 0.025". Plastic laminate overlay trim shall not be used to close caps.
 - 4. Secure cabinets permanently to floor using anchors spaced at maximum of 30" o.c., minimum of two for each unit while maintaining 3/4" clearance between the back of cabinet and the exterior wall.
 - 5. Bolt adjoining cases together, maximum width of joints 1/32".

6. Fasten tops to bases with screws driven through base cabinet top frame into bottom of countertop.
7. Scribe all backsplashes and aprons and caulk.
8. Blocking, Bucks, and Nailers: Install plumb, level and true with joints flush, fastened securely in place.
9. Furring and Stripping: Install plumb and level, shim to provide true finish surface.
10. Install color-matched sealant at unfinished joints with other materials.
11. Install wall-shelving standards on solid backing or with toggle bolts into steel studs or masonry or TEK screws into concrete.
 - a. Do not install wall-shelving standards into gypsum wallboard only.
 - b. Space standards as required to support indicated loading but not less than 5-plf based on shelf material provided.
12. Do not install cabinetry or millwork closer than 24" to ceilings in fully sprinklered buildings or such that installation obstructs any fire sprinkler head.

3.3 ADJUSTING AND CLEANING

- A. Adjust doors, drawers, hardware, fixtures, and other moving or operating parts to function smoothly and correctly.
- B. On completion of installation, touch up marred or abraded finished surfaces and wipe down surfaces to remove fingerprints and markings, and leave in clean condition.

3.4 WASTE MANAGEMENT

- A. Waste Management: Collect cutoffs and scrap and place in designated areas for recycling.

END OF SECTION

DIVISION

8

OPENINGS

SECTION 08 06 00
DOOR AND FRAME SCHEDULE NOTES AND LEGEND

1.1 General Notes and Legend

A. Legend

- | | | | |
|----|-----|---|----------------------|
| 1. | AL | - | Aluminum |
| 2. | GL | - | Glass |
| 3. | HM | - | Hollow Metal - Steel |
| 4. | SS | - | Stainless Steel |
| 5. | STL | - | Steel |
| 6. | WD | - | Wood |

B. Fire Rating in Minutes

- | | | | |
|----|-----|---|--|
| 1. | 20 | - | 20 Minute |
| 2. | 45 | - | C Label 3/4 Hour (interior); E label 3/4 hour (exterior) |
| 3. | 60 | - | B Label 1 Hour |
| 4. | 90 | - | B Label 1-1/2 Hour (interior); D label 1-1/2 hour (exterior) |
| 5. | 180 | - | A Label 3 Hour |

C. Door sizes are indicated thus: 21070 (2'-10"W. x 7'-0"H.) Door sizes as shown on Door and Frame Schedule are nominal. Approved shop drawings must be distributed between trades to coordinate and verify actual door and frame sizes.

D. Door thickness shall be 1-3/4 inch, unless noted otherwise.

E. (HM) hollow metal doors and frames shall be as specified in Section – Steel Doors and Frames.

F. Hardware sets indicated on schedule are specified under Section – Door Hardware.

G. Type and thickness of glazing for doors and frames shall be as specified in Section – Glazing.

H. UL frame anchors required for labeled openings.

I. For door and frame elevations see Drawing sheet A-104.

J. Closers shall be the last hardware item installed. Installing Contractor shall verify maximum degree of door swing that field conditions will allow and install closers accordingly regardless of swing shown on Drawings.

K. Except when restricted by individual published listings, it is permissible for a fire door assembly to consist of the labeled, listed, or classified components of different organizations that are acceptable to the authority having jurisdiction.

L. Steel astragals and wood door metal vision light frame shall be painted. Color to be as selected by the Architect.

- M. Provide knurled levers on all doors to hazardous areas. Tactile material is not acceptable.
- N. Contractor shall provide shims for wall mounted wall stop/holders where the trim (pull, lever, or knobs) extend beyond the engaged depth of wall holder.
- O. Door specified with kickplates and vertical rod exit devices – cut kickplate short of vertical rod bottom latch case.
- P. Door under cut 1/2 maximum inches from finished floor.

The following information has been noted on the Door and Frame Schedule under the remarks column:

- A. Refer to the notes under the Remarks Column on the Door Schedule.

END OF SECTION

SECTION 08 11 13
METAL DOORS AND FRAMES

PART 1 GENERAL

1.1 RELATED DOCUMENTS

- A. The provisions of the General Conditions, Supplementary Conditions, Drawings, Specifications and the Sections included under Division 1, General Requirements and References are included as a part of this Section as though bound herein.

1.2 SECTION INCLUDES

- A. Provide labor, material, services and equipment necessary to furnish and install work as indicated and as specified herein, which includes, but is not limited to:
 - 1. Hollow steel doors and steel frames, frame components including sidelites, transom frames, borrowed lites, and louvers as indicated.
 - 2. Attachments including screws, bolts, expansion shields and related prep work.
 - 3. Door Hardware.

1.3 RELATED WORK

- A. Section 01 25 13 – Product Substitution Procedures
- B. Section 01 31 00 – Project Coordination
- C. Section 01 33 00 – Submittal Procedures
- D. Section 01 42 00 – References
- E. Section 01 45 00 – Quality Control
- F. Section 01 66 00 – Product Storage and Handling
- G. Section 01 74 00 – Cleaning and Waste Management
- H. Section 01 78 00 – Closeout Submittals
- I. Section 04 05 16 – Masonry Grouting
- J. Section 04 22 00 – Concrete Unit Masonry
- K. Section 08 14 29 – Prefinished Wood Doors
- L. Section 08 71 00 – Door Hardware
- M. Section 08 81 00 – Glazing
- N. Section 09 22 13 – Metal Furring
- O. Section 09 29 00 – Gypsum Board
- P. Section 09 91 00 – Painting

1.4 REFERENCES

- A. See Section 01 42 00 – References for additional reference standards, abbreviations, definitions and acronyms.
- B. ASCE 7-10 – Minimum Design Loads for Buildings and other Structures.
- C. American Society of Testing Materials (ASTM):
 - 1. ASTM A568A/568M-14: Standard Specification for Steel Sheet, Carbon, Structural, and High Strength, Low-Alloy, Hot-Rolled and Cold Rolled, General Requirements for
 - 2. ASTM A653/A653M-13: Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.

3. ASTM A1008/A1008M-15: Standard Specification for Steel, Sheet, Cold Rolled Carbon Structural High Strength Low-Alloy and High-Strength Low-Alloy with Improved Formability, Solution Hardened, and Bake Hardenable
4. ASTM E-90-09 – Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements.
- D. DHI (Door Hardware Institute) – The Installation of Commercial Steel Doors and Steel Frames, Insulated Steel Doors in Wood Frames and Builder's Hardware.
- E. National Fire Protection Association (NFPA):
 1. NFPA 80 – Fire Doors and Windows.
 2. NFPA 252 – Fire Tests for Door Assemblies.
- F. Florida Building Code, 6th Edition.
- G. Florida Fire Prevention Code, 6th Edition.
- H. American National Standards Institute (ANSI):
 1. ANSI A250.3 – Test Procedure and Acceptance Criteria for Factory Applied Finish Painted Steel Surfaces for Steel Doors and Frames.
 2. ANSI A250.8 – SDI-100 – Recommended Specifications for Standard Steel Doors and Frames.
 3. ANSI A250.10 – Test Procedure and Acceptance Criteria for Prime Painted Steel Surfaces for Steel Doors and Frames.
 4. ANSI A115.IG – Installation Guide for Doors and Hardware.
 5. ANSI A250.11 – Recommended Erection Instructions for Steel Frames.
- I. Underwriter's Laboratory (UL):
 1. UL 10B – Fire Tests for Door Assemblies.
 2. UL 10C – Positive Pressure Fire Test of Door Assemblies.

1.5 QUALITY ASSURANCE

- A. Comply with Section 01 45 00 – Quality Control.
- B. Conform to requirements of ANSI A250.8 SDI-100 – Recommended Specifications for Standard Steel Doors and Frames, or as amended herein if more restrictive.
- C. Manufacturer: Company specializing in manufacturing the products specified with minimum of three years continuous documented experience manufacturing products indicated.
- D. Product Approval: Door / Frame Assemblies shall meet current Florida Building Code Product Approval System or Miami-Dade Code Compliance Office requirements for High Velocity Hurricane Zone (HVHZ) or Notice of Approval (NOA) product approval.

1.6 SUBMITTALS

- A. Comply with Section 01 33 00 – Submittal Procedures.
- B. Submit Product Approvals for Door / Frame Assemblies certifying compliance with current Florida Building Code Product Approval System or Miami-Dade Code Compliance Office requirements for High Velocity Hurricane Zone (HVHZ) or Notice of Approval (NOA) product approval.
- C. Submit shop drawings, product data, manufacturer's literature and installation instructions. Include details of each frame type, elevations of door design types, conditions at openings details of construction, location and installation requirements of finish hardware and reinforcements and details of joints and connections.
- D. Indicate door and frame configuration, anchor spacing, anchor types, location of cutouts for hardware and glazing, and internal reinforcement.

- E. Performance Requirements: Provide hollow metal doors and frame assemblies that comply with performance requirements as demonstrated by testing manufacturer's assemblies in accordance with ASCE 7-10.
- F. Submit manufacturer's written installation instructions.
- G. Manufacturer shall certify and submit documentation that product complies with large and small missile impact criteria and have been tested and approved in compliance with Florida Product Approval or Miami Dade NOA and applicable requirements and submit documentation

1.7 DELIVERY, STORAGE, AND PROTECTION:

- A. Comply with Section 01 66 00 – Product Storage and Handling Requirements.
- B. Deliver doors and frames marked to identify each door, frame and opening in which they are located per numbers indicated.
- C. Store doors and frame in dry area on end with minimum ¼” spacers between units to allow ventilation.
- D. Frames shall be shipped and stored with temporary stiffeners and spacers in place to prevent distortion.
- E. Doors and frames shall be kept covered with water resistant, breathable fabric to prevent moisture intrusion on surfaces and allow ventilation.
- H. Replace doors and frames damaged during delivery, storage or construction.

1.8 WARRANTY:

- A. Comply with Section 01 33 00 – Submittal Procedures.
- B. Provide manufacturer's five-year warranty in which manufacturer agrees to repair or replace metal doors and frames that become corroded or rust within warranty period.
- C. Warranty shall include installation and finishing that is required due to repair or replacement of doors and frames.

PART 2 PRODUCTS

2.1 APPROVED MANUFACTURERS

- A. CECO DOOR, Division of Assa Abloy, 9159 Telecom Dr., Milan, TN 38353; Tel: 731-686-8345; Fax: 731-686-4211; Website: www.cecodoor.com.
- B. STEELCRAFT, 9017 Blue Ash Rd., Cincinnati, OH 45242; Tel: 800-243-9780; Fax: 513-745-6657; Website: www.steelcraft.com.
- C. Curries Manufacturing, Inc., 1502 12th St. NW, Mason City, IA 50401; Tel: 641-423-1334; Fax: 641-424-8305; Website: www.curries.com.
- D. Windsor Republic Doors, 155 Republic Dr., McKenzie, TN 38201; Tel: 800-733-3667; Website: www.republicdoor.com.
- E. Other manufacturers shall comply with Section 01 25 13 – Product Substitution Procedures.

2.2 DOORS AND FRAMES

- A. Material: Electro-Zinc coat bonderized conforming to ASTM A653/A653M-13.
 - 1. Exterior doors and frames: Factory applied G-90 (275 g/m²) electro plated zinc finish.
 - 2. Interior doors and frames: Factory applied G-60 (182 g/m²) electro plated zinc finish.

- B. Core: 20-gage cold rolled sheet steel vertical stiffeners in a "Z" configuration, spaced not more than 6" o.c. (16mm) and spot welded to face sheet. Vertical stiffeners extend full length of door cavity, except in areas of reinforcement. Fill core between stiffeners with rigid polyurethane chemically bonded to interior surfaces with minimum value of R10.
- C. Door Face: 16-gage.
- D. Door Reinforcement:
 - 1. Hinge reinforcement shall be minimum 10 ga. plate, 1.5" (318 mm) by full height of door.
 - 2. Tops and bottom reinforcement shall be minimum 16 ga. full width of door welded to both face sheets.
- E. Frame Gage: 16-gage for interior frames, 14-gage for exterior frames.
- F. Fire Rated: Provide fire rated assembly where scheduled or required by Code. Installations shall be in accord with NFPA 80.
- G. Insulated Doors: "U" value of 0.10 for polyurethane core for exterior metal doors.
- H. Fire Rated Doors:
 - 1. Test Doors in accord with UL 10B, UL 10C and NFPA 252.
 - 2. Doors shall have UL labels, applied by authorized agent, in accord with independent testing agency.
 - 3. Stairwell doors shall have 250°F (121°C) temperature rise rating with fire rating label on doors.

2.3 VISION LITES

- A. Provide manufacturer's standard vision lites of minimum 16 gauge cold-rolled steel, factory primed of shapes and sizes where shown on drawings. Corners shall be mitered
- B. Vision lites for fire rated applications shall be fire rated to comply with door rating.
 - 1. At light opening cut outs, provide 18 gage bonderized zinc coated steel channel type stops tightly fitted to opening, with square and true butt joints.
 - a. Drill and dimple countersink stops for fastenings. Provide zinc plated No. 6 oval head screws into opening frames at not over 12 inches o.c.
 - b. Exterior stops shall be integral with opening frame, integral with door welded in place.
 - 2. At exterior doors caulk perimeter seam between closure channel and door face sheet with grade exterior sealant prior to finish painting.
 - 3. All light openings shall be cut, reinforced and stops applied in the shop. No field cutting of the doors.
- C. Finish shall be zinc coat with baked enamel color selected by architect from manufacturer's standard colors.
- D. Exterior frames shall be A60 galvanized or hot dipped galvanized.

2.4 LOUVERS

- A. Frames shall be cold rolled 18 gauge frame steel with mitered welded corners.
- B. Louver blades shall be cold rolled 18 gauge steel inverted blade, sight proof with minimum 60 percent free air flow area.
- C. Frames to have countersunk holes and tamper proof fasteners.
- D. Louvers for fire rated applications shall be fire rated to comply with door rating and with a fusible link design conforming to UL or FM where required.
- E. Finish shall be zinc coat with baked enamel color selected by architect from manufacturer's standard colors.

- F. Exterior frames shall be A60 galvanized or hot dipped galvanized.

2.5 ACCESSORIES

- A. Door Silencers: Except on weather-stripped frames, drill stops to receive three silencers on strike jambs of single frames and two silencers on heads of double frames.
- B. Jamb Anchors: Provide minimum four anchors on both hinge and latch jambs. Provide 14-gage galvanized sheet steel, angle anchors welded for each jamb which extend to floor, punched for minimum of two 0.25" (6.4 mm) diameter bolts.
- C. Spreader: Provide frames with temporary steel spreader bars tack welded to jamb bottoms to maintain full rigidity and proper alignment during installation.
- D. Astragals: Provide steel astragals (removable) as scheduled or indicated.

2.6 PROTECTIVE COATINGS

- A. Frames: Provide with full immersion dip coat of rust-inhibitive metal primer for complete coverage including hidden surfaces.
- B. Doors: Provide full coverage electrostatic spray coat of rust-inhibitive metal primer.
- C. Dry frames and doors in baking oven process.
- D. AwlGrip Max Cor CF Primer manufactured by AkzoNobel Corp., 2270 Morris Ave., Union, NJ 07083; Tel: 908-686-1300; Fax: 908-964-2219; Website: www.akzonobel.com/us

2.7 GROUTING OF EXTERIOR FRAMES

- A. Paint inside (concealed) faces of door frames in exterior masonry or concrete walls, using fibered asphalt emulsion coating. Apply over shop primer approximately 1/8" thick and allow to dry before handling.
- B. Fill jambs and heads of hollow metal door and window frames solid with grout.

2.8 FABRICATION:

- A. Door Fabrication: Fully welded seamless construction. No metal tabs will be accepted.
- B. Frame Fabrication: Fully welded mitered corners ground smooth. Interior intersection of jambs shall be fully welded. Integral stops minimum 0.675" (16 mm) depth and minimum 2.5" (63.5 mm) width. Punch frames to receive silencers three on strike jamb of single leaf jambs. Provide 26-gage sheet metal grout guards at hinges, lock, bolts, door closer, foot, and silencer locations.
- D. Frame Reinforcement: Hinge reinforcing steel plate 0.1875" (4.8 mm) thick x 1.5"(43 mm) wide x 10" (254 mm) long and secured by a minimum of six spot-welds. Door closer foot shall be 10-gage steel reinforcing plate, 14" (356 mm) long x stop width anchored by minimum of 8 spot welds in hinge corner of head section of jamb.
- E. Hardware Location: Locate door hardware in accord with "Recommended Locations for Builder's Hardware" published by National Builder's Hardware Association.

PART 3 EXECUTION

3.1 INSTALLATION:

- A. Examine new and existing adjacent framing and rough opening preparation for conditions, which would prevent quality installation of doors and frames.

- B. Immediately notify Contractor/CM of conditions precluding successful installation. Proceeding with installation indicates installer's acceptance of conditions.
- C. Install frames in accord with NAAMM CHM-1-74 and ASCE 7-10.
- D. Install doors in accord with SDI-100, DHI and ASCE 7-10.
- E. Coordinate with masonry wall construction for anchor placement.
- F. Install roll-formed-steel reinforcement channels between two abutting frames. Anchor to structure and floor.
- G. Fully grout interior and exterior hollow metal frames with non-shrink grout.

3.2 PAINTING

- A. Comply with Section 09 91 00 – Painting for door and frame finishes.
- B. Exterior Door Frames: Air spray Max Cor DF AwlGrip, two component, anti-corrosive, chromate free epoxy primer on inside of door frame profiles of exterior doors prior to installation in accord with manufacturer's printed installation instructions.

3.3 TOLERANCES:

- A. Maximum Diagonal Distortion: 0.06375" (7.8 mm) measured with straight edge, corner to corner.
- B. Clearance between door and frame head and jambs shall be uniform 0.125" (15.6 mm).
- C. Clearance between meeting edges of pairs of doors shall be 0.1875" (23.4 mm) +/- 0.6375" (7.8 mm). For fire rated applications, clearance between meeting stiles shall be 0.125" (15.6 mm) +/- 0.06375" (7.8 mm).
- D. Bottom of door clearance shall be 0.50" (12.7 mm) minimum and 0.75" (19 mm) maximum floor clearance.
- E. Clearance between face of door and door stop shall be minimum 0.0625" (7.8 mm) to maximum 0.125" (15.6 mm).

3.4 ADJUSTING AND CLEANING:

- A. Adjust for smooth and balanced door movement.
- B. Check and readjust operating finish hardware items, leaving steel doors and frames undamaged and in complete and proper operating condition.

END OF SECTION

SECTION 08 14 16
FLUSH WOOD DOORS

PART 1 GENERAL

1.1 RELATED DOCUMENTS

- A. The provisions of the General Conditions, Supplementary Conditions, Drawings, Specifications and the Sections included under Division 1, General Requirements and References are included as a part of this Section as though bound herein.

1.2 SECTION INCLUDES

- A. Provide labor, material, services and equipment necessary to furnish and install work as indicated and as specified herein, which includes, but is not limited to:
 - 1. Flush wood doors with stain grade wood veneer, fire-rated and non-rated, solid core with and without glazing as indicated.

1.3 RELATED SECTIONS

- A. Section 01 25 13 – Request for Substitution.
- B. Section 01 31 00 – Project Coordination.
- C. Section 01 33 00 – Submittal Procedures
- D. Section 01 42 00 – References.
- E. Section 01 45 00 – Quality Control.
- F. Section 01 66 00 – Product Storage and Handling.
- G. Section 01 74 00 – Cleaning and Waste Management.
- H. Section 01 78 00 – Closeout Submittals.
- I. Section 06 20 00 – Finish Carpentry
- J. Section 06 40 00 – Architectural Woodwork
- K. Section 08 11 00 – Metal Doors and Frames
- L. Section 08 70 00 – Finish Hardware
- M. Section 08 80 00 – Glazing

1.4 REFERENCES AND REGULATORY REQUIREMENTS

- A. See Section 01 42 00 – References for additional reference standards, abbreviations, acronyms and definitions.
- B. American Society of Testing Materials (ASTM):
 - 1. ASTM E90-09: Standard Test Method for Laboratory Measurement of Airborne Transmission Loss of Building Partitions
 - 2. ASTM E413-10: Classification for Rating Sound Insulation
- C. National Fire Protection Association (NFPA):
 - 1. NFPA 252 – Standard Methods for Fire Assemblies.
 - 2. NFPA 80 – Fire Doors and Windows.
- D. Florida Building Code, 6th Edition.
- E. Underwriters Laboratories, Inc.
 - 1. UL 10B – Fire Tests for Door Assemblies – Neutral Pressure.
 - 2. UL 10C – Fire Tests for Door Assemblies – Positive Pressure.
- F. American Woodwork Institute (AWI):

1. Architectural Woodwork Standards, Section 9-Doors, 2nd Edition.
- G. Wood Door Manufacturers Association (WDMA):
 1. WDMA I.S.1-13:
 2. WDMA I.S.6-A.13: Interior Architectural Stiles and Rails Doors.

1.5 QUALITY ASSURANCE

- A. Comply with Section 01 45 00 – Quality Control.
- B. Door Standards:
 1. AWS Quality Standards 2nd Edition for Custom Grade.
 2. ANSI/WDMA I.S.6-A.13
- C. Labeling Agencies:
 1. Underwriters Laboratories, Inc. UL10B for neutral pressure and UL10C for positive pressure for rated doors.
 2. Intertek Testing Services-Warnock Hersey (ITS-WH) (Ratings for both Neutral pressure and Positive pressure rated doors).
- D. Sound Transmission Coefficient (STC) Minimum Performance Criteria:
 1. Classroom, Labs, Resource Room Doors and other spaces not noted: 31.
 2. Music (Band Choral and Orchestra Spaces): 50.
 3. Offices, Conference and Mechanical Room Doors: 45.

1.6 SUBMITTALS

- A. Submit in accord with Section 01 33 00 – Submittal Procedures.
- B. Shop drawings shall include:
 1. Door type.
 2. Door size.
 3. Fire rating.
 - a. Neutral pressure.
 - b. Positive pressure.
 4. Hardware types and locations.
 5. Lite opening size and location.
 6. Prefinished system type and approved color(s).
- C. Product Data: Indicate door core materials, thickness, construction, veneer may be ash, birch or maple species. See WDMA “A Specifier’s Guide to Door Face Veneers” for cut and matching requirements, factory machining and factory finishing criteria.
- D. Construction samples: Submit two or more manufacturer’s standard samples demonstrating door construction.
- E. Finish of submitted samples shall illustrate total range of color and grain of door face materials.
 1. Door color and grain finish failing to meet samples shall be rejected. Architect shall be sole judge of approved and rejected doors.
 2. Rejected doors shall be replaced at no additional cost to Owner.
- F. Provide manufacturer’s full lifetime door warranty.

1.7 DELIVERY STORAGE, HANDLING AND SITE CONDITIONS

- A. Comply with Section 01 66 00 – Product Delivery and Handling.
- B. Comply with WDMA’s Appendix Section “Care and Installation at Job Site”.
 1. Store doors flat and off floor on level surface in dry, well ventilated building.

2. Protect doors from exposure to light, dirt, water and abuse.
3. Storage area in building shall have operational HVAC system maintaining temperature between 50° F (10°C) and 80° F (26.7°C) and 25%-55% relative humidity.
4. When handling doors, lift and carry. Do not drag across other doors or surfaces. Handle with clean hands or gloves.
5. Mark each door on top rail with opening number.
6. Accept doors on site in manufacturer's standard packaging. Inspect for damage.

1.8 COORDINATION

- A. Coordinate work in accord with Section 01 31 00 – Project Coordination.
- B. Coordinate work with door opening construction, door frame and door hardware installation with in pre-installation conference.

1.9 WARRANTY

- A. Provide manufacturer's warranty to include:
 1. Interior Solid Core Doors: "Full Life of Original Installation" including rehang and refinishing if door(s) do not comply with warranty tolerance standards.
 2. Include coverage for delamination, warping, bow, cup and telegraphing of core construction beyond warranty tolerances.

PART 2 PRODUCTS

2.1 APPROVED MANUFACTURERS

- A. Eggers Industries, Inc., 164 North Lake St., Neenah, WI 54956; Tel: 920-722-6444; Fax: 920-722-0357; website: www.eggersindustries.com.
- B. Algoma Hardwoods, Inc., 1001 Perry St., Algoma, WI 54201; Tel: 920-487-5221; Fax: 920-487-3636; website: www.algomahardwoods.com.
- C. Marshfield Door Systems, Inc., 1401 East Fourth St., Marshfield, WI 54449-3667; Tel: 800-869-3667; website: www.marshfielddoors.com.
- D. Graham Wood Doors, Div. of Assa Abloy; 525 9th St. SE, Mason City, IA; Tel: 641-423-2444; Website: www.grahamdoors.com.
- E. Other manufacturers shall make requests for substitutions in accord with Section 01 25 13 – Product Substitution Procedures.

2.2 DOOR CONSTRUCTION

- A. Stiles and Rails: Comply with WDMA I.S. 6A-13 – Interior Architectural Stiles and Rails Doors.
- B. Flush Doors: Comply with WDMA I.S. 1-13 - 6A-13 – Interior Architectural Wood Flush Doors.
- C. Fabricate doors to “Custom Grade” per AWI Quality Standards, 2nd Edition.

2.3 FABRICATION

- A. Non Fire Rated Doors:
 1. Structural Composite Lumber Core (SCLC) engineered hardwood composite complying with WDMA minimum performance levels for interior applications:

- a. Screw holding strength: 540 lbs. (245Kg) minimum.
 - b. Modulus of rupture: Average of 4,000 psi (27.58 MPa).
 - c. Modulus of elasticity: Average of 600,000 psi (4137 MPa).
 - d. Density: Minimum 38 lbs./cu. ft. (609 Kg/M³) for Staves engineered with single species hardwood composite core.
2. Core Materials:
 - a. Stiles (Vertical Edges): Same species as face veneer.
 - b. Rails (Horizontal Edges): Structural composite lumber (SLC) as specified in core section per minimum requirements.
 - c. Stiles, rails, and mullions shall be joined with both 0.50" wooden dowels, and cope and stick joints and bonded with glue.
 3. Veneers:
 - a. Flush Wood Veneer Door Facing: White Birch (no heartwood), plain sliced veneers.
 - b. Veneer Matching: Book Match.
 - c. Assembly of Spliced Veneers: Running book match.
 - d. Doors in Pairs or Sets: Pair Match required. Door schedule shall reflect pairs and sets by door numbers, including doors separated by mullions.
- B. Fire Rated Doors:
1. Structural Composite Lumber Core (SCLC) engineered hardwood composite complying with WDMA minimum performance levels for interior applications:
 - a. Screw holding strength: 540 lbs. (245Kg) minimum.
 - b. Modulus of rupture: Average of 4,000 psi (27.58 MPa).
 - c. Modulus of elasticity: Average of 600,000 psi 4137 MPa).
 - d. Density: Minimum 38 lbs./cu. ft. (608.7 K/M³) for staves engineered with single species hardwood composite core.
 2. Core and Edge Construction shall utilize non-combustible mineral composite materials and intumescent required for ¾, 1, and 1-1/2 hour ratings per Door Schedule.
 3. 20-minute fire-rating:
 - a. Positive Pressure: Category A (concealed intumescent).
 - 1) Structural Composite Lumber; SCL-20
 - 2) Staves with one species per core; SLC-20
 4. 45, 60, or 90-minute mineral core fire-rated as noted.
 - a. Category A (concealed intumescent).
 5. Acoustical:
 - a. Sound Transmission Class (STC) specified shall be certified by manufacturer based on tests conducted at independent testing agency in accord with ASTM E90-09 and E413-10 (earlier tests are not acceptable).
 - b. Acoustical doors with lites shall be factory glazed to maintain STC rating.
 - c. Provide STC ratings as indicated.
 6. Fire rated doors are indicated in Door Schedule.
- C. Lite and Astragal Details
1. Lite openings shall be furnished with same species wood lite beads.
 2. Metal astragals and door edge may be used for pairs of fire doors.
- D. Vertical Edges (Stiles)
1. Non-rated and 20-minute rated doors shall have edges to match face veneer.
 2. 20-minute rated pairs (No metal edges or astragal required).
 - a. Manufacturer's standard as required for fire approval. (May include veneer banding with structural composite lumber backers or inner plies).
 3. Fire Resistant Composite Core

- a. Manufacturer's standard as required for fire approval. Veneered edge of matching/compatible veneer to face veneer.
- E. Horizontal Edges (Rails)
 - 1. Manufacturer's standard. (MDF top and bottom rails not permitted).
 - 2. Meet positive pressure ratings.
- F. Adhesives
 - 1. Face Adhesive: Type 1
- G. Inner Blocking For Fire Resistant Composite Core Fire Doors
 - 1. Supply hardware reinforcement for surface applied hardware where required by manufactured to eliminate use of through bolts.
- H. Machining
 - 1. Factory fit and machine doors for frame and finish hardware in accord with hardware and NFPA 80 requirements and dimensions.
 - 2. Do not machine for surface hardware. Apply appropriate fire labels.
 - 3. Do not trim positive pressure rated doors for width.

2.4 ACCESSORIES

- A. Glazing Stops
 - 1. Non-Rated and 20 minute: Manufacture's Standard Metal Vision Frames.
 - 2. Fire-Rated 45 minutes and above:
 - a. Manufacturer's Standard Metal Vision Frames.
 - b. Verify compatibility of glazing system with positive pressure requirements.
 - 4. Verify compatibility of glazing system with positive pressure requirements.
 - 5. Glazing per Section 08 80 00 – Glazing.
- B. Glass and Glazing in Wood Doors: Provided by manufacturer.
- C. Meeting Edges For Pairs Of Fire Rated Doors
 - 1. Metal edge and astragal or metal edges.
 - 2. Meet positive pressure requirements for Category A (concealed intumescent).
- D. Applied Moldings
 - 1. As selected from manufacturer's standard profiles and install as detailed.
 - 2. Applied moldings to be affixed to doors without use of nails or staples. No visible fasteners are permitted.

2.5 FACTORY FINISH

- A. Doors to be factory finished shall meet WDMA I.S. 1-A-04 specifications for TR-6 catalyzed polyurethane finish system or AWS section 5 specifications for UV curable polyester urethane finish system.
- B. Factory Finish (Basis of Design): Eggers' Gardall - water based stain and UV curable polyester urethane finish system complying with applicable Federal and State regulations for Volatile Organic Compounds (VOC) and Hazardous Air Pollutants (HAP) emission limitations per EPA Clean Air Act.
- C. Stain color shall be selected by Architect from manufacturer's standard colors that match existing wood door finish.
- D. Submit approved samples for factory finishing.
- E. Factory finished doors to be installed just prior to substantial completion.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify substrate opening sizes and tolerances are acceptable and ready to receive work. Notify Contractor/CM of any conditions preventing successful installation.
- B. Do not install doors in frame openings that are not plumb or are out of tolerance for size or alignment. Start of installation indicates installer's acceptance of conditions.
- C. Use three hinges for doors 7'-6" (2.286 m) in height or less and one additional hinge for each incremental 30" (76.2 cm) of height over 7'-6" (2.286 m).

3.2 INSTALLATION

- A. Install fire-rated and non-rated doors in accord with NFPA 80, Manufacturers' printed instructions and ITS-WH/UL requirements.
- B. Trim non-rated door width by cutting equally on both jamb edges.
- C. Trim door height by cutting bottom edges to a maximum 0.75" (19 mm).
- D. Trim fire door height at bottom edge only, in accord with fire rating requirements. Allow fitting clearance of 0.125" (3.33 mm) at each side and at top of door.
- F. Do not trim Positive Pressure rated doors for width.
- G. Pilot drill screw and bolt holes using templates provided by hardware manufacturer. Use threaded through bolts for half surface hinges.
- H. Exercise caution when drilling pilot holes and installing hinges to ensure pilot holes are not over-drilled and screws are not over-torqued. Follow Manufacturer's printed installation instructions for Positive Pressure doors. Do not use self-drilling or combination wood/metal screws on wood doors.
- I. Coordinate installation of doors with installation of frames and hardware.
- J. Coordinate installation of glass and glazing.
- K. Install door louvers and light kits plumb and level.
- L. Reseal or refinish any doors that require site alteration.

3.3 WARRANTY TOLERANCES

- A. Conform to WDMA standards and testing methods for warp, cup, bow and telegraphing.

3.4 ADJUSTING

- A. Adjust doors and hardware for proper function, smooth operation, proper latching and balanced door movement, without force or excessive clearances.

3.5 CLEANING

- A. Clean doors immediately after installation in accord with manufacturer's written Care and Handling Instructions.

3.6 PROTECTION

- A. Protect installed doors from damage.
- B. Replace or repair doors damaged during construction, as directed by Architect.

END OF SECTION

SECTION 08 41 13
ALUMINUM STOREFRONT SYSTEM

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

- A. The provisions of the General Conditions, Supplementary Conditions, Drawings, Specifications and the Sections included under Division 1, General Requirements and References are included as a part of this Section as though bound herein.

1.2 SUMMARY

- A. Provide labor, materials, services, and equipment necessary to furnish and install work as indicated and as specified herein, which includes, but is not limited to:
 - 1. Aluminum storefront door and window systems.
 - 2. Hardware for aluminum doors will be furnished under Specification Section–Door Hardware, except continuous gear hinges, but installed under this Section.

1.3 REFERENCES

- A. AA (Aluminum Association) – Designation System for Aluminum Finishes
- B. AAMA Series number 11 – Design Wind Loads for Buildings and Boundary Layer Wind Tunnel Testing
- C. AAMA 101 – Standard Specification for Window, Doors, and Skylights
- D. AAMA 200 – Standard Practice for the Installation of Windows with Frontal Flanges for Surface Barrier Masonry Construction
- E. AAMA 502-08 – Voluntary Specification for field Testing of Newly Installed Fenestration Products
- F. AAMA 511 – Voluntary Guideline for Forensic Water Penetration Testing of Fenestration Products
- G. AAMA 606.1 – Voluntary Guide Specifications and Inspection Methods for Integral Color Anodic Finishes for Architectural Aluminum
- H. AAMA 607.1 – Voluntary Guide Specification and Inspection Methods for Clear Anodic Finishes for Architectural Aluminum
- I. AAMA 608.1 – Voluntary Guide Specification and Inspection Methods for Electrolytically Deposited Color Anodic Finishes for Architectural Aluminum
- J. AAMA 701/702 – Combined Voluntary Specifications for Pile Weather-stripping and Replaceable Fenestration Weatherseals
- K. AAMA 1503.1 – Voluntary Test Method for Thermal Transmittance and Condensation Resistance of Windows, Doors and Glazed Wall Sections
- L. ASCE 7 – Minimum Design Loads for Buildings and other Structures
- M. ASTM A123/A123M – Standard Specification for Zinc (Hot Dip Galvanized) Coatings on Iron and Steel Products
- N. ASTM B209 – Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate
- O. ASTM B221 – Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes
- P. ASTM C509 – Standard Specification for Elastomeric Cellular Preformed Gasket and Sealing Material

- Q. ASTM D2000 – Standard Classification System for Rubber Products in Automotive Applications
- R. ASTM D2287 – Standard Specification for Non-rigid Vinyl Chloride Polymer and Copolymer Molding and Extrusion Compounds
- S. ASTM E283 – Standard Test Method for Determining the Rate of Air Leakage Through Exterior Windows, Curtain Walls and Doors Under Specified Pressure Differences Across the Specimen
- T. ASTM E330 – Standard Test Method for Structural Performance of Exterior Windows, Doors, Skylights and Curtain Walls by Uniform Static Air Pressure Difference
- U. ASTM E331 – Standard Test Method for Water Penetration of Exterior Windows, Skylights, Doors, and Curtain Walls by Uniform Static Air Pressure Difference
- V. ASTM E1105 – Standard Test Method for Field Determination of Water Penetration of Installed Exterior Windows, Skylights, Doors, and Curtain Walls by Uniform or Cyclic Static Air Pressure Difference
- W. ASTM F588 – Standard Test Methods for Measuring the Forced Entry Resistance of Window Assemblies, Excluding Glazing Impact
- X. FED L-S-125B – Screening, Insect, Nonmetallic
- Y. FED RR-W-365A – Wire Fabric (Insect Screening)
- Z. FBC – Florida Building Code
- AA. Current Florida Building Code Product Approval

1.4 SUBMITTALS

- A. Product Data: For each product specified include details of construction relative to materials, dimensions of individual components, profiles, manufacturer's specifications and catalog cuts, and finishes. Provide structural test reports that meet all hurricane and impact resistant codes and requirements.
- B. Shop drawings shall show elevations of each door type, door construction details and methods of assembling sections, hardware locations and installation methods, dimensions, and shapes of materials, anchorage and fastening methods, weatherstripping, and finish requirements.
 - 1. Provide schedule of doors and frames using same reference numbers for details and openings as those on Contract Drawings and Schedules.

1.5 PERFORMANCE REQUIREMENTS FOR EXTERIOR STOREFRONT AND WINDOW SYSTEMS

- A. Performance Requirements: Provide aluminum curtain wall systems that comply with performance requirements indicated, as demonstrated by testing manufacturer's assemblies in accordance with South Florida Building Code Test Protocols TAS 201, TAS 202 and TAS 203.
 - 1. Air Infiltration: Completed storefront systems shall have 0.06 CFM/FT² (1.10 m³/h·m²) maximum allowable infiltration when tested in accordance with ASTM E 283 at differential static pressure of 6.24 psf (299 Pa).
- B. Water Infiltration: No uncontrolled water when tested in accordance with ASTM E 331 at test pressure differential of: 12 PSF (575 Pa) (or when required, field tested in accordance with AAMA 503). Fastener Heads must be seated and sealed against Sill Flashing on any fasteners that penetrate through the Sill Flashing.
- C. Wind Loads: Completed storefront system shall withstand wind pressure loads normal to wall plane indicated on structural drawings.

- D. Deflection: Maximum allowable deflection in any member when tested in accordance with ASTM E 330 with allowable stress in accordance with AAMA Specifications for Aluminum Structures.
 - 1. Without Horizontals: $L/175$ or $3/4"$ (19.1mm) maximum.
 - 2. With Horizontals: $L/175$ or $L/240 + 1/4"$ (6.4mm) for spans greater than 13'-6" (4.1m) but less than 40'-0" (12.2m).
- E. Thermal Movement: Provide for thermal movement caused by 180 degrees F. (82.2 degrees C.) surface temperature, without causing buckling stresses on glass, joint seal failure, undue stress on structural elements, damaging loads on fasteners, reduction of performance, or detrimental effects.

1.6 PERFORMANCE REQUIREMENTS FOR INTERIOR STOREFRONTS

- A. Deflection: Maximum allowable deflection in any member when tested in accordance with ASTM E 330 with allowable stress in accordance with AAMA Specifications for Aluminum Structures.
 - 1. Without Horizontals: $L/175$ or $3/4"$ (19.1 mm) maximum.
 - 2. With Horizontals: $L/175$ or $L/240 + 1/4"$ (6.4 mm) for spans greater than 13'-6" (4.1 m) but less than 40'-0" (12.2 m).
- B. Thermal Movement: Provide for thermal movement caused by 180 degrees F. (82.2 degrees C.) surface temperature, without causing buckling stresses on glass, joint seal failure, undue stress on structural elements, damaging loads on fasteners, reduction of performance, or detrimental effects.

1.7 QUALITY ASSURANCE

- A. Doors shall be provided to conform to the Florida Building Code. These requirements supersede Technical Specifications in this Section.
- B. Provide test reports from AAMA Accredited Laboratories.
- C. System shall conform to large and small impact requirements.

1.8 PROJECT CONDITIONS

- A. Field Measurements: Check openings by accurate field measurement before fabrication. Show recorded measurements on shop drawings. Coordinate fabrication schedule with construction progress to avoid delay of the work.

1.9 EHPA REQUIREMENTS (for use only if an EHPA designated area is indicated)

- A. Storefront systems that are indicated to be provided in an EHPA shelter area shall be designed and modified if necessary and installed to comply with structural design loads and all applicable codes. Documentation shall be provided indicating compliance with requirements.

PART 2 – PRODUCTS

2.1 MANUFACTURERS

- A. Basis of Design Product: Subject to compliance with requirements provide the following manufacturer.
 - 1. YKK North America

- B. The following manufacturers are acceptable provided they equal or exceed the material requirements and functional qualities of the basis of design product.
 - 1. Tubelite Division of Indal, Inc., Reed City, Michigan
 - 2. Wausau Metals Corp., Wausau, Wisconsin
 - 3. EFCO Corp., Monett, Missouri

2.2 STOREFRONT SYSTEM

- A. Basis of Design
 - 1. Interior Storefront Door
 - a. Basis of Design: YHS 50H medium stile impact system with insulated impact resistant glazing.
 - b. FPA-FL #16554.2.
 - 2. Interior Storefront Wall and Window System
 - a. Basis of Design: YHS 50 TU, thermally broken impact system with insulated impact resistant glazing.
 - b. FPA – FL #14218.5.

2.3 MATERIALS AND CONSTRUCTION

- A. Sections shall be extruded from 6063-T5 aluminum alloy (A.S.T.M. B221 Alloy GS 10A T5).
- B. Major portions of the door stiles shall be .125 inch in thickness, and glazing molding shall be .050 inch thick.
 - 1. Mullions shall be as detailed on Drawings and as required for type of door being furnished.
- C. Screws, miscellaneous fastening devices, and internal components shall be of stainless steel, plated, or corrosion-resistant materials of sufficient strength to perform the functions for which they are used.
- D. Wide Stile: Vertical stiles shall be 5 inches, top rail 6-1/2 inches, and bottom rail 10 inches. Corner construction shall consist of both sigma deep penetration and sigma fillet welds and mechanical fastening. Inside joints between the top rail and vertical stiles shall have a continuous bead of sealant. Interior glazing stops shall be square snap-in type with neoprene bulb type glazing. Square stops on exterior side shall be lock-in tamperproof type. No exposed screws shall be required to secure stops.
- E. Door shall be weatherstripped on 3 sides with metal backed pile cloth installed in the door and/or frame. An adjustable weatherstrip astragal with stainless steel backing shall be provided at the meeting stiles of a pair of doors.
 - 1. Provide compression weatherstripping at fixed stops. At other locations, provide sliding weatherstripping retained in adjustable strip mortised into door edge.
- F. Doors shall have a portion of the top rail closed for mounting security door contacts.
- G. Where aluminum doors are scheduled to receive a concealed overhead stop, the jamb bracket shall be mortised into the frame and the channel mortised into the top of the door. The cut for the arm on the stop side of the door shall not be cut below the stop strip of the frame.
- H. All dissimilar metals must be properly insulated to prevent galvanic action.
- I. All exposed fasteners shall be aluminum or stainless steel.
- J. All aluminum extrusions shall have a minimum wall thickness of .080” and comply with ASTM B221 (ASTM B221M), 6063-T5 Aluminum Alloy.
- K. All units to be “dry-glazed” with EPDM gasket to accept impact rated glass.

2.4 SILL PAN AT EXTERIOR STOREFRONT

- A. Provide .125 inch aluminum sill pan with ¼" upturn at inside edge.
- B. Finish shall match storefront system.

2.5 ENTRANCE DOOR HARDWARE

- A. General:
 - 1. Provide hardware that is compliance with the Miami Dade NOA and/or Florida Product Approval.
 - 2. Opening-Force Requirements:
 - a. Egress Doors: Not more than 8.5 lbf to open the door to its minimum required width.
- B. Opening-Force Requirements:
 - 1. Latches and Exit Devices: Not more than 5 lbf required to release latch.
- C. Pivot Hinges: BHMA A156.4, Grade 1.
 - 1. Offset-Pivot Hinges: Provide top, bottom, and intermediate offset pivots at each door leaf.
- D. Manual Flush Bolts: BHMA A156.16, Grade 1.
- E. Mortise Auxiliary Locks: BHMA A156.5, Grade 1.
- F. Panic Exit Devices: BHMA A156.3, Grade 1, listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for panic protection, based on testing according to UL 305.
- G. Cylinders: To match cylinder manufacturer as specified in 08 71 00 "Door Hardware".
- H. Strikes: Provide strike with black-plastic dust box for each latch or lock bolt; fabricated for aluminum framing.
- I. Operating Trim: BHMA A156.6.
- J. Closers: BHMA A156.4, Grade 1, with accessories required for a complete installation, sized as required by door size, exposure to weather, and anticipated frequency of use; adjustable to meet field conditions and requirements for opening force.
- K. Door Stops: BHMA A156.16, Grade 1, floor or wall mounted, as appropriate for door location indicated, with integral rubber bumper.
- L. Weather Stripping: Manufacturer's standard replaceable components.
 - 1. Compression Type: Made of ASTM D 2000, molded neoprene, or ASTM D 2287, molded PVC.
 - 2. Sliding Type: AAMA 701, made of wool, polypropylene, or nylon woven pile with nylon-fabric or aluminum-strip backing.
- M. Weather Sweeps: Manufacturer's standard exterior-door bottom sweep with concealed fasteners on mounting strip.
- N. Silencers: BHMA A156.16, Grade 1.
- O. Thresholds: BHMA A156.21, raised thresholds beveled with a slope of not more than 1:2, with maximum height of 1/2 inch.

2.6 FABRICATION

- A. General: Fabricate components that, when assembled, will have accurately fitted joints with ends coped or mitered to produce hairline joints free of burrs and distortion. After fabrication, clearly mark components to identify their locations in Project according to shop drawings.
- B. Forming: Form shapes with sharp profiles, straight and free of defects or deformations, before finishing.

- C. Entrances: Fabricate door framing in profiles indicated. Reinforce as required to support imposed loads. Factory-assemble door units and factory install hardware to greatest extent possible. Reinforce door units as required for installing hardware indicated. Cut, drill, and tap for factory installed hardware before finishing components.
 - 1. Interior Doors: Provide ANSI/BHMA A156.16 silencers at stops to prevent metal to metal contact. Provide 3 silencers on strike jamb of single door frames and 2 silencers on head of double door frame.
- D. Storefront frames: Unless otherwise noted on drawings;
 - 1. Depth of frame as required for applicable wind loading.
 - 2. Frame components shall be shear block construction.

2.7 ALUMINUM FINISHES

- A. Clear Anodic Finish: AAMA 611, AA-M12C22A31, Class II, 0.010 mm or thicker.

PART 3 – EXECUTION

3.1 PREPARATION

- A. Openings for aluminum entrances and storefronts shall be prepared to the proper size, plumb, square, level, and in the proper location and alignment as shown on the Architect's Drawings and the final shop drawings.

3.2 INSTALLATION

- A. Aluminum doors shall be securely installed according to the manufacturer's recommendations, and operating hardware shall be checked for proper function and adjustment.
- B. Install entrances plumb and true in alignment with established lines and grades without warp or rack. Lubricate operating hardware and other moving parts according to hardware manufacturer's written instructions.
 - 1. Install surface mounted hardware according to manufacturer's written instructions using concealed fasteners to greatest extent possible.
- C. Install glazing to comply with requirements of Section – Glazing, unless otherwise indicated.
- D. Do not cut aluminum frame stop strip when mounting exit devices and closers.
- E. Provide conduits at frames and card reader locations to accommodate the future installation of card readers at doors indicated on the finish schedule. Conduits shall be run to 6' above the finished ceiling height and accessible to ceiling space.

3.3 ADJUSTING AND CLEANING

- A. Adjust doors and hardware to provide tight fit at contact points and weatherstripping, smooth operation, and weathertight closure.

3.4 PROTECTION

- A. Protect the aluminum doors and their finish against damage from construction activities and harmful substances. Clean the aluminum surfaces as recommended for the type of finish applied.

END OF SECTION

SECTION 08 71 00
DOOR HARDWARE

PART 1 GENERAL

1.1 RELATED DOCUMENTS

- A. The provisions of the General Conditions, Supplementary Conditions, Drawings, Specifications and the Sections included under Division 1, General Requirements and References are included as a part of this Section as though bound herein.

1.2 SECTION INCLUDES

- A. Provide labor, material, services and equipment necessary to furnish and install work as indicated and as specified herein, which includes, but is not limited to:
 - 1. Hardware for wood and hollow steel doors.
 - 2. Lock Cylinders for gates, folding partitions, wire cages and doors.
 - 3. Thresholds.
 - 4. Gaskets.
 - 5. Screws, bolts, expansion shields and related prep work.
 - 6. Hardware layout templates.
 - 7. Keys key cabinet and Knox Box.

1.3 RELATED WORK

- A. Section 01 25 13 – Product Substitution Procedures.
- B. Section 01 31 00 – Project Coordination.
- C. Section 01 33 00 – Submittal Procedures.
- D. Section 01 42 00 – References.
- E. Section 01 45 00 – Quality Control.
- F. Section 01 74 00 – Cleaning and Waste Management.
- G. Section 01 78 00 – Closeout Submittals.
- H. Section 08 11 13 – Hollow Metal Doors and Frames.
- I. Section 08 14 29 – Prefinished Wood Doors.
- J. Section 08 41 00 – Entrances and Storefronts.

1.4 REFERENCES

- A. See Section 01 42 00 – References for additional reference standards, abbreviations, definitions and acronyms.
- B. ANSI A117.1 - Specifications for Making Buildings and Facilities Accessible to and Usable by Physically Handicapped People.
- C. ANSI/NFPA 80 - Fire Doors and Windows.
- D. AWI - Architectural Woodwork Institute.
- E. BHMA - Builders' Hardware Manufacturers Association.
- F. DHI - Door and Hardware Institute.
- G. Florida Fire Prevention Code.
- H. NAAMM - National Association of Architectural Metal Manufacturers.
- I. NFPA 101 - Life Safety Code, Current Edition.
- J. SDI - Steel Door Institute.

K. Florida Building Code (FBC), 5th Edition.

1.5 COORDINATION

A. Coordinate hardware installation with other affected trades in accord with Section 01 31 00 – Project Coordination.

1.6 QUALITY ASSURANCE

- A. Manufacturers: Company shall specialize in manufacturing door hardware with five years continuous experience.
- B. Hardware Supplier: Company shall specialize in supplying institutional door hardware with five years continuous documented experience, approved by manufacturer.
- C. Hardware Supplier Personnel: Employ Architectural Hardware Consultant (AHC) on project.

1.7 REGULATORY REQUIREMENTS

- A. Conform to Florida Building Code for requirements applicable to fire rated doors, frames, and accessibility for physically disabled.
- B. Conform to Florida Fire Prevention Code and applicable sections of NFPA 101.

1.8 CERTIFICATIONS

- A. Architectural Hardware Consultant shall inspect complete installation and certify that hardware and installation has been furnished and installed in accord with manufacturer's printed instructions and as specified.
- B. Provide two copies of certifications to Architect.

1.9 SUBMITTALS

- A. Submit schedules, samples, parts lists, templates, installation instructions and product data per Section 01 33 00 - Submittals.
- B. Submittals shall identify each door and each set number following numbering system noted on Drawings.
- C. Manufacturing order shall not be placed until hardware schedule has been submitted and reviewed by Architect.
- D. Furnish templates to facilitate work schedule.
- E. Indicate locations and mounting heights of each type of hardware.
- F. Submit samples of hinge, latch set, exit device, door closer, thresholds, illustrating style, color and finish.
- G. Project samples may be incorporated in Work.
- H. Submit manufacturer, supplier, fabricator and installer's qualifications in accord with Section 01 33 00 – Submittal Procedures.

1.10 OPERATION AND MAINTENANCE DATA

- A. Submit operation and maintenance data in accord with Section 01 78 00 – Closeout Submittals.
- B. Include data on operating hardware, and inspection procedures related to preventative maintenance.

1.11 DELIVERY, STORAGE, AND HANDLING

- A. Deliver, store and protect products in original packaging to site in accord with Section 01 66 00 – Project Storage and Handling Requirements.
- B. Hardware Packaging
 - 1. Items shall be individually labeled and identified with door opening code and hardware group to match hardware schedule.
 - 2. Each item shall identify door location by number identified on Door Schedule.
- C. Hardware manufacturers shall deliver via security shipping following items to District Maintenance Dept., 2485 SE Dixie Hwy., Stuart, FL 34996:
 - 1. Two copies of factory key biting schedule.
 - 2. Permanent building keys and construction key voiding devices.
- D. Protect hardware from theft by cataloging and storing in secured area.

1.12 WARRANTY

- A. Provide five-year warranty period in accord with Section 01 78 00 - Closeout Submittals for locksets, latch sets, exit devices hinges and items listed in the hardware schedule excluding overhead door closers.
- B. Provide ten-year warranty period in accord with Section 01 78 00 - Closeout Submittals for overhead door closers.

1.13 MAINTENANCE MATERIALS

- A. Provide special wrenches and tools applicable to different or special hardware component.
- B. Provide maintenance tools and accessories supplied by hardware component manufacturer.

PART 2 – PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

- A. Manufacturers not listed may submit requests for substitution except as noted in accord with Section 01 25 13 – Product Substitution Procedures.
- B. Obtain each kind of hardware from one manufacturer.
- C. Acceptable products and manufacturers are listed below:
 - 1. Hinges: Ives, Hager, Stanley, Bommer.
 - 2. Locks and Latches: Best Access (No Substitution Permitted).
 - 3. Cylinders, Keys, Keying: Corbin/Russwin (No Substitution Permitted).
 - 4. Exit Devices: Von Duprin (No Substitution Permitted).
 - 5. Removable Mullions: Von Duprin (No Substitution Permitted).
 - 6. Door Closers: LCN (No Substitution Permitted).
 - 7. Overhead Stops/holders: Glen Johnson, Rixon.
 - 8. Wall/Floor Stops/Flush Bolts: Ives, Rockwood, Glen Johnson.
 - 9. Kick Plates: Ives, Rockwood, Quality.
 - 10. Thresholds/Weatherstripping: National Guard, Zero, Pemko.
 - 11. Silencers: Ives, Rockwood, Quality, Glen Johnson.
 - 12. Push/Pulls: Quality, Rockwood.
 - 13. Key Cabinet: Lund, Key Control, Telkey.

2.2 HARDWARE FINISH

- A. Hardware shall have the following finishes:
 - 1. Exterior Hinges: Stainless Steel (32D).
 - 2. Interior Hinges/Locks/Exit Devices/Overhead Holders: Satin Chrome (26D).
 - 3. Door Closers: Aluminum.
 - 4. Flat Goods: Stainless Steel (32D) or Satin Chrome (26D).
 - 5. Thresholds: Mill Finish Aluminum.

2.3 HINGES AND PIVOTS

- A. Exterior butts shall be stainless steel (32D). Butts on all out-swinging doors shall be furnished with non-removable pins (NRP). Size: 4½" wide x 4½" high, for exterior doors up to 42" wide and heavy weight 4½" wide x 4½" high hinges for doors over 42" wide.
- B. Interior butts shall be steel, standard weight 4½" wide x 4½" high hinges doors up to 42" wide and heavy weight 4½" wide x 4½" high hinges for doors over 42" wide.
- C. Doors less than 5'-0" high shall have two (2) butts. Furnish one (1) additional butt for each 2'-6" of height or fraction thereof.

2.4 KEYING

- A. Pre-Order Meeting: Hardware supplier shall meet with District's Maintenance Lock Dept. Representative to establish keying order before lock order is placed.
- B. Locks shall be construction master keyed using split key method keyed to School District's restricted keyway.
- C. Hardware supplier shall meet with District's Maintenance Lock Dept. Representative will establish final count of locks and cylinders, and transmit release order to Best Access Systems Lock Company for production in amounts established with Hardware Supplier.
- D. Construction keys in following quantities:
 - 1. 12 master keys
- E. Supply permanent keys in following quantities:
 - 1. Six keys for each lock with maximum of 12 keys of keyed alike sets.
 - 2. Five master keys for each building or area grouping. Key groups include:
 - a. Auditorium/Multipurpose/Stage (including adjacent support spaces).
 - b. Food Service (including Kitchen and adjacent support spaces).
 - c. Media Center (including adjacent support spaces).
 - d. Administrative Offices (including adjacent support spaces).
 - e. Classrooms, Resource Rooms and Labs (including adjacent storage area) subdivided into subgroups by floor level or building(s).
 - f. Mechanical/Electrical Rooms.
 - g. Custodial/Receiving Areas.
 - 3. Grand master keys shall be supplied based on size of facility as follows:
 - a. Five (5) Grandmaster keys for Elementary Schools and Ancillary Projects.
 - b. Ten (10) Grandmaster Keys for Middle Schools.
 - c. Twenty (20) Grandmaster keys for High Schools.
 - 4. Keys shall be stamped "DO NOT DUPLICATE".
- F. Key Function
 - 1. Supply locksets with following key functions:

Location	Function
a. Passage	N

- | | |
|-----------------------------|-----|
| b. Privacy | L |
| c. Classroom/Office | R |
| d. Storage/Mechanical Rm | D |
| e. Electronic Lever Lockset | DEL |

2.5 KEY CABINETS

- A. Key Cabinet: Lund 1203 with pin tumbler lock.
- B. Cabinet Size: Size for project keys plus 10% spare capacity.
 - 1. Horizontal metal strips for key hook labeling with clear plastic strip cover over labels.
 - 2. Finish: Baked enamel finish, gray color.
- C. Attach key legend in key cabinet with 5-way cross-reference system indicating **keyset** number, FISH Room number, key code number, hook number and key description.

2.6 KEY VAULT

- A. Recessed Key Vault: Knox Company, Series 4400 Know-Vault, Model 4400-R.
- B. Key Vault shall be keyed to Owner's key system and will be Owner provided.
- C. Manufacturer: Knox Company. Key box shall meet criteria of fire department having jurisdiction at project location.

2.7 CLOSER/MAGNETIC HOLD OPEN SYSTEM

- A. LCN, Series No: 4041.
- B. Furnish closer/electromagnet compete with required accessories necessary for complete working system.
- C. Furnish two-year warranty.

2.8 LOCKSETS

- A. Lever Lock: Best Access Lock Company, heavy duty cylindrical type, Best 93K Series, Lever Design 15D.
- B. Electronic Lever Lock: Best Access Lock Company, heavy duty cylindrical type, Best 93KW7DEU, Lever Design 15D.

2.9 EXIT DEVICES

- A. Von Duprin 98 Series in types and functions listed.
- B. Devices shall be listed under "Panic Hardware" in accident equipment list of Underwriter Laboratories. Fire ratings shall be attached where indicated per UL requirements.
- C. Exit devices shall be tested per ANSI/BHMA A156.3 by BHMA certified testing laboratory. Provide written certification of 1,000,000 cycle testing per Section 01 33 00 – Submittals.
- D. Supply locksets with following key functions:

Location	Function
1. Non Fire Rated	19R NLP, 19R DT, or 19R BE with 560 strike as required.
2. Fire Rated	F19R SE or F19R BE with 570 strike as required.
3. Non Fire Rated (Pairs)	19R NLP, 19R DT, or 19R BE with 570 strike as required.

- 4. Fire Rated (Pairs) F19R SE or F19R BE with 570 strike and F4023 mullion as required.
- 5. Fire Rated (Electronic) ELX981-F X 992L X 06 X 26D.
- 6. Non-fire Rated (Electronic) SD ELL X 98NL X 990NL X 06 X 26D.
- 7. Power Supply PS873B X 4TD
- E. Electrical Power Transfer: EPT-10 X SP28.
- F. Surface strikes shall be roller type with plate underneath to prevent movement and dead-latching feature to prevent latchbolt tampering.

2.10 DOOR CLOSERS

- A. Door closers shall be LCN 4040/4041 Series with non-ferrous covers, forged steel arms, separate valves for adjusting backcheck closing and latching cycles and adjustable spring to provide up to 50% increase in spring power.
- B. Furnish closers with parallel arm mounted on door openings into egress spaces, mounted to permit 180 degree door swing where wall conditions permit, and have non-hold open arms unless otherwise noted.
- C. Door closer cylinders shall be high strength cast iron construction.
- D. Door closers shall be tested in accord with ANSI/BHMA A156.4 by BHMA certified testing laboratory and attest in writing that closers have successfully completed one million cycles.
- E. Door closers shall utilize temperature stable fluid capable of withstanding temperature ranges of 120° F (49°C) to -30°F (-34°C), without requiring seasonal adjustment of closer speed to properly close door.
- F. Closers for fire rated doors shall be provided with temperature stabilizing fluid complying with UCB 7-2 (1997) and UL 10C.
- G. Door closers shall incorporate tamper resistant non-critical screw valves of V-slot design to reduce clogging from particles within closer.
- H. Closers shall have separate and independent screw valve adjustments for latch speed, general speed, and hydraulic backcheck.
- I. Backcheck shall be located to effectively slow swing of door at minimum of 10 degrees in advance of dead stop location to protect door frame and hardware from damage.

2.11 DOOR TRIM

- A. Push/pull plates, armor plates, and kick plates shall be .050 gage stainless steel with US32D finish.
- B. Plates shall be two (2") less than door width with beveled edges, sized as follows:
 - 1. Push and pull plates shall be 4" wide x 16" high mounted 42" from door bottom.
 - 2. Armor plates shall be 36" high less than door width mounted 2" from door bottom.
 - 3. Kick plates 10" high x 2" less than door width mounted 2" from door bottom.

2.12 DOOR STOPS

- A. Door stops shall be furnished for doors to prevent door and hardware damage. Wall bumpers are preferred. Provide floor stops where wall bumpers are not practical. Where neither wall nor floor stops are practical, use surface mounted overhead stops as follows:
 - 1. Wall Stops: Ives WS407CVX Series.
 - 2. Floor Stops: Ives FS436 or FS438.
 - 3. Overhead Stops: Glynn Johnson 450 Series (Interior) and 900 Series (Exterior).

2.13 THRESHOLDS, WEATHERSTRIPPING AND SEALS

- A. Thresholds and weatherstripping shall be as listed in Hardware Schedule.

2.14 DOOR SILENCERS

- A. Door Silencers: Ives SR64 Two (2) per door pair and three (3) per single door frame.

2.15 AUTOMATIC FLUSH BOLTS, SURFACE BOLTS AND COORDINATORS

A. Door Bolts:

1. Manufacturer; H. B. Ives.
 - a. Non Fire-rated: 454-f26D 8".
 - b. Fire-rated: 456-B26D.
2. Manufacturer: Glynn Johnson:
 - a. Non Fire-rated: 1631 or 1632.
 - b. Fire-rated: FB7 or FB8.
3. Manufacturer; DCI.
 - a. Non Fire-rated: 1008-US26D.
 - b. Fire-rated: 842-US26D.

B. Coordinators:

1. Manufacturer; Monarch, B-1277 with B-1278 opening bar.
2. Manufacturer: H. B. Ives, 469-B26D with 478 carry bar.
3. Manufacturer: DCI, 500 with carry bar.

2.16 OVERHEAD RAIN DRIP

- A. Rain Drip; Pemko 346PW at exterior HM Steel door locations or as scheduled herein.

PART 3 – EXECUTION

3.1 INSPECTION

- A. Verify that doors and frames are ready to receive work and dimensions are as indicated on shop drawings.
- B. Beginning of installation shall indicate installer's acceptance of existing conditions.

3.2 INSTALLATION

- A. Install hardware in accord with manufacturer's instructions and requirements of DHI.
- B. Use templates provided by hardware item manufacturer.
- C. Mounting heights for hardware from finished floor to center line of hardware item:
1. Locksets: 38".
 2. Push/Pulls: 42".
 3. Dead Locks: 48".
 4. Exit Devices: 40".
- D. Conform to of Florida Bldg. Code: Accessibility, 5th Edition.
- E. Set door thresholds in full bed of butyl rubber.

3.3 ADJUST AND CLEAN

- A. Adjust and check operation of each item of hardware and door, to ensure proper function of every item.
- B. Replace items that cannot be adjusted to operate freely and smoothly.
- C. Final adjustment shall be made after ventilating systems are in operation.
- D. Clean hardware and adjacent surfaces after hardware installation.
- E. Instruct Owner's personnel in adjustment and maintenance of hardware and hardware finishes.

3.4 PROTECTION

- A. Protect installed hardware from damage.
- B. Replace damaged hardware.



3.5 HARDWARE SCHEDULE

- A. Attached Schedule is furnished for guidance in preparing Bidder's cost proposal and should not be considered as totally inclusive.
- B. Bidders shall use drawings to prepare hardware quantities. Variations between this schedule and drawings shall be communicated to Architect for resolution.
- C. Quantities listed are for each pair of doors or for each single door.
- D. Hardware Schedule was prepared by: Hardware Consultant's Name, Address, FAX and Phone Number and email address.
- E. Index of Manufacturers:
 - 1. Corbin/Russwin: NGP.
 - 2. Glynn-Johnson: BLY.
 - 3. Hager: HAG.
 - 4. Ives: IVE.
 - 5. LCN Closers: LCN.
 - 6. Best: BES.
 - 7. Von Durprin: VON.
 - 8. Pemko: PEM
 - 9. B/O: supplied by other trades.
- F. Hardware Group Schedules

Hardware Group No. 2 - CR

For use on Door #(s):

Provide each SGL door(s) with the following:

QT		DESCRIPTION	CATALOG NUMBER		FINIS	MFR
Y					H	
1	EA	MORTISE CYLINDER	1E74		626	BES
1	EA	SURFACE CLOSER	4040XP REG OR PA AS REQ		689	LCN
			TBSRT			

BALANCE OF HARDWARE BY DOOR MANUFACTURER, CARD ACCESS SYSTEM AND CARD READER BY SECURITY SUPPLIER.

Martin County School District
 Warfield Elementary School
 Enhanced Security Project A2

Hardware Group No. 3 - CR

For use on Door #(s):

Provide each SGL door(s) with the following:

QT		DESCRIPTION	CATALOG NUMBER		FINIS	MFR
Y					H	
1	EA	POWER TRANSFER	EPT10		689	VON
1	EA	ELEC PANIC HARDWARE	QEL-9847-NL-OP-110MD 24 VDC		626	VON
1	EA	RIM CYLINDER	1E72		626	BES
1	EA	SURFACE CLOSER	4040XP EDA TBSRT		689	LCN
1	EA	POWER SUPPLY	PS902		LGR	VON

BALANCE OF HARDWARE BY DOOR MANUFACTURER, CARD ACCESS SYSTEM AND CARD READER BY SECURITY SUPPLIER.

Hardware Group No. 4 - RECEPTION, ASST.PRINCIPAL, IPS OFFICE

For use on Door #(s):

Provide each SGL door(s) with the following:

QT		DESCRIPTION	CATALOG NUMBER		FINIS	MFR
Y					H	
3	EA	HINGE	5BB1 4.5 X 4.5		652	IVE
1	EA	CLASSROOM SECURITY CYLINDRICAL LOCK	93K7IN 15D		626	BES
1	EA	SURFACE CLOSER	4040XP REG OR PA AS REQ TBSRT		689	LCN
1	EA	WALL STOP	WS406/407CCV		630	IVE
3	EA	SILENCER	SR64		GRY	IVE

Hardware Group No. 5 - CLINIC

For use on Door #(s):

Provide each SGL door(s) with the following:

QT		DESCRIPTION	CATALOG NUMBER		FINIS	MFR
Y					H	
2	EA	HINGE	5BB1HW 4.5 X 4.5		652	IVE
1	EA	ELECTRIC HINGE	5BB1HW 4.5 X 4.5 CON TW8		652	IVE
1	EA	POWER TRANSFER	EPT2		689	VON
1	EA	ELECTRONIC LOCK	93KW7DEU 15D		626	BES
1	EA	SURFACE CLOSER	4040XP REG OR PA AS REQ TBSRT		689	LCN
1	EA	WALL STOP	WS406/407CCV		630	IVE
3	EA	SILENCER	SR64		GRY	IVE

CR, CARD ACCESS SYSTEM AND CARD READER BY SECURITY SUPPLIER

Martin County School District
Warfield Elementary School
Enhanced Security Project A2

Door#	HwSet#
1-54A	4
1-56	5
1-57	4
1-62	4
A	2
B	3
C	3

END OF SECTION

SECTION 08 80 00
GLAZING

PART 1 GENERAL

1.1 RELATED DOCUMENTS:

- A. The provisions of the General Conditions, Supplementary Conditions, Drawings, Specifications and the Sections included under Division 1, General Requirements and References are included as a part of this Section as though bound herein.

1.2 SECTION INCLUDES

- A. Provide labor, materials, services, and equipment necessary to furnish and install work as indicated and as specified herein, which includes, but is not limited to:
 - 1. Glass and glazing

1.3 REFERENCES

- A. ASCE-7 – Minimum Design Loads for Buildings and other Structures
- B. ANSI Z97.1 – Safety Glazing Materials Used in Buildings - Safety Performance Specifications and Methods of Test
- C. ASTM C-162 – Standard Terminology of Glass and Glass Products
- D. ASTM C864 – Standard Specification for Dense Elastomeric Compression Seal Gaskets, Setting Blocks, and Spacers
- E. ASTM C920 – Standard Specification for Elastomeric Joint Sealants
- F. ASTM C1036 – Standard Specification for Flat Glass
- G. ASTM C1048 – Standard Specification for Heat-Treated Flat Glass - Kind HS, Kind FT Coated and Uncoated Glass
- H. ASTM C1172 – Standard Specification for Laminated Architectural Safety Glass
- I. ASTM C1349 – Standard Specification for Architectural Flat Glass Clad Polycarbonate
- J. ASTM C 1503 – Standard Specification for Silvered Flat Glass Mirror.
- K. ASTM E84 – Standard Test Method for Surface Burning Characteristics of Building Materials
- L. ASTM E152 – Methods for Fire Test of Door Assemblies
- M. ASTM E283 – Standard Test Method For Determining Rate of Air leakage Through Exterior Windows, Curtain Walls and Doors Under Specified Pressure Differences Across the Specimen
- N. ASTM E330 – Standard Test Method for Structural Performance of Exterior Windows, Doors, Skylights and Curtain Walls by Uniform Static Air Pressure Difference
- O. ASTM E1996 – Standard Specification for Performance of Exterior Windows, Curtain Walls, Doors and Impact Protective Systems Impacted by Windborne Debris in Hurricanes
- P. ASTM E2025 – Standard Test Method for Evaluating Fenestration Components and Assemblies for Resistance to Impact Energies
- Q. CPSC 16 CFR 1201 Safety Standards for Architectural Glazing Materials
- R. FBC – Florida Building Code
- S. GANA – Glazing Manual
- T. GANA Laminated Glazing Reference Manual
- U. FGMA – Sealant Manual
- V. NFPA 80 – Standard for Fire Doors and Fire Windows
- W. NFPA 252 – Standard Methods of Fire Test of Doors Assemblies
- X. NFPA 257 – Standards on Fire Test of Window and Glass Block Assemblies

1.4 SUBMITTALS

- A. Manufacturer's Data:
 - 1. Submit two-copies of manufacturer's specifications, and installation instruction for each type of glass, glazing sealant and compound, gasket and associated miscellaneous material required.
 - 2. Include manufacturer's published data, or letter of certification, or certified test laboratory report indicating that each material complies with the requirements and is intended generally for the applications shown.
 - 3. Show by transmittal that the Glazer distributed one copy of each recommendation and instruction.
 - 4. If Safety glass, provide two copies of manufacturer certification of the glass meeting the requirements of CPSC 16 CFR 1201.
- B. Samples: Submit two-samples 12" x 12" in size illustrating glass coloration.
- C. Manufacturer shall certify that product complies with large and small missile impact criteria and have been tested and conform to SSTD and ASTM, Miami-Dade County, TAS 201, 202, and 203.

1.5 SYSTEM PERFORMANCE REQUIREMENTS

- A. General: Provide glazing systems that are produced, fabricated, and installed to withstand normal thermal movement, wind loading, and impact loading, without failure including loss or glass breakage attributable to the following: defective manufacturer, fabrication, and installation; failure of sealants or gaskets to remain watertight and airtight; deterioration of glazing materials; and other defects in construction.
- B. Hurricane rated impact loading on exterior glazing.
- C. Deterioration of Laminated Glass: Defects developed from normal use that are attributed to the manufacturing process and not to causes other than glass breakage and practices for maintaining and cleaning laminated glass contrary to manufacturer's written instructions. Defects include edge separation, delamination materially obstructing vision through glass, and blemishes exceeding those allowed by referenced laminated-glass standard.
- D. Glass Design: Glass thicknesses as indicated are for detailing only. Confirm glass thicknesses by analyzing Project loads and in service conditions. Provide glass lites for the various size openings in the thicknesses and strengths (annealed or heat-treated) to meet or exceed the following criteria:
 - 1. Glass Thicknesses: Minimum glass thickness, nominally, of lites in exterior walls is 6.0 mm.
 - 2. Glass Thicknesses (Hurricane): Select minimum glass thicknesses to comply with ASTM E-1300, according to the following requirements and performance standards:
 - a. Specified Design Wind Loads: 140 mph.
 - b. Safety
 - i) CPSC Cat. I and II
 - c. Security
 - i) UL972
 - ii) Blast Resistance
 - d. Natural Disasters
 - i) Hurricane Small Missile (River Gravel #6 for impact)
 - ii) Hurricane Large Missile (2" x 4" timber weighing 9 lbs.)

- E. Specific hazardous locations: The following shall be considered specific hazardous locations for purposes of glazing.
 - 1. Glazing in ingress and means of egress doors.
 - 2. Glazing adjacent to a door and within the same wall plane as the door whose nearest vertical edge is within 24 inches of the door in a closed position and whose bottom edge is less than 60 inches above the floor or walking surface, unless an intervening interior permanent wall is between the door and the glazing.
 - 3. Glazing in fixed panels having a glazed area in excess of 9 square feet with the lowest edge less than 18 inches above the finish floor level or walking surface within 36 inches of such glazing, unless a horizontal member not less than 1-1/2 inches in width is located between 24 inches and 36 inches above the walking surface.
- F. Normal thermal movement results from the following maximum change (range) in ambient and surface temperatures acting on glass framing members and glazing components. Base engineering calculation on materials' actual surface temperatures due to both solar heat gain and nighttime sky heat loss.
 - 1. Temperature Change (Range): 120 deg F, ambient; 180 deg F, material surfaces.

1.6 LABELS

- A. Glass shall bear labels indicating the manufacturer, type and thickness, and a note "Do Not Remove Label".
- B. All safety glass shall at least a permanent label indicating manufacturer, type, thickness, and compliance with CPSC 16 CFR 1201.
- C. If temporary label, label is to remain on glass until District Building Inspection is complete, then removed and turned into the District Building Department.

1.7 GLASS BREAKAGE

- A. The glazing subcontractor shall be responsible for all glass broken, scratched, damaged, or defective and shall replace same at his expense.

1.8 QUALITY ASSURANCE

- A. Perform Work in accordance with FGMA Glazing Manual, FGMA Sealant Manual, SIGMA and Laminators Safety Glass Association - Standards Manual for glazing installation methods.
- B. Installer Qualifications: Company specializing in performing the work of this section with minimum 5-years documented experience.

1.9 WARRANTY

- A. General: Warranties specified in this Article shall not deprive the Owner of other rights the Owner may have under other provisions of the Contract Documents and will be in addition to and run concurrent with other warranties made by the Contractor under requirements of the Contract Documents.
- B. Manufacturer's Special Warranty on Laminated Glass: Written warranty made out to Owner and signed by laminated-glass manufacturer agreeing to furnish replacements for laminated glass units that deteriorate as defined in "Definitions" Article f.o.b. the nearest shipping point to Project Site, within specified warranty period indicated below:
 - 1. Warranty Period: Five years from date of Substantial Completion.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Primary Glass; provide products from one of the following:
 - 1. PPG, Ford City, Pennsylvania
 - 2. Guardian, Carleton, Michigan
 - 3. Visteon, Detroit, Michigan
 - 4. LOF, Toledo, Ohio
 - 5. AFG, Kingsport, Tennessee
 - 6. Wire Glass
 - a. Pilkington, Don Mills, Ontario, Canada
 - b. Asahi, Miami Beach, Florida
 - c. Nippon, Los Angeles, California
- B. Architectural Glass Fabricators; provide products from one of the following:
 - 1. Primary glass manufacturers
 - 2. Globe-Amerada Glass, Elk Grove Village, Illinois (laminated glass products)
 - 3. Interpane/Spectrum Glass Products, Deerfield, Wisconsin (high performance glass)
 - 4. HGP and affiliates, Moorestown, New Jersey (full line glass fabricator)
 - 5. Viracon, Owatonna, Minnesota (high performance glass et. al)
 - 6. Laminated Glass Corporation, Plymouth Meeting, Pennsylvania
 - 7. Glasstemp, Bensenville, Illinois (glass door manufacturer also)
 - 8. Perilstein Distributing Corporation (PDC), Cheswick, Pennsylvania
- C. Plastic Interlayer Manufacturers, provide products from one of the following:
 - 1. DuPont, Wilmington, Delaware.
 - 2. Saflex, St. Louis, Missouri.
- D. Products of other manufacturers will be considered for acceptance provided they equal or exceed the material requirements and functional qualities of the specified product. Requests for Architect's approval and complete technical data for evaluation must be received at least 14 days prior to bid due date. Additional approved manufacturers will be issued by Addendum.

2.2 GLASS STANDARDS

- A. General
 - 1. Unless indicated otherwise, reference numbers used throughout this Specification Section are from ASTM C 1036 and C 1048. When the end product involves one or more categories, both, the primary glass specifications and the specifications of the additional features or construction shall be met.
- B. Clear Float Glass: Type I (transparent glass, flat), Class 1 (clear), Quality q3 (glazing select).
- C. Tinted Float Glass: Type I (transparent glass, flat), Class 2 (tinted heat absorbing and light reducing), Quality q3 (glazing select). Final shade shall be Architect selected from the manufacturer's standards within the following range:
 - 1. Grey: Visible light transmittance of 41-43 percent and shading coefficient of 0.67 – 0.69 percent for ¼ inch thick glass.
 - 2. Medium Green: Visible light transmittance of 75 percent and shading coefficient of 0.69 percent for ¼ inch thick glass.
- D. Tempered Glass (Safety Glass): Condition C (other than coated glass), kind FT (fully tempered), complying with ANSI Z97.1, ASTM C 1036 and ASTM C 1048 and "Federal CPSC Standard 16 CFR 1201 Category II."

- E. Heat-Treated Float Glass: ASTM C1048; Type I (transparent glass, flat); Quality q³ (glazing select); class, kind, and condition as indicated in examples under Article 4-GLASS USAGE.
- F. Fire Rated Glazing: Shall be listed and labeled by Underwriters Laboratories.
- G. Laminated glass shall meet minimum requirements as specified in ASTM C 1036-85 and laminate shall comply with ANSI Z97.1-1984 CPSC 16 CFR 1201 Category II where required.

2.3 MIRROR GLASS

- A. Safety Glass Mirrors
 - 1. Tapeback: Provide annealed float glass mirrors with manufacturer applied safety tape applied to the back surface and complying with FS DD-G-1403, ANSI Z97.1-1984 CPSC 16 CFR 1201 Category II.
- B. Mirror Glass Production and Fabrication
 - 1. Glass coating: Coat second surface of glass, unless otherwise indicated, with glass coating system complying with FS DD-M-00411 requirements and consisting of successive layers of chemically deposited silver, electrically or chemically deposited copper, and manufacturer's standard protective organic coating.
- C. Mirror Sizes: After application of glass coating, cut mirror glass to sizes as shown on Drawings and in 1/4 inch glass thickness.
- D. Edges: Seal edges after treatment to prevent chemical or atmospheric penetration of backing. Perform edge treatment and sealing in factory immediately after cutting to final sizes.
- E. Provide CRL mirror mount system in satin anodized finish. Continuous top channel shall be two pieces, D1638 channel and D1637 cleat. Bottom and ends shall have D638 channel. System shall be as manufactured by C.R. Lawrence Company, Inc. (800-421-6144) or an approved equal.

2.4 GLASS USAGE

- A. Exterior Insulated (Hurricane) – Large and Small Impact Rated
 - 1. Glass for all exterior door storefront, exterior door lites, and window openings: 1-3/16 inch insulated laminated glass complying with the following:
 - a. Insulated laminated Lite 1-3/16" Laminate – ¼" Clear – 0.090" Clear PVB – ¼" Clear, ½" air space, ¼" Tinted, Low-E on #5 surface
 - b. Performance Characteristics
 - Thermal
 - Winter U-factor/U-Value (Btu/hr-ft²-F°): 0.28
 - Solar Heat Gain Coefficient: between .25 and .27
 - Optical
 - Visible Light Transmittance: between 32% and 36%
 - Visible Light Reflectance (outside): less than 9%
 - Visible Light Reflectance (inside): less than 7%
 - c. Laminated glass products to be fabricated in autoclave with heat, plus pressure, free of foreign substances and air pockets.
 - d. Interlayer material: Polyvinyl Butyral sheets
 - e. Tint: Colored tint as selected by the Architect.
 - f. Impact rated as required by FBC Product Approval System.
- B. Fire Rated Glass
 - 1. Shall meet the safety glazing requirements of CPSC 16 CFR 1201, and
 - 2. Have the proper fire rating for the assembly (see plans for assembly fire ratings).

- a. SAFTI – Superlite 1-W acceptable for Cat II location per CPSC
 - b. Pilkington – Pyroshield Plus acceptable for Cat I location per CPSC
 - c. Cat I location is glass area less than or equal to 9 SF, and Cat II is glass area greater than 9 SF.
3. All glass shall have label indicating fire rating and safety glazing rating.
- C. Interior
1. Glass for Vestibule Doors, Sidelights, and Transoms: 1/4 inch thick clear tempered glass.
 2. Glass for Interior Fire Rated Doors and Windows: 1/4 inch fire rated glazing, polished both sides.
 3. Glass for Interior Non-Fire Rated Doors and Windows: 1/4 inch clear tempered safety glass.
 4. Large Mirrors: Where indicated.

2.5 GLAZING GASKETS

- A. Polyvinyl Chloride Glazing Gaskets: Shall be extruded, flexible PVC gaskets of the profile and hardness shown or as required for watertight construction, complying with ASTM D2287.

2.6 MISCELLANEOUS GLAZING MATERIALS

- A. Setting Blocks: Neoprene, 70-90 Durometer hardness, with proven compatibility of sealants used.
- B. Spacers: Provide neoprene, 40-50 Durometer hardness, with proven compatibility of sealants used.
- C. Compressible Filler Rod: Shall be closed-cell or waterproof jacketed rodstock of synthetic rubber or plastic foam with proven compatibility with sealants used. Rod shall be flexible and resilient with 5-10 PSI compression strength for 25 percent deflection.
- D. Cleaners, Primers and Sealers: Type recommended by sealant or gasket manufacturer.

2.7 ACCESSORIES

- A. Aluminum T-Trim:
1. Extruded aluminum TEE model # E-11177 EA as manufactured by Eagle Mouldings. Trim shall be used around decorative glass at per detail 5/A3.5

2.8 OTHER MATERIALS

- A. Provide other materials not specifically described but required for a complete and proper installation.

PART 3 EXECUTION

3.1 INSTALLATION OF GLASS

- A. General Requirements:
1. Follow recommendations of the glass manufacturer and the sealant, gaskets and glazing materials manufacturer, except if the codes or listed references are more restrictive.
 2. Where a combination of sealing materials is required for glazing in the same frame, the manufacturer must certify that all glazing materials furnished are compatible with each other.

3. Where setting blocks and spacer shims require setting into a glazing compound or sealant, contractor may butter them with the compound or sealant, then place them in position and allow to firmly setting prior to installation of glass.
- B. Sash and Frame Preparation and Acceptance
1. Inspect all window sash, frames, and surrounds glazed under this section and notify the Contractor of any defects, improper materials, or workmanship of other conditions that will affect the satisfactory installation of glass.
 - a. Do not proceed with glazing until such conditions are acceptable.
 - b. Absence of notification, or the beginning of glazing, will indicate acceptance of all previously placed related work executed by other trades.
 2. Other trades will execute the following work; but before starting glazing work, the glazier shall verify compliance with the requirements listed.
 - a. That the sash and frames are firmly anchored in proper position, plumb and square within 1/8" nominal dimensions on approved shop drawings.
 - b. That the rivet, screw, bolt or nail heads, welding fillets and other projections are removed from glazing rabbets to provide the specified clearances.
 - c. That all corners and fabrication intersections are sealed and sash and frames are weather-tight.
 - d. That rabbets at seals weep to outside and all rabbets are of sufficient depth and width to receive the glass and provide the required overlap of the glass.
 - e. That all sealing surfaces of steel sash and frames are primer painted.
- C. Preparation of Glass and Rabbets:
1. Clean the sealing surfaces of glass and the sealing surfaces of rabbets and stop beads before applying any glazing compound or gaskets.
 2. Use only the approved solvents and cleaning agents recommended by the compound manufacturer.
- D. Positioning Glass:
1. Center in glazing in the frame and rabbet to maintain specified clearances at perimeter on all four sides.
 2. Maintain centered position of glass in rabbet and provide the required sealer thickness (1/8" maximum) on both sides of glass.
 3. Whenever glass dimensions are larger than 50 united inches, provide setting blocks at the sill and spacer shims on all four sides; locate setting blocks one-quarter way in from each end of glass.
- E. Stop Bead Glazing; Use Putty or Elastic Glazing Compound for bedding glass in hollow metal frames, except if otherwise specified in this document.
1. Apply ample back putty or compound to rabbet so that it will ooze out when pressing glass into position and completely cover glass in rabbet.
 - a. Place setting blocks and spacer shims as required, and press glass into position.
 2. Secure glass in place by the application of stop beads.
 - a. Bed stop beads against glass and bottom of rabbet with compound and/or putty, leaving proper thickness between glass and stop beads.
 - b. Secure stop beads in place with suitable fastenings.
 - c. Strip surplus compound or putty from both sides of glass and tool to provide clean sight lines.

3.2 REPLACEMENT AND CLEANING:

- A. Upon completion of work, all glass shall be free from cracks and other defects.
- B. Any defective or broken glass that may appear before acceptance or within the 1-year warranty period shall be removed and replaced with new glass without additional cost to the Owner; excepting glass which is broken by a specific cause relating to building occupancy not relating to this contract.
- C. Thoroughly wash and clean all glass upon completion of the work and just prior to occupancy of the building.

END OF SECTION

DIVISION

9

FINISHES

SECTION 09 22 16
NON-STRUCTURAL METAL FRAMING

PART 1 GENERAL

1.1 RELATED DOCUMENTS

- A. The provisions of the General Conditions, Supplementary Conditions, Drawings, Specifications and the Sections included under Division 1, General Requirements and References are included as a part of this Section as though bound herein.

1.2 SECTION INCLUDES

- A. Provide labor, material, services and equipment necessary to furnish and install work as indicated and as specified herein, which includes, but is not limited to:
 - 1. Non-load bearing metal studs, support framing, bridging, bracing, strapping, attachments and accessories required for complete partition walls, soffits, bulkheads, and ceiling assemblies as indicated.
 - 2. Area separation and shaft wall framing products.

1.3 RELATED SECTIONS

- A. Section 01 25 13 – Product Substitution Procedures.
- B. Section 01 31 00 – Project Coordination.
- C. Section 01 33 00 – Submittal Procedures.
- D. Section 01 43 39 – Mockups
- E. Section 01 45 00 – Quality Control.
- F. Section 01 66 00 – Product Storage and Handling Requirements.
- G. Section 01 78 00 – Closeout Submittals.
- H. Section 03 30 00 – Cast in Place Concrete.
- I. Section 05 40 00 – Cold-Formed Metal Framing.
- J. Section 09 29 00 – Gypsum Board.
- I. Section 09 22 26 – Suspension Systems.
- J. Section 09 22 36 – Lath.
- K. Section 09 23 00 – Gypsum Plastering.
- L. Section 09 22 39 – Veneer Plaster Base.
- M. Section 09 91 00 – Painting.

1.4 REFERENCES

- A. See Section 01 42 00 – References for additional reference standards, abbreviations, acronyms and definitions.
- B. AISI - Standard for Cold-Formed Steel Framing General Provisions.
- C. AISI - North American Specification (NASPEC) for the Design of Cold-Formed Steel Structural Members - 2001.
- D. American Society of Testing Materials (ASTM):
 - 1. ASTM A653/A653M-13: Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy Coated (Galvannealed) by the Hot-Dip Process

2. ASTM A780/A789M-09: Standard Practice for Repair of Damaged and Uncoated Areas of Hot-Dip Galvanized Coatings
 3. ASTM A1003/A1003M-15: Standard Specification for Steel Sheet, Carbon, Metallic- and Nonmetallic-Coated for Cold-Formed Framing Members
 4. ASTM C645-14: Standard Specification for Nonstructural Steel Framing Members
 5. ASTM C754-15: Standard Specification for Installation of Steel Framing Members to Receive Screw-Attached Gypsum Panel Products.
 6. ASTM C840-13: Specification for Application and Finishing of Gypsum Board.
 7. ASTM C1513-13: Standard Specification for Steel Tapping Screws for Cold-Formed Steel Framing Connections.
 8. ASTM E84-15a: Standard Test Method for Surface Burning Characteristics of Building Materials.
 9. ASTM E90-09: Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements.
 10. ASTM E119-14: Standard Test Methods for Fire Tests of Building Construction and Materials.
 11. ASTM E413-10: Classification for Rating Sound Insulation.
- E. Gypsum Association (GA): GA-600 - Fire Resistance Design Manual.
- F. Steel Stud Manufacturers Association (SSMA): Product Technical Guide, Current Edition).

1.5 DESIGN REQUIREMENTS

- A. Design steel in accord with American Iron and Steel Institute Publication "Specification for the Design of Cold-Formed Steel Structural Members", except as otherwise shown or specified.
- B. Design loads: As indicated on the Architectural Drawings. 5 PSF minimum design lateral load is required for interior walls by building code. Shaftwall framing minimum design lateral load is 15 PSF.
- C. Framing systems for interior non-load bearing walls shall withstand design loads for lateral deflections less than $L/180$.
- D. Framing system to accommodate deflection of primary building structure and construction tolerances.
- E. Fire-Test-Response Characteristics:
 1. For fire-resistance-rated assemblies that incorporate non-load-bearing steel framing, provide materials and construction identical to those tested in assembly indicated according to ASTM E119-14 by independent testing laboratory.
 2. Products used in assembly shall carry classification label from testing laboratory.
- F. Sound Transmission Characteristics (STC):
 1. For gypsum assemblies wall and ceilings with STC rated requirements, provide materials and construction methods that are identical to requirements of ASTM E90-09.
 2. Testing or inspection agencies shall be certified and independent organizations.

1.6 SUBMITTALS

- A. Comply with Section 01 33 00 – Submittal Procedures.
- B. Submit manufacturer's product literature and data sheets for specified products.
- C. Manufacturer's certification of product compliance with codes and standards.

1.7 QUALITY ASSURANCE

- A. Comply with Section 01 45 00 – Quality Control.
- B. Product manufacturers shall be current members of Steel Stud Manufacturers Association (SSMA).
- C. Provide full time quality control over fabrication and erection complying with applicable codes and regulations of government agencies having jurisdiction.
- D. Conduct pre-installation meeting to verify project requirements, substrate conditions, and manufacturer's installation instructions.
- E. Submit manufacturer's storage and product installation instructions.
- F. Submit documentation verifying materials and components are from single manufacturer.
- G. Installer shall submit qualifications demonstrating five consecutive years of installing specified products of similar and equivalent work scope.

1.8 MOCKUPS

- A. Comply with Section 01 43 39 – Mockups.
- B. Prepare 8' (2.44 m) x 8' (2.44 m) wall section where directed by Architect to demonstrate, quality of substrate framing, material application and finished gypsum board surface on one side of partition mockup.
- C. Do not proceed with additional work until mockup is approved by Architect.
- D. Mockup may be incorporated into finished work product providing mockup remains available for inspection until end of framing and gypsum board work.

1.9 DELIVERY, STORAGE AND HANDLING

- A. Comply with Section 01 66 00 – Product Storage and Handling Requirements.
- B. Notify manufacturer of damaged materials received prior to installing.
- C. Deliver materials in manufacturer's original, unopened, undamaged containers with identification labels intact.
- D. Store materials inside building, protected from exposure to water, wind or other harmful weather conditions.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Approved Manufacturer's:
 - 1. Clark Dietrich Building Systems, 9100 Centre Point Dr., Suite 210 West Chester, OH 45069; Tel: 513-870-1100, 800-543-7140; Fax: 513-870-874-1300; Website: www.clarkdietrick.com.
- B. Manufacturers listed below are approved providing their products are equal to those specified as basis of design:
 - 1. Marino/Ware, Inc., 400 Metuchen Rd., South Plainfield, NJ 07080; Tel: 1-800-627-4661, 908-757-9000; Fax: 908-753-8786; Website: www.marinoware.com.
- C. Requests for substitutions by other manufacturers will be considered in accord with Section 01 25 13 – Product Substitution Procedures.

2.2 MATERIALS

- A. Steel: Galvanized Steel meeting requirements of ASTM A1003/A1003M-15.
1. Coating: Galvanized G40 (Z120) coating minimum, complying with ASTM C645-14.

2.3 COMPONENTS

- A. Nonstructural Studs: Cold-Formed galvanized steel C-studs. Material: Galvanized steel meeting or exceeding the requirements of ASTM A754-15 for conditions indicated below:
1. Flange Length: 1.25" (32 mm) 125 flange, web depth 1-5/8" and 3-5/8" and as indicated on Drawings.
2. Minimum Material Thickness: Traditional 20ga or UltraSTEEL 20 EQ.
3. Punch Outs: 12" (305 mm) from base and every 48" (1219 mm) thereafter.
- B. Nonstructural Track: Cold-Formed galvanized steel runner tracks.
1. Flange Length: 1.25" (32 mm) T125 flange.
2. Web: Track web to match stud web size.
3. Minimum Material Thickness: Traditional 20ga or UltraSTEEL 20 EQ.
4. Minimum Material Thickness: Track thickness to match wall stud thickness.
- C. Deflection Track: Cold-Formed Deep Leg Runner Slip Track.
1. Leg Length: As required by design.
2. Minimum Material Thickness: To match stud thickness.
- D. Channel (CRC Cold Rolled Channel):
1. Size: 150U50-54, 1.5" (38 mm) 54mils (16 ga.).
- E. Furring Channel: Furring walls and suspended ceiling applications.
1. Size: 087F125-30 .875" (22 mm) Furring Channel 30 mils (20 ga Drywall).
2. Size: 087F125-33 .875" (22 mm) Furring Channel 33 mils (20 ga Structural).
3. Sizes and locations as indicated on Drawings.
- F. Resilient Channel: Cold-Formed Resilient Channel System to decrease sound transmissions.
1. Size: Two Leg .50" x 1.25" Resilient Channel.
- G. Area Separation Wall System: Lightweight non-load-bearing gypsum panel assembly designed to provide fire resistive protection at common walls, complying with ASTM C754-15 for conditions indicated.
- H. Drywall Corner Beads: Cold-Formed galvanized steel beads.
1. 103 USG Durabead Deluxe Metal Corner Bead 1.25" x 1.25" (32 mm x 32 mm).
- I. Drywall Trims: Cold-Formed galvanized steel trims.
1. U-Trim (Mudable) Size: .625" (15.9 mm).
2. J-Trim (Reveal) Size: .625" (15.9 mm).
- J. Framing Accessories: Accessories required in this project.
1. Flat Strapping for Backing Strip.
2. Flat Strapping and bridging for lateral bracing.
3. Angles.
4. SwiftClip Fixed Connection Angles.
- K. Fasteners: Self-drilling, self-tapping screws; complying with ASTM C1513-13 - Standard Specification for Steel Tapping Screws for Cold-Formed Steel Framing Connections.
- L. All Window & Door opening stud framing Studs: Cold-Formed galvanized steel C-studs. Material: Galvanized steel meeting or exceeding the requirements of ASTM A754-15 for conditions indicated below:

1. Flange Length: 1.25" (32 mm) 125 flange, web depth 1-5/8" and 3-5/8" and as indicated on Drawings.
 - a. Minimum Material Thickness: Traditional 18ga.
 - b. Punch Outs: 12" (305 mm) from base and every 48" (1219 mm) thereafter.
 - c. Double Studs at each jamb, sill & head of door & window openings.
- M. Touch-Up Paint:
 1. Comply with Section 09 91 00 – Painting.
 2. Comply with ASTM A780/A780M-09 (2015): Standard Practice for Repair of Damaged and Uncoated Areas of Hot-Dip Galvanized Coatings.

PART 3 EXECUTION

3.1 INSPECTION

- A. Inspect supporting substrates and structures for compliance of proper conditions for installation and performance of non-structural metal framing.

3.2 PREPARATION

- A. Prepare attachment surfaces for plumb, level, and proper alignment for accepting cold-formed structural framing.

3.3 FABRICATION

- A. Prior to fabrication of framing, submit product submittal sheets to Architect for approval.
- B. Framing components may be preassembled into panels prior to erecting. Prefabricate panels to be plumb and square, with components attached to prevent racking and minimizes distortion during lifting and transport.
- C. Cut framing components square for attachment to perpendicular members or as required for angular fit against abutting members.
- D. Plumb, align and securely attach studs to flanges of both upper and lower runners, except that for interior, non-load bearing walls where studs need not be attached to upper or lower runners.
- E. Splices in members other than top and bottom runner track are not permitted.
- F. Provide temporary bracing where required, until erection is complete.

3.4 INSTALLATION – NON-AXIAL LOAD-BEARING PARTITION WALLS

- A. Runners shall be securely anchored to supporting structure.
- B. Jack studs or cripples shall be installed below window sills, above window and door heads, and elsewhere to furnish supports.
- C. Lateral bracing shall be provided by use of gypsum board and gypsum sheathing, metal studs, or cold-rolled steel angles or channels.
- D. Provisions for structure vertical movement shall be provided where indicated.
- E. Partition walls shall extend to bottom of deck above floor, unless otherwise noted.
- F. Handling and lifting of prefabricated panels shall not cause distortion in members.

3.5 PROTECTION

- A. Protect installed products until completion of project.
- B. Touch-up, repair or replace damaged products before substantial completion of final installation.

END OF SECTION

SECTION 09 29 00
GYPSUM BOARD SYSTEM

PART 1 GENERAL

1.1 RELATED DOCUMENTS

- A. The provisions of the General Conditions, Supplementary Conditions, Drawings, Specifications and the Sections included under Division 1, General Requirements and References are included as a part of this Section as though bound herein.

1.2 SECTION INCLUDES

- A. Provide labor, materials, services, and equipment necessary to furnish and install work as indicated and as specified herein, which includes, but is not limited to:
 - 1. Gypsum Board Partition Systems
 - 2. Gypsum Board Accessories
 - 3. Joint Treatment
 - 4. Textured Finish

1.3 REFERENCES

- A. ASTM C36/C36M – Standard Specification for Gypsum Wallboard
- B. ASTM C79/C79M – Standard Specification for Treated Core and Non-treated Core Gypsum Sheathing Board
- C. ASTM C442/C442M – Standard Specification for Gypsum Backing Board and Coreboard, and Gypsum Shaftliner Board
- D. ASTM C475 – Standard Specification for Joint Compound and Joint Tape for Finishing Gypsum Board
- E. ASTM C630/C630M – Standard Specification for Water Resistant Gypsum Backing Board
- F. ASTM C645 – Standard Specification for Nonstructural Steel Framing Members
- G. ASTM C754 – Standard Specification for Installation of Steel Framing Members to Receive Screw Attached Gypsum Panel Products
- H. ASTM C931/C931M - Standard Specification for Exterior Gypsum Soffit Board
- I. ASTM E695 – Standard method for Measuring Relative Resistance of Wall, Floor, and Roof Construction to Impact loading
- J. ASTM D3273 – Standard Test Method for Resistance to Growth of Mold on the Surface of Interior Coatings in an Environmental Chamber
- K. ASTM D5420 – Standard Test Method for Impact Resistance of Flat Rigid Plastic Specimen By Means of a Striker Impacted by Falling Weight (Gardner Impact)
- L. ASTM E119 – Standard Test Methods for Fire Tests of Building Construction and Materials
- M. ASTM C840 – Standard Specification for the Application and Finishing of Gypsum Board
- N. GA 201 – Using Gypsum Board for Walls and Ceilings
- O. GA-216 – Recommended Specifications for the Application and Finishing of Gypsum Board
- P. GA-600 – Fire Resistance Design Manual
- Q. Florida Building Code (FBC)

1.4 SUBMITTALS

- A. Product Data: Submit manufacturer's product data sheets and printed installation instructions for each product or system proposed for use.
- B. Product Data: Unless otherwise indicated, submit the following for each type of product provided under work of this Section:
 - 1. Recycled Content:
 - a. Indicate recycled content; indicate percentage of pre-consumer and post-consumer recycled content per unit of product.
 - b. Indicate relative dollar value of recycled content product to total dollar value of product included in project.
 - c. If recycled content product is part of an assembly, indicate the percentage of recycled content product in the assembly by weight.
 - d. If recycled content product is part of an assembly, indicate relative dollar value of recycled content product to total dollar value of assembly.
 - 2. Local/Regional Materials: (*Provide materials extracted/harvested and manufactured within a 500 mile radius from the project site.*)
 - a. Sourcing Location(s): Indicate location of extraction, harvesting, and recovery; indicate distance between extraction, harvesting, and recovery and the project site.
 - b. Manufacturing Location(s): Indicate location of manufacturing facility; indicate distance between manufacturing facility and the project site.
 - c. Product Value: Indicate dollar value of product containing local/regional materials; include materials cost only.
 - d. Product Component(s) Value: Where product components are sourced or manufactured in separate locations, provide location information for each component. Indicate the percentage by weight of each component per unit of product.
 - 3. VOC Data: Submit manufacturer's product data for joint compounds. Indicated VOC limits of the product. Submit MSDS highlighting VOC limits.
- C. Submit environmental data in accordance with Table 1 of ASTM E2129 for products provided under work of this Section.

1.5 QUALITY ASSURANCE

- A. Perform gypsum board systems work in accordance with recommendations of ASTM C754, C840, and GA-216 except as otherwise specified in this Section.
- B. Regulatory Requirements:
 - 1. Fire-rated Assemblies: Listed and rated by Underwriter's Laboratories, Inc. or generic fire resistance ratings listed in GA-600.
 - 2. Fire-Hazard Classification: Listed and labeled by Underwriter's Laboratories, Inc.

1.6 COORDINATION

- A. Prior to and during installation, coordinate with work of other trades to facilities required openings and finishes.
- B. Conduct pre-construction meeting with drywall contractor, architect, owner, project coordinator, and others involved with process.

1.7 DELIVERY, STORAGE AND HANDLING

- A. Store the material off the floor in dry area to prevent damage from moisture or excessive handling.
- B. Follow manufacturer's requirements for on site storage and handling of materials.

1.8 PROJECT CONDITIONS

- A. Environmental Conditions, General: Establish and maintain environmental conditions for applying and finishing gypsum board to comply with ASTM C840 and with gypsum board manufacturer's recommendations.
- B. Room Temperatures: For non-adhesive attachment of gypsum board to framing, maintain not less than 40 degrees F. For adhesive attachment and finishing of gypsum board, maintain not less than 50 degrees F. for 48 hours prior to application and continuously after until dry. Do not exceed 95 degrees F. when using temporary heat sources.
- C. Ventilation: Ventilate building spaces, as required, for dry joint treatment materials. Avoid drafts during hot dry weather to prevent finishing materials from drying too rapidly.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturer shall be one of the following however products of other manufacturers will be considered for acceptance provided they equal or exceed the material requirements and functional qualities of the specified product.
 - 1. National Gypsum Corp.
 - 2. U.S. Gypsum Corp.
 - 3. Georgia-Pacific Corp.
- B. All gypsum board products shall have minimum mold growth ASTM D3273 rating of 10.
- C. Do not use drywall manufactured in China.

2.2 MATERIALS

- A. Furring Channels: USG metal stud channel, 1½" deep, roll-formed sections of 20-ga galvanized steel, ASTM C645.
- B. Gypsum Wallboard (General and above 8' AFF): ½" thick, ASTM C36/C36M, tapered edge, fire rated Type X. (Note: At radius walls the Contractor has the option to install ¼" and/or ⅜" thick gypsum wallboard in layers.)
- C. Gypsum Wallboard (Corridors, stairways, cafeteria, stage, and gymnasium up to at least 8' AFF minimum): Abuse resistant brand, ½" thick, ASTM C36/C36M, tapered edge, fire rated Type X. (Note: At radius walls the Contractor has the option to install ¼" and/or ⅜" thick gypsum wallboard in layers.)
 - 1. Acceptable abuse resistant drywall:
 - a. Fiber Rock VHI by USG
 - b. Or approved equal.
- D. Sound Absorbing Board: Acoustically enhanced gypsum board shall be 5/8" thick, Type "X" sound break as manufactured by National Gypsum Co. or approved equal. Gypsum board shall be moisture resistant and comply with ASTM D 3273, score of 10 and comply with ASTM G21, score of 0.
- E. Water Resistant Gypsum Wallboard: ½" thick, tapered edge.

1. Provide at "wet" areas (areas subject to contact with water), as shown on plans.
- F. Cementitious backer board for tile and wet locations: Complying with ANSI A118.9 of thickness indicated and in maximum lengths available to minimize end-to-end butt joints. Ends and edges shall be square cut and finished smooth; formed in a continuous process of aggregated Portland cement slurry; and reinforced with vinyl coated, woven glass-fiber mesh embedded in both surfaces.
 1. Thickness: Manufacturer's standard thickness, but not less than 7/16 inch, unless otherwise indicated.
 2. Products: Subject to compliance with requirements, provide one of the following products:
 - a. Wonderboard Multi-Board; Custom Building Products.
 - b. DonCrete Cementitious Tile Backer Board; Domtar Gypsum.
 - c. Durock Cement Board; United States Gypsum Co.
- G. Exterior Gypsum Soffit Board: 5/8" "DensGlass Gold Fireguard" complying with ASTM C1177.
- H. Gypsum Backing Board: Standard or Fire Rated type, square edges, ASTM C442/C442M.
- I. Gypsum Sheathing 5/8" thick exterior water resistant board for metal framing systems with book tongue and grooved edges.
 1. Acceptable product shall be DensGlass Gold Exterior Guard, or similar product by other approved manufacturers in 2.1 of this section.
- J. Recycled Content: Provide post-consumer recycled or pre-consumer recycled content.

2.3 MISCELLANEOUS MATERIALS

- A. Joint treatment materials and adhesives shall be as recommended by the gypsum board manufacturer. Joint tape shall be paper-reinforcing tape, unless otherwise recommended by gypsum board manufacturer for use with setting type compound.
 1. Setting Type Joint Compounds for Gypsum Board: Factory packaged, job mixed, and chemical hardening powder products formulated for use indicated.
 - a. Where setting type joint compounds are indicated as a taping compound only or for taping and filling only, use formulation that is compatible with other joint compounds applied over it.
 - b. For prefilling gypsum board joints, use formulation recommended by gypsum board manufacturer.
 - c. For filling joints and treating fasteners of water resistant gypsum backing board behind base for ceramic tile, use formulation recommended by gypsum board manufacturer.
 - d. Drying Type Joint Compounds for Gypsum Board: Factory packaged vinyl based products complying with the following requirements for formulation and intended use.
 - e. Ready Mixed Formulation: Factory mixed product.
 - 1) Topping compound formulated for finish (third) coats.
 - 2) All-purpose compound formulated for topping compound.
 - f. Toxicity/IEQ: Sheetrock Join Tape. Paper; fiberglass joint tape not permitted.
- B. Joint Compound for Cementitious Backer Board: Material recommended by cementitious backer unit manufacturer.
 1. Toxicity/IEQ: Lime compound. All purpose joint and texturing compound containing inert fillers and natural binders. Pre-mixed compounds shall be free of antifreeze, vinyl adhesives, preservatives, biocides, and other slow releasing compounds.
- C. Joint compound for gypsum sheathing board. G.P. setting type joint compound.
 1. Toxicity/IEQ: Lime compound. All purpose joint and texturing compound containing inert fillers and natural binders. Pre-mixed compounds shall be free of antifreeze, vinyl adhesives, preservatives, biocides, and other slow releasing compounds.

- D. Joint Tape for Cementitious Backer Board: Polymer-Coated, open glass-fiber mesh recommended by cementitious backer unit manufacturer.
 - 1. Toxicity/IEQ: Sheetrock Joint Tape, Paper: fiberglass joint tape not permitted.
- E. Screws for Gypsum Board (ASTM C1002): Phillips head galvanized steel Type "S" or "S-12" self-drilling screws, length and type as required and recommended by gypsum board manufacturer.
- F. Screws for Gypsum Sheathing Board.
 - 1. Type S-12, Bugle head, self-tapping, rust-resistant, fine tread for heavy gauge steel.
 - 2. Type S, bugle head, rust resistant, sharp point, and fine thread for light gauge steel or furring.
- G. Accessories for Interior Installation: Corner bead, edge trim, and control joints complying with ASTM C1047 and requirements indicated below:
 - 1. Material: Formed metal with metal complying with the following requirements:
 - a. Steel sheet zinc coated by hot-dip or electrolytic process, or steel sheet coated with aluminum or rolled zinc.
 - b. Do not use plastic accessories.
 - 2. Shapes indicated below by reference Figure 1 designations in ASTM C1047:
 - a. Corner bead on outside corners, unless otherwise indicated.
 - 1) Product shall be similar to "Dur-A-Bead Corner Bead (103)"; USG or as approved by board manufacturer and Architect.
 - b. L-bead with face flange only; face flanged formed to receive joint compound. Use L-beads for edge trim (perimeter relief).
 - 1) Product shall be similar to "No. 200-B Metal Trim"; USG or as approved by board manufacturer and Architect.
 - c. One-piece control joint formed with V-shaped slot and removable strip covering slot opening.
 - 1) Product shall be similar to "No. 093 Control Joint"; USG or as approved by board manufacturer and Architect.
- H. Sheathing Tape: 2-1/2 inch wide, 10 by 10 self-adhering fiberglass reinforced joint tape like No. 8086 Contractor Sheathing Tape as produced by the 3M Company of St. Paul, Minnesota.
- I. Spot Grout: ASTM C475, setting type joint compound recommended for spot grouting hollow metal doorframes.
- J. Texture Compound: Acrylic texture coating DS4000 as manufactured by TWI.
- K. Asphalt Saturated Organic Felt: ASTM D 226, Type I (No. 15 asphalt felt), nonperforated.
- L. Foam Gaskets: Closed cell vinyl foam adhesive backed strips that allow fastener penetration without foam displacement, 1/8 inch thick, in width to suit metal stud size indicated.
- M. Gypsum board sheathing sealants, caulk, tape:
 - 1. Don Corning 795 or equivalent; Pecora 895 or equivalent
 - 2. Borden HPPG Elmer's siliconized acrylic latex caulk or equivalent.
 - 3. 2" wide 10 x 10 glass mesh quick tape or equivalent.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Examine adjacent construction for conditions that prevent proper installation of drywall systems.
- B. Do not proceed until defects are corrected.

3.2 METAL FRAMING INSTALLATION

- A. General:
 - 1. Install metal framing in accordance with ASTM C754 except as otherwise specified.
 - 2. Install the members true to line and level to provide surface flatness with maximum variation of 1/8" in 10' in any direction.
 - 3. Install metal studs at 16" o.c. unless noted otherwise.
- B. Metal Furring Channels
 - 1. Secure to masonry walls and around door and window openings, intersections, and corners with low velocity power driven anchors.
 - 2. Install metal furring at 16" o.c. vertically.
 - 3. Extend furring on exterior walls full height of wall.

3.3 GYPSUM BOARD SYSTEM INSTALLATION

- A. Gypsum Board Application and Finishing Standards: Install and finish gypsum panels to comply with ASTM C840 GA -201, GA-216 and GA-600.
- B. Work shall be provided in accordance with the manufacturer's printed instructions and as specified herein. Where fire rating requirements for systems are indicated on the Drawings or in the schedules, install components in accordance with manufacturer's instructions to comply with indicated fire rating requirements.
- C. Wallboard joints shall be butted tightly together. Maximum allowable gap at end joints shall be 1/8 inch. Support end joints on framing members.
 - 1. On partitions/walls apply gypsum panels vertically, unless parallel application is required for fire-resistive-rated assemblies. Use maximum length panels to minimize end joints.
 - 2. Install ceiling boards in direction, either parallel or perpendicular to framing members, which results in the least number of joints. Install in maximum practical lengths to span with minimum number of end (butt) joints. Stagger end joints of adjoining boards.
 - 3. Where ceiling or walls consist of 2 layers, face layer shall be installed perpendicular to base layer. Base layer to be screw attached and face layer to be strip laminated per manufacturer's instructions and screw attached to base layer in accordance with gypsum board application and finishing standards. Lay out joints so that tapered edges do not align with edges of openings.
 - 4. Fire Rated Walls: Construct required rated wall using thickness of Type "X" gypsum board required by code, installed to code requirements.
 - 5. Do not attach wallboard to head track.
 - 6. Provide a minimum of 1/4 inch perimeter relief where board abuts different materials. Trim edges with U-bead edge trim, where edges of gypsum panels are exposed. Seal joints between edges and abutting structural surfaces with acoustical sealant.
 - 7. Provide no less than 1/4", nor more than 3/8", space at bottom of board above floor.
- D. Wall Tile Substrates: For substrates indicated to receive thin-set ceramic tile and similar rigid applied wall finishes, comply with the following:
 - 1. Install cementitious backer units where tile is to be installed to comply with ANSI A108.11. Refer to Tile Specification.
- E. Soffits and Ceilings: Apply exterior gypsum soffit board panels perpendicular to supports, with end joints staggered over supports. Install with 1/4 inch open space where panels abut other construction or structural penetrations.
 - 1. Fasten with corrosion-resistant screws.

- F. Openings cut in gypsum board to fit electrical outlets, plumbing, and piping shall fit snugly and shall be small enough to be covered by plates and escutcheons. Both face and back paper shall be cut for cutouts that are not made by use of a saw.
- G. Fasteners: Install fasteners no closer than 3/8 inch to end or edge. Space fasteners approximately 7 inches o.c., opposite each other on adjacent ends or edges. Begin fastening from center of wallboard and proceed toward outer end or edges.
- H. Apply pressure on gypsum board, adjacent to fasteners being driven, to ensure that gypsum board will be secured tightly to framing member. Check for looseness at fasteners. Drive fastener with shank reasonably perpendicular to face of board.
- I. Drive screws with power screwdriver as recommended by gypsum board manufacturer. Surface of head shall be below surface of paper without cutting paper.
- J. Joint and corner treatment shall be in accordance with the manufacturer's printed instructions to provide a finished surface, ready for painting. Surface shall be free of dimples, excess finishing compound, ridges, or untrue corners.
 - 1. Install edge trim where edge of gypsum panels would otherwise be exposed or semi-exposed. Provide edge trim type with face flange formed to receive joint compound except where other types are indicated.
- K. Provide control joints in gypsum board partitions, bulkheads, ceilings, and soffits as follows:
 - 1. Partition, furring, or column fireproofing abuts a structural element (except floor) or dissimilar wall or ceiling.
 - 2. Ceiling or soffit abuts a structural element, dissimilar wall or partition or other vertical penetration.
 - 3. Construction changes within plane of partition or ceiling.
 - 4. Partition or furring run exceeds 40 feet, unless noted otherwise.
 - 5. Ceiling dimensions exceed 50 feet in either direction.
 - 6. Exterior soffits exceed 30 feet in either direction.
 - 7. Wings of "L", "U", and "T"-shaped ceiling areas are joined.
 - 8. Expansion or control joints occur in the exterior wall.
 - 9. Less than ceiling height frames should have control joints extending to the ceiling from both corners. Ceiling height door frames may be used as control joints. Treat window openings in same manner as doors.
 - 10. USG Control Joint No. 093: Apply over face of gypsum board where specified. Cut to length with a fine-toothed hacksaw (32 teeth per inch). Cut end joints square, butt together, and align to provide neat fit. Attach control joint to gypsum board with fasteners spaced 6 inches o.c. maximum along each flange. Remove plastic tape after finishing with joint compound or veneer finish.
 - a. Leave a 1/2 inch continuous opening between gypsum boards for insertion of surface-mounted joint.
 - b. Interrupt wood floor and ceiling plates with a 1/2 inch gap, wherever there is a control joint in the structure.
 - c. Do not attach gypsum board to steel studs on one side of control joint.
 - d. Provide separate supports for each control joint flange.
 - e. Provide an adequate seal behind control joint where sound or fire ratings are prime considerations.
- L. Maximum variation in flatness required is 1/8" in 10'.
- M. Install sound-attenuation blankets, where indicated, prior to installing gypsum panels unless blankets are readily installed after panels have been installed on one side.
- N. Install ceiling board panels across framing to minimize the number of abutting end joints and to avoid abutting end joints in the central area of each ceiling.
 - 1. Stagger abutting end joints of adjacent panel not less than one framing member.

- O. Install gypsum panels with face side out.
 - 1. Do not install imperfect, damaged, or damp panels.
 - 2. Butt panels together for a light contact at edges and ends with not more than $\frac{1}{16}$ " of open space between panels.
 - 3. Do not force into place.
 - 4. Install all wall board with $\frac{1}{4}$ " to $\frac{1}{2}$ " separation from floor surface in accordance with manufacture's recommendation.
- P. Locate both edge or end joints over supports, except in ceiling applications where providing intermediate supports or gypsum board back blocking behind end joints.
 - 1. Do not place tapered edges against cut edges or ends.
 - 2. Stagger vertical joints on opposite sides of partitions.
 - 3. Avoid joints other than control joints at corners of framed openings where possible.
- Q. Attach gypsum panels to steel studs so leading edge or end of each panel is attached to open (unsupported) edges of stud flanges first.
- R. Attach gypsum panels to framing provided at openings and cutouts.
- S. Spot grout hollow metal doorframes for solid-core wood doors, and hollow metal doors.
 - 1. Apply spot grout at each jamb anchor clip and immediately insert gypsum panels into frames.
- T. Form control and expansion joints at locations indicated and as detailed, and as recommended by manufacturer with space between edges of adjoining gypsum panels, as well as supporting framing behind gypsum panels.
- U. Cover both faces of steel stud partition framing with gypsum panels in concealed spaces (above ceilings, etc.), except in chases braced internally.
 - 1. Except in concealed applications indicating or requiring sound, fire, air, or smoke ratings, may use scraps of not less than 8 s.f. in.
 - 2. Fit gypsum panels around ducts, pipes, and conduits.
 - 3. Where partitions intersect open concrete coffers, concrete joists, and other structural members projecting below underside of floor/roof slabs and decks, cut gypsum panels to fit profile formed by coffers, joists, and other structural members; allow $\frac{1}{4}$ " - $\frac{3}{8}$ " wide joints to install sealant.
- V. Isolate perimeter of non load-bearing gypsum board partitions at structural abutments, except floors, as detailed.
 - 1. Provide ($\frac{1}{4}$ " - $\frac{1}{2}$ " wide spaces at these locations and trim edges with U-bead edge trim where edges of gypsum panels are exposed.
 - 2. Seal joints between edges and abutting structural surfaces with acoustical sealant.
- W. In STC-rated gypsum board assemblies, seal construction at perimeters, behind control and expansion joints, openings, and penetrations with a continuous bead of acoustical sealant at both faces of the partitions.
 - 1. Comply with ASTM C 919 and manufacturer's recommendations for location of edge trim and closing off sound-flanking paths around or through gypsum board assemblies, including sealing partitions above acoustical ceilings. Contractor to coordinate with all required fire/smoke rated separations.
- X. Space the fasteners in gypsum panels according to GA-216, finishing standard, and manufacturer's recommendations.

3.4 ACCESSORIES INSTALLATION

- A. Corner Beads: Install on external corners, with screws spaced 8" o.c. both sides.
- B. Trim: Install over face-layer gypsum board with fasteners spaced 8" o.c. Install where gypsum board surfaces meet dissimilar surfaces and at other detailed locations.

- C. Corner beads and trim may be either galvanized metal or plastic.

3.5 JOINT TREATMENT

- A. Treat joints, interior angles, fastener depressions, and finishing trim on face-layer gypsum board, including gypsum board in ceiling plenums.
- B. Pre-fill, tape, fill, and finish in accordance with manufacturer's directions.
- C. Apply a thin skim coat of joint compound over entire surface of gypsum board.
- D. Sand finish coat and leave surfaces smooth, uniform, and free of fins, depressions, cracks and other imperfections.
- E. Provide draft stopping in any concealed or furred space of the extruded insulation at the ceiling line and horizontally and vertically at 10'-0" o.c. maximum spacing. Provide at locations where interior wall(s) intersect or abut the exterior wall, at no more than 10' intervals in large rooms with walls over 20', and as required by FBC.
 - 1. Draft stopping may be ½" drywall, solid minimum 22-gauge metal strip, or ½" minimum mineral wool.
 - 2. Anchor draft stopping independent of the extruded insulation.
- F. Finish level shall be as indicated:
 - a. All spaces: level 4 with textured finish unless noted otherwise.

3.6 FINISHING GYPSUM BOARD ASSEMBLIES

- A. Levels of Finish: The following levels of finish are established as a guide for specific final finishes in accordance with GA-214.
 - 1. Level 0: No taping, finishing, or accessories required. This level of finish shall be used in temporary construction only.
 - 2. Level 1: Joints and interior angles shall have tape embedded in joint compound. Surface shall be free of excess joint compound. Tool marks and ridges are acceptable. This finish level shall be used in plenum areas above ceilings, in attics, in areas where the assembly is concealed.
 - 3. Level 2: Joints and interior angles shall have tape embedded in joint compound, and one separate coat of joint compound applied over joints, angles, fastener heads, and accessories. Surface shall be free of excess joint compound. Tool marks and ridges are acceptable. This finish level shall be used where water resistant gypsum backing board (ASTM C630) is used as a substrate for tile only.
 - 4. Level 3: Joints and interior angles shall have tape embedded in joint compound, and two separate coats of joint compound applied over joints, angles, fastener heads, and accessories. Joint compound shall be smooth and free of tool marks and ridges. Note: It is recommended that the prepared surface be coated with a primer/sealer prior to the application of final finishes. See painting/wall covering specification in this regard. This final level shall be used in areas that are to receive heavy textured, thick (1/8 inch or greater) wall coverings.
 - 5. Level 4: Joints and interior angles shall have tape embedded in joint compound, and three separate coats of joint compound applied over joints, angles, fastener heads, and accessories. Joint compound shall be smooth and free of tool marks and ridges. Note: Prepare surface to be coated with a primer/sealer prior to the application of final finishes. This finish level shall be used where textured finishes, wall coverings, and painted (flat or eggshell) finishes are to be applied.

6. Level 5: Joints and interior angles shall have tape embedded in joint compound and three separate coats of joint compound applied over joints, angles, fastener heads, and accessories. A thin skim coat of joint compound, or a material manufactured especially for this purpose, shall be applied to the entire surface. The surface shall be smooth and free of tool marks and ridges. Note: Prepare surface to be coated with a primer/sealer prior to the application of finish paint. This finish level shall be used with semi-gloss or gloss painted finishes and where indicated on the Room Finish Schedule.
- B. Use the following joint compound combination as applicable to the finish levels specified:
1. Embedding and First Coat: Setting type joint compound. Fill (Second) Coat: Setting type joint compound. Finish (Third) Coat: Ready mixed, drying type, all purpose or topping compound.

3.7 SITE ENVIRONMENTAL PROCEDURES

- A. Indoor Air Quality:
1. Temporary ventilation: Provide temporary ventilation for work of this Section.
 2. Multi-layer gypsum board: Screw attachment. Adhesive attachment will not be permitted.
- B. Waste Management: As specified.
- C. Select panel sizes and layout panels to minimize waste; reuse cut offs to the greatest extent possible.

END OF SECTION

SECTION 09 51 23
ACOUSTICAL TILE CEILINGS

PART 1 GENERAL

1.1 RELATED DOCUMENTS

- A. The provisions of the General Conditions, Supplementary Conditions, Drawings, Specifications and the Sections included under Division 1, General Requirements and References are included as a part of this Section as though bound herein.

1.2 SECTION INCLUDES

- A. Provide labor, material, services and equipment necessary to furnish and install work as indicated and as specified herein, which includes, but is not limited to:
 - 1. Ceiling tiles, metal grid, ceiling suspension system and related accessories required for complete and functioning ceiling system.
 - 2. Removal and recycling of existing acoustical tile ceilings in renovation projects.

1.3 RELATED SECTIONS

- A. Section 01 25 13 – Product Substitution Procedures.
- B. Section 01 31 00 – Project Coordination.
- C. Section 01 33 00 – Submittal Procedures.
- D. Section 01 42 00 – References.
- E. Section 01 45 00 – Quality Control.
- F. Section 01 74 00 – Cleaning and Waste Management.
- G. Section 01 78 00 – Closeout Submittals.
- H. Section 04 22 00 – Concrete Unit Masonry.
- I. Section 09 21 00 – Plaster and Gypsum Board Assemblies.
- J. Section 09 22 00 – Supports for Plaster and Gypsum Board.
- K. Section 23 37 00 – Air Outlets and Inlets.
- L. Section 26 09 23 – Lighting Control Devices.
- L. Section 26 51 00 – Interior Lighting.
- M. Section 27 60 00 – Sound reinforcement System.

1.4 REFERENCES

- A. Comply with Section 01 42 00 – References for additional reference standards, abbreviations, definitions and acronyms.
- B. American Society of Testing Materials (ASTM):
 - 1. ASTM C423-09: Sound Absorption and Sound Absorption Coefficients by the Reverberation Room Method
 - 2. ASTM C635-13: Standard Specification the Manufacture, Performance, and Testing of Metal Suspension Systems for Acoustical Tile and Lay-in Panel Ceilings.
 - 3. ASTM C636-13: Recommended Practice for Installation of Metal Ceiling Suspension Systems for Acoustical Tile and Lay-in Panels
 - 4. ASTM C641-09: Specification for Steel Sheet, Zinc-Coated (galvanized) Carbon Steel Wire

5. ASTM A653-13: Specification for Steel Sheet, Zinc-Coated (galvanized) or Zinc-Iron Alloy-Coated (galvanized) by the Hot-Dip Process
 6. ASTM E84-14: Test Method for Surface Burning Characteristics of Building Materials
 7. ASTM E119-12a: Standard Test Method for Fire Test of Building Construction and Materials
 8. ASTM E795-05(12): Standard Practice for Mounting Test Specimens During Sound Absorption Tests
 9. ASTM E1264-08e1: Standard Classification of Acoustical Ceiling Products
 10. ASTM E1414-11a: Standard Test Method for Airborne Sound Attenuation Between Rooms Sharing a Common Ceiling Plenum
 11. ASTM E1477-98a (2013): Standard Test Method for Luminous Reflectance Factor of Acoustical Materials by Use of Integrating Sphere Reflectometer
- C. Ceilings and Interior Systems Contractors Association (CISCA):
1. Acoustical Ceilings: Use and Practice.
 - B. Ceiling Systems Handbook.
- D. International Organization of Standardization (ISO):
1. ISO 11654:1997 – Sound Absorbers for use in Buildings – Rating of Sound Absorption
 2. ISO 14024:1999 – Environmental Labels and Declarations- Type I Environmental Labeling – Principles and Procedures
 3. ISO 14025:2006 – Environmental Labels and Declarations- Type III Environmental Labeling – Principles and Procedures
- E. Underwriter’s Laboratories (UL): Fire Resistance Directory and Building Material Directory

1.5 SUBMITTALS

- A. Comply with Section 01 33 00 – Submittal Procedures.
- B. Submit product data for each type of product specified.
- C. Submit samples for verification purposes of each type of exposed finish required, prepared on samples of size indicated below and of same thickness and material indicated for final unit of Work.
- D. Where finishes involve normal color and texture variations, include sample sets showing full range of variations expected.
- E. Submit 150 mm (6") square samples of each acoustical panel type, pattern, and color.
- F. Submit two (2) 300 mm (12") long samples of exposed suspension system members, including moldings, for each color and system type required.

1.6 QUALITY ASSURANCE

- A. Comply with Section 01 45 00 – Quality Control.
- B. Comply with CISCA “Ceiling Systems Handbook” and “Acoustical Ceilings: Use and Practice.
- C. Fire Performance Characteristics: Provide acoustical ceilings in accord with ASTM indicated:
 1. ASTM E 84-14: Flame Spread of 25 or less, and Smoke Developed of 50 or less.
 2. ASTM E 1264-08e1: Tile products rated Class A.
- D. Single Source Responsibility for Ceiling Units: Obtain each type of acoustical ceiling unit from a single source with resources to provide products of consistent quality in appearance and physical properties without delaying progress of Work.

- E. Single Source Responsibility for Suspension System: Obtain each type of suspension system from single source with resources to provide products of consistent quality in appearance and physical properties without delaying progress of Work.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Comply with Section 01 66 00 – Product Storage and Handling.
- B. Deliver acoustical ceiling units and suspension system components to Project site in original, unopened packages and store in fully enclosed space.
- C. Protect from damage due to moisture, direct sunlight, surface contamination, and other causes.
- D. Before installation, permit tiles to reach room temperature and attain stabilized moisture content.
- E. Handle acoustical ceiling units carefully to avoid chipping edges or damaging units. Replace damaged units.

1.8 PROJECT CONDITIONS

- A. Environmental Limitations: Do not install interior acoustical ceilings until interior spaces are enclosed and weatherproof, wet finish work is completed and nominally dry, work above ceilings is complete, and ambient temperature and humidity are continuously maintained per manufacturer's printed product installation instructions.

1.9 EXTRA MATERIALS

- A. Furnish extra materials described below that match products installed, are packaged with protective covering for storage, and are identified with labels describing contents.
- B. Acoustical Ceiling Units: Furnish two boxes of 2' (608 mm) x 2' (608 mm) replacement tiles on project site for Owner's use upon completion of work.

1.10 WARRANTY

- A. Comply with Section 01 78 00 – Submittal Documents.
- B. Submit printed warranty executed by manufacturer agreeing to repair or replace acoustic panels from sagging or warping, grid system from rusting or other manufacturing defects for ten years from date of project's substantial completion.
- C. Warranty shall not cover abuse or acts of God.

PART 2 PRODUCTS

2.1 APPROVED MANUFACTURERS

- A. Armstrong World Industries, Inc., P.O. Box 3001, Lancaster, PA 17604; Tel: 877-276-7876; Fax: 800-572-8324; Website: www.armstrong.com.
- B. USG Interiors, subsidiary of USG Corp., 550 West Adams St. Chicago, IL 60661-3637; Tel: 800-950-3839; Website: www.usg.com.
- C. Certainteed Corporation, subsidiary of Saint Goblain, P.O. Box 860, 750 East Swedesford Rd., Valley Forge, PA 19482; Tel: 800-233-8990, 610-341-7777; Website: www.certainteed.com.

- D. Other manufacturers may request approval in accord with Section 01 25 13 – Product Substitution Procedures.

2.2 PRODUCTS

- A. Tiles shall be 24" (608 mm) x 24" (608 mm) x 3/4" (19.5 mm) thick white, non-directional, with 15/16" (23.8 mm) wide white grid unless noted otherwise.
- B. Ceiling Tile Locations:
 - 1. ACT-1 (Non wet areas such as Classrooms, Offices, Media Center, Cafeteria & Stage):
 - a. Armstrong World Industries "Fine Fissured" Square Lay-in.
 - b. CertainTeed Corp. "Baroque"
 - c. USG Interiors Radar Climaplus

2.3 ACOUSTICAL CEILING UNITS

- A. Standard for Acoustical Ceiling Units: ASTM E 1264-08e1 classifications as designated by reference to types, patterns, acoustical ratings, and light reflectance, unless otherwise indicated.
- B. Mounting Method for Measuring NRC: Type E 400 (plenum mounting in which face of test specimen is 15-3/4" (400 mm) away from the test surface) per ASTM E 795-05(12).
- C. Colors and Patterns: Provide products to match appearance characteristics indicated under each product type.

2.4 SUSPENSION SYSTEM

- A. Standard for Metal Suspension Systems: Comply with applicable ASTM C 635-13 requirements.
- B. Finishes and Colors: Provide manufacturer's standard factory applied finish for type of system indicated.
- C. Attachment Devices: Size for 5 times design load indicated in ASTM C 635-13, Table 1, Direct Hung unless otherwise indicated.
- D. Wire Hangers, Braces, and Ties: ASTM C 641-09, Class 1 zinc coating, soft temper.
 - 2. Gage: Provide wire sized so that stress at 3 times hanger design load (ASTM C 635-13, Table 1, Direct-Hung), will be less than yield stress of wire, but provide not less than 2.69 mm (0.106") diameter wire.
- E. Edge Moldings and Trim: Metal or extruded aluminum of types and profiles indicated or, if not indicated, manufacturer's standard moldings for edges and penetrations that fit type of edge detail and suspension system indicated. Provide column surround trim at round columns.
- F. Retention Clips (For Fire Rated Ceiling Assemblies): Armstrong #414 or equal by other approved acoustical panel manufacturers.
- G. Ceiling Cloud Trim: Armstrong Axiom Classic Trim #AX4STR

2.5 NON-FIRE-RESISTANCE-RATED DIRECT-HUNG SUSPENSION SYSTEMS

- A. Wide-Face Capped Double-Web Steel Suspension System: Main and cross-runners roll-formed from pre-painted or electrolytic zinc-coated cold-rolled steel sheet, with pre-finished 23 mm (15/16") wide metal caps on flanges; other characteristics as follows:
 - 1. Structural Classification: Intermediate Duty System.

2. End Condition of Cross-Runners: Override (stepped) or butt-edge type, as standard with manufacturer.
2. Cap Material and Finish: Steel sheet painted white.

2.6 MISCELLANEOUS MATERIALS

- A. Tile Adhesive: Type recommended by tile manufacturer, bearing UL label for Class 0-25 flame spread.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Examine substrates and structural framing to which ceiling system attaches or abuts, with Installer, for compliance with requirements specified in this and other sections that affect installation and anchorage of ceiling system.
- B. Proceeding with installation shall be deemed installer's acceptance of surface conditions to which ceiling system is attached or abutting.

3.2 PREPARATION

- A. Coordination: Furnish layouts for preset inserts, clips, and other ceiling anchors whose installation is specified in other sections.
- B. Furnish concrete inserts and similar devices to other trades for installation well in advance of time needed for coordination of other work.
- C. Measure each ceiling area and establish layout of acoustical units to balance border widths at opposite edges of each ceiling. Avoid use of less than half width units at borders, and comply with reflected ceiling plans.

3.3 INSTALLATION

- A. General: Ceiling systems installation shall be in accord with manufacturer's written instructions and CISCA "Ceiling Systems Handbook", and Standard for Installation of Ceiling Suspension Systems: ASTM C 636-13.
- B. Arrange acoustical units as indicated.
 1. Where ACT units are installed, provide retention clips in accord with ceiling panel manufacturer's recommendations.
- C. Suspend ceiling hangers from building structural members and as follows:
 1. Install hangers plumb and free from contact with insulation or other objects within ceiling plenum that are not part of supporting structural or ceiling suspension system.
 2. Splay hangers only where required to miss obstructions and offset resulting horizontal forces by bracing, counter-splaying, or other equally effective means.
 3. Where width of ducts and other construction within ceiling plenum produces hanger spacing that interferes with location of hangers at spacing required to properly support standard suspension system members, install supplemental suspension members and hangers in form of trapezes or equivalent devices.
 3. Size supplemental suspension members and hangers to support ceiling loads within performance limits established by referenced standards.

4. Secure wire hangers by looping and wire tying, either directly to structures or to inserts, eye-screws, or other devices that are secure and appropriate for substrate, and in manner that will not cause deterioration or otherwise fail due to age, corrosion, or elevated temperatures.
 5. Secure flat, angle, channel, and rod hangers to structure, including intermediate framing members, by attaching to inserts, eye-screws, or other devices that are secure and appropriate for structure to which hangers are attached and for type of hanger involved, and in manner that will not cause deterioration or fail due to age, corrosion, or elevated temperatures.
 6. Space hangers not more than 48" (1216 mm) along each member supported directly from hangers, unless otherwise shown, and provide hangers not more than 8" (200 mm) from ends of each member.
 7. Lighting, speakers or other items inserted into ceiling tiles shall be supported by building structure and not by ceiling tile or grid.
- D. Install edge moldings of type indicated at perimeter of acoustical ceiling area and where necessary to conceal edges of acoustical units.
- E. Install acoustical panels in coordination with suspension system, with edges concealed by support of suspension members. Scribe and cut panels to fit accurately at borders and at penetrations.

3.4 CLEANING

- A. Clean exposed surfaces of acoustical ceilings, including trim, edge moldings, and suspension members.
- B. Comply with manufacturer's printed instructions for cleaning and touch-up of minor finish damage.
- C. Remove and replace work that cannot be successfully cleaned and repaired to permanently eliminate evidence of damage.

END OF SECTION

SECTION 09 65 20
RESILIENT FLOORING

PART 1 GENERAL

1.1 RELATED SECTIONS

- A. The provisions of the General Conditions, Supplementary Conditions, Drawings, Specifications and the Sections included under Division 1, General Requirements and References are included as a part of this Section as though bound herein.

1.2 SECTION INCLUDES

- A. Provide labor, material, services and equipment necessary to furnish and install work as indicated and as specified herein, which includes, but is not limited to:
1. Work consists of vinyl composition tile flooring, composite sheet flooring, vinyl base, accessories and surface preparation required for complete installation.

1.3 RELATED SECTIONS

- A. Section 01 25 13 – Product Substitution Procedures
B. Section 01 33 00 – Submittal Procedures
C. Section 01 42 00 – References
D. Section 01 43 39 – Mockups
E. Section 01 45 00 – Quality Control
F. Section 01 66 00 – Project Storage and Handling Requirements
G. Section 01 78 00 – Closeout Submittals
H. Section 03 30 00 – Cast-In-Place Concrete
I. Section 03 54 16 – Hydraulic Cement Underlayment

1.4 REFERENCES

- A. See Section 01 42 00 – References for abbreviations, acronyms, definitions and reference standards.
- B. American Society for Testing and Materials (ASTM):
1. D570-98 (2010) e1: Standard Test Method for Water Absorption of Plastics.
 2. D2047-11: Standard Test Method for Static Coefficient of Friction of Polish-Coated Flooring Surfaces as Measured by the James Machine.
 3. E648-14c: Test Method for Critical Radiant Flux of Floor-Covering Systems Using a Radiant Heat Energy Source.
 4. E662-15: Test Method for Specific Optical Density of Smoke Generated by Solid Materials.
 5. F510/F510M-14: Standard Test Method for Resistance to Abrasion of Resilient Floor Covering Using an Abrader with a Grit Feed Method.
 6. F710-11: Standard Practice for Preparing Concrete Floors and Other Monolithic Floors to Receive Resilient Flooring.
 7. F970-07(2011): Standard Test Method for Static Load Limit.
 8. F1066-04(2014)e1: Standard Specification for Vinyl Composition Floor Tile
 9. E1428-15a: Standard Test Method for Evaluating the Performance of Antimicrobials in or on Polymeric Solids Against Staining by Streptomyces Species (A Pink Stain)

- Organism).
10. F925-13: Standard Test Method for Resistance to Chemicals of Resilient Flooring
 11. F1515-03 (2008): Standard Test Method for Measuring Light Stability of Resilient Flooring by Color Changes.
 12. F1869-11: Standard Test Method for Measuring Moisture Vapor Emission Rate of Concrete Subfloor using Anhydrous Calcium Chloride.
 13. G21-15: Standard Practice for Determining Resistance of Synthetic Polymeric Materials to Fungi.

1.5 SUBMITTALS

- A. Comply with Section 01 33 00 – Submittal Procedures.
- C. Submit product data, including installation instructions before starting work.
- D. Submit manufacturer's standard size samples of each type, color, and finish of resilient flooring and required accessories including full range of flooring color and pattern variations available from proposed manufacturer.
- E. Manufacturer's Safety Data Sheet (MSDS) for adhesive.
- F. Submit manufacturer's printed documentation indicating compliance to slip-resistant coefficient requirements.
- G. Submit manufacturer's written instructions for recommended maintenance practices for installed resilient flooring to include:
 1. Schedule: Frequency and type of maintenance defined.
 2. Equipment: Equipment and tools specified by generic language or manufacturer's name.
 3. Materials: Chemicals required to maintain flooring by brand name, quantities, and proper solutions.

1.6 QUALITY ASSURANCE

- A. Comply with Section 01 45 00 – Quality Control.
- B. Regulatory Requirements:
 1. Resilient tile flooring systems shall have minimum slip-resistant coefficients:
 - a. 0.5 for leveled floors such as assembly areas including cafeterias, multipurpose spaces and music rooms.
 - b. 0.6 for accessible routes such as interior corridors.
 - c. 0.8 for inclined floors such as ramps.
 2. Non-compliance of slip-resistant coefficient factor will be grounds for removal and disposal of installed flooring system, properly preparing floor substrate and installation of required slip-resistant flooring system at no additional expense.
 3. Taber Abrasionmeter Testing:
 - a. Weight loss of each tile shall average no more than 0.60 grams when ten tiles are abraded with aluminum oxide grit and S-39 leather wheel for 2000 cycles according to ASTM F510-14.
- C. Installer shall provide documentation of five years successful experience completing similar resilient tile installations.
- D. Preinstallation Conference:
 1. Conduct meeting at site prior to commencing tile work related to installation with parties associated with work.
 2. Review site conditions, procedures, and coordination required with related work.
- E. Mockups:
 1. Comply with Section 01 43 39 – Mockups.

2. Provide mockup of each type of installation using approved materials and installation procedures.
3. Obtain A/E's acceptance of mock-up prior to start of resilient tile installation.
4. Approved mockup may be incorporated into project.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Comply with Section 01 66 00 – Product Storage and Handling.
- B. Deliver products in manufacturer's unopened original dry packaging, with tags and labels intact.
- C. Provide equipment and personnel to handle materials to prevent damage from dropping, careless storage, and handling.
- D. Store material in weather protected space with temperature between 65° - 90° F (18° – 32° C).

1.8 SITE CONDITIONS

- A. Maintain room and material temperature between 65° F (18° C) and 90° F (32° C) for 48 hours before, during, and 48 hours after installation. Maintain minimum 65° F. (18° C) thereafter.
- B. Prior to installation, painting shall be completed, air-conditioning system is operational, and exterior thresholds are installed.

1.9 WARRANTY

- A. Comply with Section 01 78 00 – Closeout Documents.
- B. Furnish manufacturer's warranty covering manufacturing defects for a period of 2 years and 10 years for traffic wear resistance, excluding abusive treatment.
- C. Installer shall warrant in writing to correct conditions due to faulty installation or replace defective materials after project completion, including loss of adhesion to substrate.

PART 2 PRODUCTS

2.1 MATERIALS

- A. Products and manufacturers specified are approved for project. Other manufacturers may submit requests for product substitution in accord with Section 01 25 13 – Product Substitution Procedures.

2.2 SUPPLIER: AVA by Novalis Innovative Flooring; distributed by Capri cork email: sales@avaflor.com website: www.avaflor.com.

2.3 SUBSTITUTIONS: Refer to Division 1 Project Requirements for Product Substitution procedures.

2.4 PRODUCT OPTIONS

- A. AVA SMPL HPC Floating Plank
 1. Gauge: 2.5 mm (nominal)
 2. Wear layer: 0.5 mm (20.0

3. Core Specification: 4.0 mm high performance vinyl core, 1050 kg/m³ density
4. Acoustical Backing: 1.0 mm cork underlayment
5. Size: Planks: 7' x 48' planks
6. Carton: Planks: 22.836 sq. ft.
7. Edges: Straight Edge
8. Installation Method: Floating /Triple Lock Locking Mechanism
9. Color Planks:
Tangent Collection; Color: Charcoal; SKU; T20-600
10. Cobalt Tangent HPC construction is also available with any of the AVA DSGN, SNSE, STYL or SPRK colors/patterns for a minimum order of 4000 sf per color/patterns; lead times will apply.

2.5 PERFORMANCE: Physical properties of Cobalt Planks and Tiles shall conform to the published technical specifications for each individual product. Technical data can be found at www.cobaltsurfaces.com.

2.6 ACCESSORY PRODUCTS

- A. Provide matching trims, moldings and reducing strips specifically designed for luxury vinyl flooring. Architect / Designer shall specify the type and color of each molding. Follow industry or manufacturer's guidelines for proper use and installation of all moldings.
- B. Cleaning Products: Architect can specify per the latest edition of the maintenance instructions (available from www.avaflor.com).
- C. Resilient Tile Base:
 1. Manufacturers:
 - a. Armstrong World Industries, 2500 Columbia Ave., Lancaster, PA. 17603; Tel: 717-397-0611; Website: www.armstrong.com.
 - b. Flexco Corp., 1401 East 6th St., Tuscumbia, AL 35674; Tel: 800-633-3151; Fax: 800-346-9075; Website: www.flexcofloors.com.
 - c. Tarkett Collection by Johnsonite, Inc., 16910 Munn Rd., Chagrin Falls, OH 44023; Tel: 800-899-8916, 440-543-8916; Fax: 440-543-8920; Website: www.johnsonite.com.
 - d. Burke Mercer Industries, Inc., 2250 South Tenth St., San Jose, CA 95112; Tel: 800-447-8442; Website: www.burkemercerflooring.com.
 - e. Roppe Corp., 1602 N. Union St., P.O. Box 1158, Fostoria, OH 44830-1158.
 2. Base:
 - a. 0.125" (3.18 mm) thick, 4" (101 mm) high, Type TP rubber base with cove profile.
 - b. Colors shall be judged equivalent, as determined by A/E.
 - c. At corners, provide inside/outside corners as applicable to specific corner, to extend 4" (101 mm) (minimum) beyond corners.
- D. Accessories:
 1. Manufacturer (Basis of Design): Armstrong World Industries, 2500 Columbia Ave., 3001, Lancaster, PA. 17603; Tel: 717-397-0611; Website: www.armstrong.com.
 2. Transition Strips: Homogeneous vinyl, tapered edges in colors selected by A/E.
 - a. Carpet to tile reducer: VT0.
 - b. Carpet to concrete: VT2.
 - c. Tile to concrete: VT8.
 3. Tile Adhesive: Non-toxic with zero VOC content, waterproof, stabilized type as recommended by resilient tile flooring manufacturer.
- E. Subfloor Filler:

1. Leveling concrete patching compound and leveling concrete underlayment shall be in accord with Section 03 30 00 – Concrete, Para. 2.5.

PART 3 EXECUTION

3.1 INSPECTION

- A. Notify Contractor/CM of work surface conditions detrimental to proper installation of work. Do not proceed until conditions have been corrected in manner acceptable to installer.
- B. Substrate surfaces shall be thoroughly cleaned of debris and have been reviewed for flatness and levelness per Section 03 30 00 – Concrete. Surface irregularities shall be filled or leveled as required.
- C. Verify condition of substrate by testing concrete in accord with ASTM F1869-11 and obtain results of 5lbs. (2.27 kg) or less of vapor transmission (MVER), surface alkali of 9 or less as measured by ph test paper, and be free of carbonization and dust.
- D. Proceeding with installation indicates installer's acceptance of substrate conditions.

3.2 PREPARATION

- A. Comply with ASTM F710-11, manufacturer's printed recommendations, and as specified for surface preparation.
- B. Concrete flatness and levelness shall comply with Section 03 30 0 – Concrete Para. 3.06. Grind down ridges and irregularities, or fill to comply with requirements.
- C. Remove loose impediments from substrate with power vacuum.
- D. Fill cracks, holes, and depressions with cementitious based or underlayment as noted in Part 2 - Products.
- F. Remove paint, oils, bond breakers, waxes, and sealers from surface. Inorganic solvents shall not be used.
- G. See Section 03 54 16 – Hydraulic Cement Underlayment for preparation of uneven and damaged flooring.

3.3 INSTALLATION

- A. Lay resilient flooring, base and accessories with adhesive cement in accord with manufacturer's recommendations in patterns indicated.
- B. Layout:
 1. Butt tightly to vertical surfaces, thresholds, nosings, and edges.
 2. Scribe, as necessary, around obstructions to produce neat joints, laid tight, even, and straight.
 3. Extend flooring into toe spaces, door reveals, into closets, and similar openings.
 4. Install border tiles next to walls of not less than one half tile and of approximately equal size around the perimeter of room.
- C. Fill surface imperfections such as cracks, depressions, or rough areas with underlayment.
- D. Provide ventilation in areas where adhesive is being used. When natural ventilation is inadequate, use safety-spark-proof fans and prohibit smoking.
- E. Transition (Edge) Strips:
 1. Install vinyl transition (edge) strips wherever exposed edges of resilient flooring materials occur.
 2. Where resilient flooring stops at doorways, set transition thresholds directly under doors in closed position.

3.4 CLEANING, POLISHING AND PROTECTION

- A. Remove excess adhesive and other soilings from floors and adjacent surfaces, using neutral type cleaners as recommended by resilient flooring manufacturer.
- B. Do not use acids or other caustic solutions as cleaning agents.
- C. Clean and apply six (6) coats of liquid wax floor finish in accord with manufacturer's printed instructions.
- D. Prohibit traffic on floors for 48 hrs. Protect installed flooring from damage by covering with clean, heavy duty building paper from time of cleaning until work area is complete.
- E. Do not allow movement of heavy objects over flooring which could damage flooring or finish.
- F. Replace flooring damaged by subsequent construction operations.

END OF SECTION

SECTION 09 91 00
PAINTING

PART 1 GENERAL

1.1 RELATED DOCUMENTS

- A. The provisions of the General Conditions, Supplementary Conditions, Drawings, Specifications and the Sections included under Division 1, General Requirements and References are included as a part of this Section as though bound herein.

1.2 SECTION INCLUDES

- A. Provide labor, material, services and equipment necessary to furnish and install work as indicated and as specified herein, which includes, but is not limited to:
- B. Surface preparation and field application of paints and coatings.
1. Exposed exterior items and surfaces.
 2. Exposed interior items and surfaces.
 3. Surface preparation, priming and finish coats specified are in addition to shop priming and surface treatment specified elsewhere.
- C. Paint exposed surfaces, except where paint schedule indicates surfaces or materials to remain unpainted.
- D. If paint schedule do not specifically mention items or surfaces, paint to match adjacent materials or surfaces.
- E. If paint schedule does not indicate color or finish, the Architect will select color or finish from manufacturer's standard colors or finishes.
- F. Painting includes field painting of exposed and covered pipes and ducts, color coding, hangars, exposed steel and iron work, and primed metal surfaces of mechanical and electrical equipment.
- G. Do not paint prefinished items, concealed building surfaces, finished metal surfaces, operating parts, and labels.
1. Prefinished items include the following factory finished components:
 - a. Architectural woodwork and casework.
 - b. Acoustical wall panels.
 - c. Metal lockers.
 - d. Finished mechanical and electrical equipment.
 - e. Light fixtures.
 - f. Distribution cabinets.
 2. Concealed surfaces include walls or ceilings in the following normally concealed spaces:
 - a. Furred areas.
 - b. Ceiling plenums.
 - c. pipe chases.
 - d. Duct shafts.
 3. Finished metal surfaces include the following:
 - a. Anodized aluminum.
 - b. Stainless Steel.
 - c. Pre-finished aluminum or steel.
 4. Operating parts include moving parts of operating equipment and the following items:
 - a. Valve and damper operators.
 - b. Linkages.
 - c. Sensing devices.

- d. Motor and fan shafts.
- G. Do not paint over Underwriter's Laboratories (UL), Factory Mutual (FM), or other code-required labels, equipment names, identification, performance rating, or other nomenclature plates.

1.3 RELATED SECTIONS

- A. Section 01 25 13 – Request for Substitution
- B. Section 03 30 00 – Cast-in-Place Concrete
- C. Section 01 31 00 – Project Coordination
- D. Section 01 33 00 – Submittal Procedures
- E. Section 01 42 00 – References
- F. Section 01 45 00 – Quality Control
- G. Section 01 74 00 – Cleaning and Waste Management
- H. Section 01 78 00 – Closeout Submittals
- I. Section 10 14 00 – Signage
- J. Section 21 05 53 – Identification for fire Suppression Piping and Equipment
- K. Section 22 05 53 – Identification for Plumbing Piping and Equipment
- L. Section 32 17 23 – Pavement Markings

1.4 REFERENCES

- A. See Section 01 42 00 – References for additional reference standards, acronyms, abbreviations and definitions.
- B. American Society of Testing Materials (ASTM):
 - 1. ASTM D1614: Standard Terminology for Paint, Related Coatings, Materials and Applications
 - 2. ASTM D4442-15: Standard Test Method for Direct Moisture Content Measurement of Wood and Wood Based Materials
- C. NACE (National Association of Corrosion Engineers) - Industrial Maintenance Painting.
- D. NPCA (National Paint and Coatings Association) - Guide to U.S. Government Paint Specifications.
- E. PDCA (Painting and Decorating Contractors of America) - Painting - Architectural Specifications Manual.
- F. SSPC (Steel Structures Painting Council) - Steel Structures Painting Manual.
 - 1. SP 1 - Solvent Cleaning.
 - 2. SP 2 - Hand Tool Cleaning.
 - 3. SP 3 - Power Cleaning.

1.5 SUBMITTALS

- A. Comply with Section 01 33 00 - Submittals.
- B. Product Data: Provide manufacturer's specifications and data sheets for each paint and coating product indicating the following:
 - 1 Product Characteristics.
 - 2 Surface preparation instructions.
 - 3 Primer requirements.
 - 4 Storage and handling requirements.
 - 5 Application methods.
 - 6 Precautionary requirements.

- C. Provide a list of required coatings indicating each material and cross referencing each specific coating, finish system and application by manufacturer's product number, color and classification.
 - 1. Include manufacturer's technical information, label analysis and application instructions for each product.
 - 2. Provide certification that products comply with regulations controlling use of volatile organic compounds (VOC).
- D. Samples:
 - 1. Submit manufacturer's color charts indicating full range of colors for each product indicated.
 - 2. Submit two 9" (22.9 cm) x 9" (22.9 cm) samples of each product illustrating selected colors, sheens and textures for each product.
- E. Manufacturer's Instructions: Indicate special surface preparation procedures, substrate conditions requiring special attention.
- F. Provide manufacturer's warranties for each product used.

1.6 QUALIFICATIONS

- A. Manufacturer: Company shall specialize in manufacture of the products specified with minimum ten years continuous documented manufacturing experience.
- B. Applicator: Company specializing in performing the work of this section with five years minimum continuous documented experience on similar project scope.

1.7 REGULATORY REQUIREMENTS

- A. Conform to applicable codes for flame and smoke rating requirements for finishes.

1.8 MOCK UP PANELS

- A. Comply with Section 01 45 00 – Quality Control.
- B. Provide a complete room field sample illustrating coating color, texture, and finish.
- C. Provide exterior mock-up at outside corner condition with finish extending minimum 10' (3.05 m) both directions and 10' (3.05 m) height.
- D. Locate mockups where directed by Architect and Owner's Project Manager.
- E. Work samples that are accepted may remain as part of completed work.
- F. Work is not to proceed until mockups are approved.

1.9 DELIVERY, STORAGE, AND HANDLING

- A. Comply with Section 01 66 00 – Product Storage and Handling Requirements for delivery, storage, protection and handling of products.
- B. Deliver products to site in sealed and labeled containers; inspect to verify acceptability.
- C. Container label to include manufacturer's name, type of paint, brand name, lot number, batch date, color name and number, surface coverage, surface preparation, drying time, cleanup requirements, environmental issues, VOC content, and instructions for mixing.
- D. Store paint materials at minimum ambient temperature of 45° F (7° C) and maximum of 90° F (32° C) in ventilated area and as required by manufacturer's instructions.

1.10 ENVIRONMENTAL REQUIREMENTS

- A. Do not apply materials when surface and ambient temperatures are outside temperature ranges required by paint product manufacturer.
- B. Do not apply exterior coatings during rain or when relative humidity is outside humidity ranges required by paint product manufacturer.
- C. Minimum Application Temperatures for Latex Paints: 45° F (7° C) for interiors 50° F (10° C) for exterior unless required otherwise by manufacturer's instructions.
- D. Minimum Application Temperature for Varnish and Stain Finishes: 65° F (18° C) for interior or exterior, unless required otherwise by manufacturer's instructions.
- E. Provide lighting level of 80 foot-candles measured mid-height at substrate surface.
- F. Dispose of waste in accord with applicable regulations.

1.11 PRE-INSTALLATION MEETING

- A. Comply with Section 01 31 00 – Project Coordination for sequencing of trades to allow timely work start and completion.
- B. Pre-installation meeting shall be held minimum of one week prior to scheduled work start to verify acceptable condition of substrate surfaces to be painted, sequencing and protection of work until substantial completion.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Acceptable Manufacturer:
 - 1. The Sherwin-Williams Company, 101 Prospect Avenue NW, Cleveland, OH 44115; Tel: 1 800-321-8194; Fax: 216-566-1392; website: www.sherwin-williams.com.
- B. Other manufacturers may submit their products for approval per Section 01 25 13 – Substitutions Procedures. Manufacturers shall specify which Sherwin Williams products conform to products proposed for substitution.

2.2 MATERIALS

- A. Paintings and Coatings:
 - 1. Ready mixed, unless otherwise indicated.
 - 2. Process pigments to soft paste consistency, capable of being readily and uniformly dispersed to homogeneous coating; good flow and brushing properties.
 - 3. Capable of drying or curing free of streaks or sags.
- B. Accessory Materials: Coating application accessories shall be in accord with manufacturer's recommendations for patching materials, sealers, cleaning agents, cleaning cloths, primers, sanding paper, clean up materials, and other materials not specifically indicated but required to achieve specified finishes.

2.3 FINISHES

- A. Refer to schedule in Paragraphs 3.7 and 3.8 for exterior and interior surface finishes.
- B. Paint colors will be selected by Owner. Contractor/CM shall submit color samples to Architect who shall prepare color board for Owner's review and approval.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that surfaces are ready to receive work as instructed by the product manufacturer.
- B. Examine surfaces scheduled to be finished prior to commencement of work. Report any condition that may potentially affect proper paint application.
- C. Do not begin work until surfaces are ready to receive paint coatings. Start of work indicates acceptance of surfaces.
- D. Test shop applied primer for compatibility with subsequent cover materials.
- E. Measure moisture content of surfaces using an electronic moisture meter. Do not apply finishes unless moisture content of surfaces are below the following maximums:
 - 1. Plaster and Gypsum Wallboard: 12%.
 - 2. Masonry, Concrete, and Concrete Unit Masonry: 12%.
 - 3. Interior Wood: 15%, measured in accord with ASTM D4442-15.
 - 4. Exterior Wood: 15%, measured in accord with ASTM D4442-15.
 - 5. Concrete Floors: 8%.

3.2 PREPARATION

- A. Remove or mask electrical plates, hardware, light fixture trim, escutcheons and fittings prior to preparing surfaces or finishing.
- B. Correct defects and clean surfaces that affect work. Remove existing coatings that exhibit loose surface defects.
- C. Seal surface marks which may bleed through surface finishes.
- D. Remove mildew on surfaces per manufacturer's written recommendations.
- E. Aluminum Surfaces Scheduled for Paint Finish: Remove surface contamination by steam or high-pressure water. Remove oxidation with acid etch and solvent washing. Apply etching primer immediately following cleaning.
- F. Gypsum Board Surfaces: Fill minor defects with filler compound. Spot prime defects after repair.
- G. Galvanized Surfaces: Remove surface contamination and oils and wash with solvent. Apply coat of etching primer.
- H. Concrete and Unit Masonry Surfaces Scheduled to Receive Paint Finish: Remove dirt, loose mortar, scale, salt or alkali powder, and other foreign matter. Remove oil and grease with a solution of tri-sodium phosphate; rinse well and allow to dry. Remove stains caused by weathering of corroding metals with solution of sodium metasilicate after thoroughly wetting with water. Allow to dry.
- I. Plaster Surfaces: Fill hairline cracks, small holes, and imperfections with latex patching plaster. Make smooth and flush with adjacent surfaces. Wash and neutralize high alkali surfaces.
- J. Uncoated Steel and Iron Surfaces: Remove grease, mill scale, weld splatter, dirt and rust. Where heavy coatings of scale are evident, remove by power tool, wire brushing or sandblasting; clean by washing with solvent. Apply treatment of phosphoric acid solution, ensuring weld joints, bolts, and nuts are similarly cleaned. Spot prime paint after repairs.
- K. Shop Primed Steel Surfaces: Sand and scrape to remove loose primer and rust. Feather edges to make touch-up patches inconspicuous. Clean surfaces with solvent. Prime steel surfaces.
- L. Interior Wood Items Scheduled to Receive Finish: Wipe off dust and grit prior to priming. Seal knots, pitch streaks, and sappy sections with sealer. Fill nail holes and cracks after primer has dried; sand between coats.

- R. Interior Wood Items Scheduled to Receive Transparent Finish: Wipe off dust and grit prior to sealing, seal knots, pitch streaks, and sappy sections with sealer. Fill nail holes and cracks after primer has dried; sand lightly between coats.
- S. Exterior Wood Scheduled to Receive Paint Finish: Remove dust, grit and foreign matter. Seal knots, pitch streaks, and sappy sections. Fill nail holes with tinted exterior calking compound after prime coat has been applied.
- T. Exterior Wood Scheduled to Receive Transparent Finish: Remove dust, grit and foreign matter; seal knots, pitch streaks, and sappy sections with sealer. Fill nail holes with tinted exterior calking compound after sealer has been applied.
- U. Wood and Metal Doors Scheduled for Painting: Seal top and bottom edges with primer and paint per Schedule.

3.3 APPLICATION

- A. Apply products in accord with manufacturer's written installation instructions.
- B. Do not apply paint coatings finishes to surfaces that are not dry, immediately before or after rain, during foggy conditions, or when temperature is less than 50° F (10° C).
- C. Apply each coat to uniform finish.
- D. Apply each coat of paint slightly darker than preceding coat unless otherwise approved.
- E. Sand wood and metal lightly between coats to achieve required finish.
- F. Vacuum clean surfaces free of loose particles. Use tack cloth just prior to applying next coat.
- G. Allow applied coat to dry before next coat is applied.
- H. Where clear finishes are required, tint fillers to match wood. Work fillers into the grain before set. Wipe excess from surface.
- I. Prime back surfaces of interior and exterior woodwork with primer paint.
- J. Prime concealed surfaces of interior woodwork scheduled to receive stain or varnish finish with gloss varnish reduced 25% with mineral spirits.

3.4 FINISHING MECHANICAL AND ELECTRICAL EQUIPMENT

- A. Coordinate with Mechanical and Electrical Specifications and Drawings for schedules of color-coding and identification banding of equipment, ductwork, piping, and conduit.
- B. Paint shop primed equipment.
- C. Remove unfinished louvers, grilles, covers, and access panels on mechanical and electrical components and paint separately.
- D. Prime and paint insulated and exposed pipes, conduit, boxes, insulated and exposed ducts, hangers, brackets, collars and supports, in finished areas, except where items are pre-finished.
- E. Paint interior surfaces of air ducts, and convector and baseboard heating cabinets that are visible through grilles and louvers with one coat of flat black paint, to visible surfaces. Paint dampers exposed behind louvers, grilles and to match face panels.
- F. Paint exposed conduit and electrical equipment occurring in finished areas.
- G. Paint both sides and edges of plywood backboards for electrical and telephone equipment before installing equipment.
- H. Color code equipment, piping, conduit, and exposed ductwork in accord with requirements indicated. Color band and identify with flow arrows, names, and numbering.
- I. Reinstall electrical cover plates, hardware, light fixture trim, escutcheons and fittings removed prior to finishing.

3.5 FIELD QUALITY CONTROL

- A. Field inspection and testing will be performed in accord with Section 01 45 00 – Quality Control.

3.6 CLEANING

- A. Clean work under provisions of 01 74 00 – Cleaning and Waste Management.
- B. Collect cotton waste material that may constitute a fire hazard, place in closed metal containers and remove daily from site.

3.7 PAINT TYPE AND NUMBER OF COATS

- A. Painting schedules are intended to identify type of finishes which are required for various surfaces, and to identify surfaces to which each finish is to be applied. Refer to Room Finish Schedule.
- B. Requirements for quality, function, size, gauges, grades, textures, and color of materials are designated by manufacturer's brands, types, and number of coats required and other requirements that are to be furnished to conform to requirements of work.
- C. Where specific finishes are indicated by code designation, refer to identified types of coatings.
- D. Primers indicated under Material Identification is intended for particular substrate surface specified. Where same numbered finish are scheduled, but for another substrate, provide primer compatible with substrate and finish.
- E. Where substrate has compatible and satisfactory prime coat applied, prime coat specified for numbered finish may be omitted. Test prime coat for compatibility before applying additional coats.

3.8 EXTERIOR PAINTING SCHEDULE (Based on Sherwin Williams numbers) (Mil thickness is wet and dry film thickness per coat.) Where more than one paint finish is indicated (flat, satin, semi-gloss or gloss) finishes will be determined upon review of paint submittals.

- A. Concrete Surfaces (Poured in Place, precast walls, columns, cement stucco, cementitious siding and soffits).
 - 1. Satin Finish:
 - a. 1st Coat: S-W Acrylic Masonry Primer, A24W8300 Series (8.0 mils wet/3.2 mils dry).
 - b. 2nd Coat: S-W A-100 Exterior Latex Satin, A82 Series (4 mils wet/1.4 mils dry).
 - c. 3rd Coat: S-W A-100 Exterior Latex Satin, A82 Series (4 mils wet/1.4 mils dry).
 - 2. Gloss Finish:
 - a. 1st Coat: S-W Acrylic Masonry Primer, A24W8300 Series (8.0 mils wet/3.2 mils dry).
 - b. 2nd Coat: S-W A-100 Exterior Latex Gloss, A8 Series (4 mils wet/1.4 mils dry).
 - c. 3rd Coat: S-W A-100 Exterior Latex Gloss, A8 Series (4 mils wet/1.4 mils dry).
- B. Masonry Surfaces (Concrete Block).
 - 1. Satin Finish:
 - a. 1st Coat: S-W PrepRite Block Filler, B25W25 Series (75-100 s.f./gal.3.6 mils).
 - b. 2nd Coat: S-W A-100 Exterior Latex Satin, A82 Series (4 mils wet/1.4 mils wet).
 - c. 3rd Coat: S-W A-100 Exterior Latex Satin, A82 Series (4 mils wet/1.4 mils wet).
 - 2. Semi Gloss Finish:
 - a. 1st Coat: S-W PrepRite Block Filler, B25W25 Series (75-100 s.f./gal.3.6 mils).

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- b. 2nd Coat: S-W Metalatex Semi Gloss Coating, B42 Series (3-5 mils dry per coat).
- c. 3rd Coat: S-W Metalatex Semi Gloss Coating, B42 Series (3-5 mils dry per coat).
- 3. Gloss Finish:
 - a. 1st Coat: S-W PrepRite Block Filler, B25W25 Series (75-100 s.f./gal.3.6 mils).
 - b. 2nd Coat: A-100 Exterior Latex Gloss, A8 Series (4 mils wet/1.3 mils dry).
 - c. 3rd Coat: A-100 Exterior Latex Gloss, A8 Series (4 mils wet/1.3 mils dry).
- C. Exposed Metal Surfaces (Aluminum, Galvanized Metal).
 - 1. Satin Finish:
 - a. 1st Coat: S-W A-100 Exterior Latex Satin, A82 Series (4 mils wet/1.4 mils dry).
 - b. 2nd Coat: S-W A-100 Exterior Latex Satin, A82 Series (4 mils wet/1.4 mils dry).
 - 2. Semi-Gloss Finish:
 - a. 1st Coat: S-W Metalatex Semi Gloss Coating, B42 Series (3-5 mils dry per coat).
 - b. 2nd Coat: S-W Metalatex Semi Gloss Coating, B42 Series (3-5 mils dry per coat).
 - 3. Gloss Finish:
 - a. 1st Coat: S-W A-100 Exterior Latex Gloss, A8 Series (4 mils wet/1.4 mils dry).
 - b. 2nd Coat: S-W A-100 Exterior Latex Gloss, A8 Series (4 mils wet/1.4 mils dry).
- D. Ferrous Metal (Structural Iron and non-galvanized Steel, Tanks, Window frames, sashes and trim).
 - 1. Semi-Gloss Finish:
 - a. 1st Coat: S-W ProCryl Universal Primer, B66-310 Series (5-10 mils wet/2-4 mils dry).
 - b. 2nd Coat: S-W A-100 Metalatex Semi Gloss Coating, B42 Series (3-5 mils dry per coat).
 - c. 3rd Coat: S-W A-100 Metalatex Semi Gloss Coating, B42 Series (3-5 mils dry per coat)
 - 3. Gloss Finish:
 - a. 1st Coat: S-W ProCryl Universal Primer, B66-310 Series (5-10 mils wet/2-4 mils dry).
 - b. 2nd Coat: S-W A-100 Exterior Latex Gloss, A8 Series (4 mils wet/1.4 mils wet).
 - c. 3rd Coat: S-W A-100 Exterior Latex Gloss, A8 Series (4 mils wet/1.4 mils wet)
- E. Wood Surfaces (Framing, Joists, Columns, Siding, Trim, Doors, and Windows).
 - 1. Satin Finish:
 - a. 1st Coat: S-W Exterior Latex Wood Primer, B42W804 Series (4 mils wet/1.4 mils dry).
 - b. 2nd Coat: S-W Exterior Latex Satin, A82 Series (4 mils wet/1.4 mils dry).
 - c. 3rd Coat: S-W Exterior Latex Satin, A82 Series (4 mils wet/1.4 mils dry).
 - 2. Semi Gloss Finish:
 - a. 1st Coat: S-W Exterior Latex Wood Primer, B42W804 Series (4 mils wet/1.4 mils dry).
 - b. 2nd Coat: S-W Metalatex Semi Gloss Coating, B42 Series (3-5 mils dry)
 - c. 3rd Coat: S-W Metalatex Semi Gloss Coating, B42 Series (3-5 mils dry).
 - 3. Gloss Finish:
 - a. 1st Coat: S-W Exterior Latex Wood Primer, B42W804 Series (4 mils wet/1.4 mils dry).
 - b. 2nd Coat: S-W Exterior Latex Gloss, A8 Series (4 mils wet/1.4 mils dry).
 - c. 3rd Coat: S-W Exterior Latex Gloss, A8 Series (4 mils wet/1.4 mils dry).

3.9 INTERIOR PAINTING SCHEDULE

- A. Concrete Surfaces (Poured Concrete, Pre-Cast Concrete, Cast-In-Place Concrete, Tilt-Wall Concrete Panels, Concrete Beams, Ceilings, Stairs, Joists, and Columns).
 - 1. Egg Shell Finish (Low Odor/Low VOC):
 - a. 1st Coat: S-W Loxon Acrylic Masonry Primer, A24W8300 Series (8.0 mils wet/3.2 mils dry).
 - b. 2nd Coat: S-W ProGreen 200 Interior Latex Enamel, B20W3200 Series (4.0 mils wet/1.6 mils dry).
 - c. 3rd Coat: S-W ProGreen 200 Interior Latex Enamel, B20W3200 Series (4.0 mils wet/1.6 mils dry).
 - 2. Semi Gloss Finish (Low Odor/Low VOC):
 - a. 1st Coat: S-W Loxon Acrylic Masonry Primer, A24W8300 Series (8.0 mils wet/3.2 mils dry).
 - b. 2nd Coat: S-W ProGreen 200 Interior Latex Semi Gloss, B31W2200 Series (4.0 mils wet/1.3 mils dry).
 - c. 3rd Coat: S-W ProGreen 200 Interior Latex Semi Gloss, B31W2200 Series (4.0 mils wet/1.3 mils dry).
 - 3. Flat Finish (Low Odor/Low VOC):
 - a. 1st Coat: S-W Loxon Acrylic Masonry Primer, A24W8300 Series (8.0 mils wet/3.2 mils dry).
 - b. 2nd Coat: S-W ProGreen 200 Interior Latex Flat, B30W651 Series (4.0 mils wet/1.3 mils dry).
 - c. 3rd Coat: S-W ProGreen 200 Interior Latex Flat, B30W651 Series (4.0 mils wet/1.3 mils dry).
- B. Masonry (CMU- smooth, split, scored and fluted concrete units).
 - 1. Flat Finish:
 - a. 1st Coat: S-W PrepRite Block Filler, B25W25 Series (75-125 s.f./gal.).
 - b. 2nd Coat: S-W ProGreen 200 Interior Latex Flat, B30W651 (4.0 mils wet/1.8 mils dry).
 - c. 3rd Coat: S-W ProGreen 200 Interior Latex Flat, B30W651 (4.0 mils wet/1.8 mils dry).
 - 2. Egg Shell Finish:
 - a. 1st Coat: S-W PrepRite Block Filler, B25W25 Series (75-100 s.f./gal.3.6 mils).
 - b. 2nd Coat: S-W ProGreen 200 Interior Latex Eg-Shel, B20W2200 Series (4.0 mils wet/1.6 mils dry).
 - c. 3rd Coat: S-W ProGreen 200 Interior Latex Eg-Shel, B20W2200 Series (4.0 mils wet/1.6 mils dry).
 - 3. Semi Gloss Finish:
 - a. 1st Coat: S-W PrepRite Block Filler, B25W25 Series (75-125 s.f./gal.).
 - b. 2nd Coat: S-W ProGreen 200 Interior Latex Semi Gloss, B31W600 Series (4.0 mils wet/1.6 mils dry).
 - c. 3rd Coat: S-W ProGreen 200 Interior Latex Semi Gloss, B31W600 Series (4.0 mils wet/1.6 mils dry).
- C. Metal Surfaces (Aluminum if not prefinished, Galvanized Steel metal doors, frames, railings, exposed ductwork, pipes and conduits and ferrous metal surfaces).
 - 1. Flat Finish:
 - a. 1st Coat: S-W Industrial ProCryl Universal Primer, B66-310 Series (5-10 mils wet/2-4 mils dry).

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- b. 2nd Coat: S-W ProGreen 200 Interior Latex Semi Gloss, B30W651 Series (4.0 mils wet/1.8 mils dry).
- c. 3rd Coat: S-W ProGreen 200 Interior Latex Semi Gloss, B30W651 Series (4.0 mils wet/1.8 mils dry).
- 2. Egg Shell Finish:
 - a. 1st Coat: S-W Industrial ProCryl Universal Primer, B66-310 Series (5-10 mils wet/2-4 mils dry).
 - b. 2nd Coat: S-W ProGreen 200 Interior Latex Eg-Shel, B20W651 Series (4.0 mils wet/1.6 mils dry).
 - c. 3rd Coat: S-W ProGreen 200 Interior Latex Eg-shel, B20W651 Series (4.0 mils wet/1.6 mils dry).
- D. Metal (Exposed Structural Steel Columns, Trusses, Beams, Miscellaneous Ornamental Iron and Ferrous Metals).
 - 1. Flat Finish:
 - a. 1st Coat: S-W Industrial ProCryl Universal Primer, B66-310 Series (5-10 mils wet/2-4 mils dry).
 - b. 2nd Coat: S-W ProGreen 200 Interior Latex Flat, B30W651 Series (4.0 mils wet/1.8 mils dry).
 - c. 3rd Coat: S-W ProGreen 200 Interior Latex Flat, B30W651 Series (4.0 mils wet/1.8 mils dry).
 - 2. Egg Shell Finish:
 - a. 1st Coat: S-W Industrial ProCryl Universal Primer, B66-310 Series (5-10 mils wet/2-4 mils dry).
 - b. 2nd Coat: S-W ProGreen 200 Interior Latex Eg-Shel, B20W651 Series (4.0 mils wet/1.6 mils dry).
 - c. 3rd Coat: S-W ProGreen 200 Interior Latex Eg-Shel, B20W651 Series (4.0 mils wet/1.6 mils dry).
 - 3. Semi Gloss Finish:
 - a. 1st Coat: S-W Industrial ProCryl Universal Primer, B66-310 Series (5-10 mils wet/2-4 mils dry).
 - b. 2nd Coat: S-W ProGreen 200 Interior Latex Semi Gloss, B31W600 Series (4.0 mils wet/1.6 mils dry).
 - c. 3rd Coat: S-W ProGreen 200 Interior Latex Semi Gloss, B31W600 Series (4.0 mils wet/1.6 mils dry).
- E. Wood Surfaces (Windows, Sills, Door Trim, Wall Paneling and other wood surfaces not factory finished or indicated otherwise).
 - 1. Flat Finish:
 - a. 1st Coat: S-W PrepRite ProBlock Latex, B51 Series, (4.0 mils wet/1.4 mils dry).
 - b. 2nd Coat: ProGreen 200 Interior Latex Flat, Series B30W651 (4.0 mils wet/1.8 mils dry).
 - c. 3rd Coat: ProGreen 200 Interior Latex Flat, Series B30W651 (4.0 mils wet/1.8 mils dry).
 - 2. Egg Shell Finish:
 - a. 1st Coat: S-W PrepRite ProBlock Latex, B51 Series, (4.0 mils wet/1.4 mils dry).
 - b. 2nd Coat: ProGreen 200 Interior Latex Eg-Shel, Series B20W651 Series (4.0 mils wet/1.6 mils dry)
 - c. 3rd Coat: ProGreen 200 Interior Latex Eg-Shel, Series B20W651 Series (4.0 mils wet/1.6 mils dry)
 - 3. Semi Gloss Finish:
 - a. 1st Coat: S-W PrepRite ProBlock Latex, B51 Series, (4.0 mils wet/1.4 mils dry).

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- b. 2nd Coat: ProGreen 200 Interior Latex Semi-Gloss, Series B31W600 Series (4.0 mils wet/1.6 mils dry)
- c. 3rd Coat: ProGreen 200 Interior Latex Semi-Gloss, Series B31W600 Series (4.0 mils wet/1.6 mils dry)
- 4. Stain and Varnish Satin Finish:
 - a. 1st Coat: S-W MinWax 250 VOC Oil Stain.
 - b. 2nd Coat: Wood Classics® Waterborne Polyurethane Varnish (4mils wet/1.0 mil dry).
 - c. 3rd Coat: Wood Classics® Waterborne Polyurethane Varnish (4mils wet/1.0 mil dry).
- F. Drywall and Plaster Surfaces (Walls, columns, ceilings, soffits, bulkheads, light shelves and soffits).
 - 1. Flat Finish:
 - a. 1st Coat: ProGreen 200 Interior Latex Primer, Series B28W8200 Series (4.0 mils wet/1.5 mils dry).
 - b. 2nd Coat: ProGreen 200 Interior Latex Flat, Series B30W651 Series (4.0 mils wet/1.4 mils dry).
 - c. 3rd Coat: ProGreen 200 Interior Latex Flat, Series B30W651 Series (4.0 mils wet/1.4 mils dry).
 - 2. Egg Shell Finish:
 - a. 1st Coat: ProGreen 200 Interior Latex Primer, Series B28W8200 Series (4.0 mils wet/1.5 mils dry).
 - b. 2nd Coat: ProGreen 200 Interior Latex Eg-Shel, Series B30W651 Series (4.0 mils wet/1.6 mils dry).
 - c. 3rd Coat: ProGreen 200 Interior Latex Flat, Series B30W651 Series (4.0 mils wet/1.6 mils dry).
 - 3. Semi Gloss Finish:
 - a. 1st Coat: ProGreen 200 Interior Latex Primer, Series B28W8200 Series (4.0 mils wet/1.5 mils dry).
 - b. 2nd Coat: ProGreen 200 Interior Latex Semi-Gloss, Series B31W600 Series (4.0 mils wet/1.6 mils dry).
 - c. 3rd Coat: ProGreen 200 Interior Latex Semi-Gloss, Series B31W600 Series (4.0 mils wet/1.6 mils dry).
- G. Epoxy System (Water Base)
 - 1. Gloss Finish
 - a. 1st Coat: S-W ProGreen 200 Interior Latex Primer, B28W600 (4-mil wet, 1.5-mil dry)
 - b. 2nd Coat: S-W Waterbased Catalyzed Epoxy, B70W211 / B60V15
 - c. 3rd Coat: S-W Waterbased Catalyzed Epoxy, B70W211 / B60V15 (2.5 - 3-mil dry per coat)

END OF SECTION

10

DIVISION

SPECIALTIES

SECTION 10 14 00
SIGNAGE

PART 1 GENERAL

1.1 RELATED DOCUMENTS

- A. The provisions of the General Conditions, Supplementary Conditions, Drawings, Specifications and the Sections included under Division 1, General Requirements and References are included as a part of this Section as though bound herein.

1.2 SECTION INCLUDES

- A. Provide labor, materials, services, and equipment necessary to furnish and install work as indicated and as specified herein, which includes, but is not limited to:
 - 1. Tactile/raised letter plastic signs
 - 2. Individual plastic characters signs
 - 3. Signs of silk-screened characters on plastic
 - 4. Required sign type:
 - a. Interior room, space and area ID signs
 - b. International symbols of accessibility for accessible spaces and exits
 - c. Accessible routes
 - d. Tactile "exit" signs
 - e. Hazard and safety signs
 - f. Evacuation plans

1.3 REFERENCES

- A. ANSI A117.1 – Specifications for Making Buildings and Facilities Accessible To and Usable By Physically Handicapped People
- B. FBC – Florida Building Code
- C. NFPA 101: 7.10.1.3

1.4 SUBMITTALS

- A. Submit shop drawings as specified.
- B. Indicate sign styles, lettering font, foreground and background colors, locations, overall dimensions of each sign and anchorage.
- C. Provide complete interior and exterior sign schedule showing sign type, location, and verbiage.
- D. Samples: Submit two sample signs in size illustrating type, style, letter font, and colors specified, and method of attachment.
- E. Provide manufacturer's installation instructions, templates, and attached devices.
- F. Colors shall be as selected by the Architect.

1.5 QUALIFICATIONS

- A. Manufacturer: Company specializing in manufacturing the products specified in this section with minimum three years documented experience.

1.6 REGULATORY REQUIREMENTS

- A. Conform to applicable codes for requirements for the physically handicapped, safety and egress.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Deliver, store, protect, and handle products to site.
- B. Package signs, labeled in name groups
- C. Store adhesive attachment tape at ambient room temperatures

1.8 ENVIRONMENTAL REQUIREMENTS

- A. Do not install signs when ambient temperature is lower than recommended by manufacturer.
- B. Maintain this minimum temperature during and after installation of signs.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturer shall be one of the following however products of other manufacturers will be considered for acceptance provided they equal or exceed the material requirements and functional qualities of the specified product and acceptance is provided by the architect in writing prior to bidding.
 - 1. ASI Sign Systems, Indianapolis, Indiana; Cincinnati, Ohio; Cleveland, Ohio
 - 2. Andco Industries Corp., Greensboro, North Carolina
 - 3. Baron Signs, Lake Park, Florida
 - 4. Multi-Graphics, Inc. Pelham, Georgia

2.2 FLORIDA AMERICANS WITH DISABILITIES ACT REQUIREMENTS

- A. Manufacturer shall conform to tactile, Braille, letter size, and other requirements as required by Florida Accessibility Code for Building Construction and ANSI A117.1.
- B. ADA requirements supersede technical specifications in this Section.

2.3 BUILDING SIGNAGE – GENERAL

- A. General; applies to all signs except as noted:
 - 1. Material shall be minimum 1/8" clear matte acrylic stock with 3/8" radius corners.
 - a. Exterior signs – Shall be UV stable material of non-petroleum base phenolic resin using sand carving process to create the raised lettering, which is an integral part of the sign.
 - b. Interior signs – Shall be material of non-petroleum base phenolic resin using sand carving process to create the raised lettering, which is an integral part of the sign.
 - c. Interior signs exposed to direct sun, shall be of same material as exterior signs.
 - d. Paint shall be Matthews Acrylic Polyurethane system or equal.
 - i) Shall be low VOC
 - ii) Shall be UV Stable
 - iii) Shall be lead and chromate free
 - iv) Minimum life expectancy of 10-years
 - 2. Applied lettering not allowed.

3. Letters and background colors selected by Architect from manufacturer's standard colors.
 4. Mounting:
 - a. Shall be with adhesives and non-removable oval head screws.
 - b. Mount at locations as directed by Architect.
 - c. Mount at 60" above finished floor to the center of the sign.
 5. Graphic Process with Braille in one of the following, but no applied lettering method allowed:
 - a. Provide raised (photopolymer process)
 - b. Engraved letters
 - c. Sand craved process
 6. Letters:
 - a. Letters and numbers shall have width to height ratio between 3:5 and 1:1 and stroke width to height ratio between 1:5 and 1:10.
 - b. Letters and numbers to be raised $\frac{1}{32}$ " upper case sans serif font with Grade 2 Braille.
 - c. Raised characters shall be $\frac{5}{8}$ " high minimum and 2" high maximum.
 - d. Pictograms shall have the equivalent verbal description directly below the pictogram.
 7. Characters and backgrounds must be matte or other non-glaze surface and of contrasting colors.
 8. All signs shall comply with chapter 11 FBC.
- B. Room Name and Number Signs
1. Provide a sign for each room or space to include name and room number.
 - a. Minimum size of 3" high by 6" wide for signs, longer where nomenclature demands
 2. Mount number as directed by Architect.
 3. All spaces listed in Finish Schedule plus if more than one door is to a space, additional signs will be required one by number of doors to space.
- C. Storage Signs
1. Provide and install at mechanical and electrical rooms a sign mounted on the door to read as follows: " STORAGE NOT ALLOWED"
 2. Signs shall be matte acrylic plastic, red background with white letters 1 " high by width needed for copy and Braille, with $\frac{3}{8}$ " radius corners.
 3. Mount on doors with non-removable oval head screws verify number signs required.
- D. Toilet Room Handicapped Signs
1. Furnish and install one sign depicting National Handicapped Symbol (wheelchair) at each toilet room, equipped with facilities for the handicapped.
 - a. Size shall be 6" by 10.5".
- E. Fire Extinguisher, No Exit and Pull Station Sign
1. Copy to read: "No Exit", "Fire Pull Station Inside", And "Fire Extinguisher Inside"
 2. Red letters, same material, size and mounting as in A. General.
 3. NO EXIT sign shall have letter size as per NFPA 101 section 7.10.8.3.
 4. Braille sign not required for fire extinguisher.
 5. See plans for locations.
- F. Fire Rated/Smoke Partition Labeling
1. Field label all fire rated walls above ceiling level, with fire rating shown on the construction plans.
 - a. Provide minimum $1\frac{1}{2}$ " high block lettering stenciled on wall above finished ceiling, if in a storage, mechanical, electrical, or similar unfinished room, install at approximately 84 inches above floor.
 - b. *(Contractor to use rating from permit plans)* HOUR FIRE RATED WALL, PROTECT ALL OPENING AND THROUGH WALL PENETRATION PER CODE REQUIREMENTS.

2. Field label all smoke partitions above ceiling level.
 - a. Provide minimum 1½" high block lettering stenciled on wall above finished ceiling, if storage, mechanical, electrical, or unfinished room, install at 84" above floor.
 - b. SMOKE PARTITION, PROTECT ALL OPENING AND THROUGH WALL PENETRATION PER CODE REQUIREMENTS.
- G. Mechanical, Electrical, Data, and Similar Rooms
 1. Provide a sign saying "NO STORAGE" meeting the General requirements.
 2. If these rooms have pair of doors, provide sign saying "THIS DOOR TO REMAIN CLOSED AND LATCHED TOP AND BOTTOM, EXCEPT DURING THE TRANSFER OF EQUIPMENT".
 - a. Sign shall have 1" high block letters and be permanently attached (Attached in way as to maintain the rating of the door) to the inactive door near the latch side 60 inches from finished floor to center of sign.
 - b. Braille not required for this sign.

PART 3 EXECUTION

3.1 INSTALLATION

- A. Install all signs in strict accordance with manufacturer's instructions and FADA requirements.
- B. Room signs to be mounted 60" to center above finish floor on walls adjacent to the latch side of any door opening.

3.2 CLEANING

- A. After installation, thoroughly clean all exposed surfaces and restore all damaged material to its original condition or replaced with new material.

3.3 WARRANTY

- A. This Contractor shall fully guarantee all materials and labor under this section for a period of 5-years from date of final acceptance of the building against all defects in both workmanship and materials and he shall promptly correct and/or replace such faulty work if so notified.

END OF SECTION

12

DIVISION

FURNISHINGS

SECTION 12 48 12
ENTRANCE FLOOR MATS

PART 1 GENERAL

1.1 RELATED DOCUMENTS

- A. The provisions of the General Conditions, Supplementary Conditions, Drawings, Specifications and the Sections included under Division 1, General Requirements and References are included as a part of this Section as though bound herein.

1.2 SECTION INCLUDES

- A. Provide labor, materials, services, and equipment necessary to furnish and install work as indicated and as specified herein, which includes, but is not limited to:
 - 1. Surface-type foot grille mats.

1.3 SUBMITTALS

- A. Submit manufacturer's specifications and installation instructions for each type of entrance mat.
- B. Include methods of installation for each type of substrate.
- C. Submit samples for each type and color of exposed entrance mat, frames, and accessories required.
- D. Provide 12" square samples of mat materials and 12" lengths of frame members.
- E. Product Data: Unless otherwise indicated, submit the following for each type of product provided under work of this Section:
 - 1. Recycled Content:
 - a. Indicate recycled content; indicate percentage of pre-consumer and post-consumer recycled content per unit of product.
 - b. Indicate relative dollar value of recycled content product to total dollar value of product included in project.
 - c. If recycled content product is part of an assembly, indicate the percentage of recycled content product in the assembly by weight.
 - d. If recycled content product is part of an assembly, indicate relative dollar value of recycled content product to total dollar value of assembly.
 - 2. Local/Regional Materials: *(Provide materials extracted/harvested and manufactured within a 500 mile radius from the project site).*
 - a. Sourcing Location(s): Indicate location of extraction, harvesting, and recovery; indicate distance between extraction, harvesting, and recovery and the project site.
 - b. Manufacturing Location(s): Indicate location of manufacturing facility; indicate distance between manufacturing facility and the project site.
 - c. Product Value: Indicate dollar value of product containing local/regional materials; include materials cost only.
 - d. Product Component(s): Where product components are sourced or manufactured in separate locations, provide location information for each component. Indicate the percentage by weight of each component per unit of product.

1.4 MAINTENANCE DATA

- A. Maintenance Data: Submit manufacturer's printed instructions for cleaning, drying, maintaining, and re-handling of removable entrance mat units.

1.5 FIELD MEASUREMENTS

- A. Verify that field measurements are as indicated on shop drawings.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturer shall be the following however products of other manufacturers will be considered for acceptance provided they equal or exceed the material requirements and functional qualities of the specified product.
 - 1. Forbo Entrance Systems

2.2 MATERIALS AND FABRICATION

- A. General: Provide colors/patterns/profiles of materials, including metals and metal finishes, as indicated on drawings or by this specification or, where not indicated, as selected by Architect from manufacturer's standard colors/ patterns/ profiles.
 - 1. Shop-fabricate the entrance mat work to greatest extent possible, in sizes as indicated on plans.
 - 2. Where not otherwise indicated, provide single unit for each mat installation, but do not exceed manufacturer's maximum size recommendation for units intended for removal and cleaning.
 - 3. Where joints in mats are necessary, space them symmetrically and away from normal traffic lanes.
 - 4. Miter corner joints in framing elements, with hairline joints, or provide prefabricated corner units without joints.
 - 5. Where possible, verify sizes by field measurement prior to shop fabrication.
- B. Entrance Mat Systems:
 - 1. Provide model Forbo coral mats entrance system approved equal.
 - 2. Vinyl edge accessories to accommodate mat application as indicated per manufacturer.
 - 3. All building entrance doors shall have mats provided except for mechanical/electrical room doors.
 - 4. All entrance mats are to provide 6'-0" minimum travel length in accordance with LEED – EQ Credit 5.
 - 5. Color: As selected by the Architect from the manufacturer's standard color palette. Provide samples for approval.
 - 6. Mat size shall be 6'-0" deep and 6" wider than the door opening on each side.
 - 7. The Contractor is to verify quantity of mats to be provided.

PART 3 EXECUTION

3.1 INSTALLATION

- A. Install surface-type units to comply with manufacturer's instructions, at locations indicated and coordinated with entrance locations and traffic patterns.
 - 1. Anchor the fixed surface type frame members to floor with devices spaced as recommended by manufacturer.

END OF SECTION

23

DIVISION

HEATING, VENTILATION AND AIR-CONDITIONING

SECTION 23 02 00
BASIC MATERIALS AND METHODS OF HVAC SYSTEMS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.
- B. Refer to Division 1 for all requirements pertaining to General Provisions.

1.2 WORK INCLUDED

- A. Access doors.
- B. Piping and equipment identification.
- C. Electrical requirements.
- D. Painting.
- E. Concrete work.
- F. Fabricated steel supports.
- G. Excavation, trenching and backfilling.
- H. Placing of equipment.

1.3 RELATED WORK

- A. DIVISION 9 - FINISHES (Access Doors - Painting).
- B. DIVISION 3 - CONCRETE.
- C. DIVISION 31- SITEWORK (Excavation).

1.4 APPLICABLE PUBLICATIONS

- A. The publications listed below form a part of this Section to the extent referenced.
 - 1. American Institute of Steel Construction (AISC) Publications
 - 2. American National Standards Institute (ANSI) Standards
 - 3. American Society for Testing and Materials (ASTM) Publications
 - 4. American Welding Society (AWS) Publications
 - 5. Underwriters Laboratories, Inc. (UL) Standards

1.5 SUBMITTALS

- A. General: Where submittals are required, comply with Division 1 requirements.
- B. Shop Drawings: Submit drawings of fabricated steel supports where proposed supports are not in accordance with details on drawings, or where drawings do not detail supports. Submittal for acceptance is required.
- C. Product Data: Submittal for other than fabricated steel supports is not required. Product data for the following shall be included in the operation and maintenance manuals. Submittal for acceptance is not required.
 - 1. Access doors.
 - 2. Piping and equipment identification.

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

- A. Access Doors:
 - 1. Acudor
 - 2. Elmodor Manufacturing, Co.
 - 3. Karp Metal Associates, Inc.
 - 4. Larsen's Manufacturing Co.
 - 5. Milcor
- B. Piping and Equipment Identification:
 - 1. Communications Technology Corp.
 - 2. Craftmark Identification Systems, Inc.
 - 3. EMED Co., Inc.
 - 4. Florida Marking Products, Inc.
 - 5. Marking Services, Inc.
 - 6. Seton Name Plate Corp.
 - 7. W.H. Brady Co., Signmark Division

2.2 FABRICATION

- A. Access doors:
 - 1. Access doors: UL labeled where installed in fire rated walls, partitions, and ceilings. Door rating shall be not less than wall, partition, or ceiling rating.
 - 2. Frames: 16 gauge steel, flush trim, with corners welded and ground smooth, masonry anchor strap for masonry walls, bolt holes for mounting in framed openings.
 - 3. Non-fire rated doors: 13 gauge steel, concealed continuous piano hinge with dust flap, flush screwdriver operated lock with stainless steel cam and studs.
 - 4. Fire rated doors: 20 gauge steel welded pan type, concealed continuous piano hinge with stainless steel pins, key-operated latch bolt, interior latch release, automatic door closer, automatic door latch when door closes. The door panel shall contain 2- inch thick insulation in sandwich type construction.
 - 5. Finish of doors and frames: Prime coat of rust inhibitive baked enamel, except as specified otherwise.
 - 6. Finish of doors and frames in wet areas, and in areas with surfaces subject to wet cleaning: No. 4 satin stainless steel.
- B. Piping and Equipment Identification:
 - 1. Pipe markers: Sub-surface printed plastic, with protective undercoating. Markers shall be permanently curled for snap-on installation for pipe sizes (including insulation) up to 6" diameter. For external diameters above 8". Marker shall be secured using cable ties for indoor use and stainless steel banding or ultraviolet resistant plastic for exterior use. Markers for outdoor installation shall be over-laminated with Tedlar™ on polyester ultraviolet damage and fading. Markers shall identify the pipe contents and direction of flow through 360 degree visibility range. Marker size, letter size, letter color, wording and background color shall be in accord with ANSI A13.1 – Scheme for the Identification of Piping Systems. Based on Marking Services Inc. Model MS-970 Coiled Plastic Markers for indoor use and Model MS-995 Maxilar Marker for exterior use.
 - 2. Valve tags: Contractors Option:
 - a. Indoor:
 - 1) 19 gauge brass, 1-1/2 inch round, with 1/4 inch high black pipe service letter

- abbreviation above 1/2 inch high black valve number. Pipe service letter abbreviation shall be in accord with legend on drawings. Valve tag attachment shall be 4 ply 0.018 copper wire meter seal or #6 solid brass bead chain with locking link. Based on Marking Services Inc.
- 2) 1/16 inch thick plastic, 1-1/2" round, with 1/4 inch high black pipe service abbreviation above 1/2 inch high black valve number. Pipe service letter abbreviation shall be in accord with legend on drawings. Color of valve tag shall match pipe marker color. Valve tag attachment shall be 4 ply 0.018 copper wire meter seal or #6 solid brass bead chain with locking link. Based on Marking Services Inc.
- b. Outdoor Service:
- 1) 19 gauge brass, 1-1/2 inch round, with 1/4 inch high black pipe service letter abbreviation above 1/2 inch high black valve number. Pipe service letter abbreviation shall be in accord with legend on drawings. Valve tag attachment shall be 4 ply 0.018 copper wire meter seal or #6 solid brass bead chain with locking link. Based on Marking Services Inc.
 - 2) 19 gauge Type 304 stainless steel, 1-1/2" round, with 1/4 inch high pipe service abbreviation above 1/2 inch high black valve number. Pipe service letter abbreviation shall be in accord with legend on drawings. Color of valve tag shall match pipe marker color. Valve tag attachment shall be 4 ply 0.018 stainless wire meter seal or #6 Type 304 stainless steel bead chain with locking link. Based on Marking Services, Inc.
3. Valve chart frame: Self-closing, satin-finished, extruded aluminum with glass window, 8-1/2 inch by 11 inch chart size.
4. Equipment nameplates:
- a. Indoor: Shall be 1/16 inch thick plastic with black satin surface and white core. Lettering shall be engraved through the surface color to expose the core color. Plate size shall be a minimum of 2-1/2 inch by 4 inch, with 3/4 inch high lettering for equipment and 3/4 inch by 2-1/2 inch, with 3/16 inch high lettering for ceiling grid labeling. Equipment identifying name and number shall be in accord with schedules on the Contract Documents. Plate manufacturer shall furnish pre-drilled hole locations for pop riveting. Where pop riveting is not suitable, a suitable adhesive for permanently attaching plate to equipment shall be provided.
 - b. Outdoor: Shall be 125 Mil rigid plastic constructed of printed legend sealed between two layers of chemically-resistant plastic to resist ultraviolet damage. Plate size shall be a minimum of 2-1/2 inch by 4 inch, with 3/4 inch high lettering for equipment. Equipment identifying name and number shall be in accord with schedules on the Contract Documents. Plate manufacturer shall furnish pre-drilled hole locations for pop riveting. Where pop riveting is not suitable, a suitable adhesive for permanently attaching plate to equipment shall be provided.
 - c. Based on Marking Services Inc. Model MS-215 Max-Tex.
- C. Electrical Requirements: Product description not applicable to this Section.
- D. Painting: Product specified in Division 9 - FINISHES.
- E. Concrete Work: All work is provided under Division 3.
- F. Fabricated Steel Supports:
1. Steel angles, channels, and plate shall be in accordance with ASTM A36.
 2. Steel members, including fasteners, exposed to weather shall be galvanized.
- G. Excavation, Trenching, and Backfilling: Product description not applicable.
- H. Placing of Equipment: Product description not applicable.

PART 3 - EXECUTION

3.1 GENERAL

- A. Installation of materials and equipment shall be in accord with the manufacturer's written instructions, except as specified.

3.2 INSTALLATION

- A. Access Doors:
 - 1. Furnish access doors for installation under Division 9 - FINISHES.
 - 2. Deliver access doors to the appropriate trade well in advance of the time they are needed so as to avoid unnecessary delay of the work.
 - 3. Access doors shall be sized as indicated on drawings. If no size is given, provide access door of size suitable for servicing equipment or valve. Unless otherwise noted, the minimum size for an access door shall be 12" x 12".
 - 4. Access doors shall be provided where indicated and if not indicated, where required.
 - 5. Access doors shall be installed so as to allow full door swing.
 - 6. Where full swing and access is not possible, removable doors shall be provided.
 - 7. Access doors not required in lay-in-tile ceilings.
- B. Piping and Equipment Identification:
 - 1. Install pipe markers adjacent to each valve and fitting, at each branch connection, on each side of wall, floor, and ceiling penetrations, where entering and leaving underground areas, and at minimum 40 foot spacing on horizontal and vertical pipe runs. Markers shall be arranged for easy reading at eye level.
 - 2. Provide valve tags on all valves exposed or concealed unless otherwise noted.
 - 3. Attach valve tag to stem of each valve to be tagged. Valve numbers shall follow in sequence the Owner's existing valve numbers, where applicable.
 - 4. Provide a marker for each valve and equipment to be tagged, located above lift-out tile ceilings. The marker shall be 1/16 inch thick plastic with a satin surface and white core. Color of the marker shall match color of piping identification system. Lettering shall be engraved through the surface color to expose the core color. Plate size shall be 3/4 inch by 2-1/2 inch, with 3/16 inch high lettering for ceiling grid labeling. Plate manufacturer shall furnish suitable adhesive for permanently attaching plate to ceiling grid.
 - 5. Provide a minimum of 4 valve charts. Chart information shall indicate job name, Contractor name, date of installation, valve number, valve location, valve type, valve purpose, and system in which installed. Mount framed chart in equipment room, and insert copy of chart in each operating and maintenance manual under separate tabbed section labeled "Valve Chart". Where project drawings include a piping flow schematic, request AutoCad file from Engineer and label all of the valves according to the valve chart and frame in an 18" x 24" frame in main mechanical or pump room.
 - 6. Provide air and water flow diagrams installed in waterproof, laminated frames on the wall in each Mechanical Room. Air flow diagrams shall show locations of dampers, sensors, and exhaust fans associated with the air handling unit. Water flow diagrams shall show shut-off valves and control valve locations.
 - 7. Permanently affix nameplate to each item of equipment using stainless steel pop rivets. Where irregular surface impede direct attachment of plates, affix plate to sheet metal bracket and attach bracket to equipment with screws, bolts or suitable adhesive from nameplate manufacturer.

8. Refrigeration System - Additional Requirements:
 - a. Marking and Signage:
 - (1) Provide a permanent sign containing the following information:
 - (a) Name and address of installer.
 - (b) Kind of refrigerant.
 - (c) Lbs. of refrigerant.
 - (d) Field test pressure applied.
 - (2) Provide a permanent sign: Main electrical supply, i.e., main compr. disc.
 - (3) Provide metal tags with 0.5" letters:
 - (a) Shut-off valves to each vessel, i.e., L.P. receiver shut-off.
 - (b) Relief valve.
 - (4) Piping shall be marked as either:
 - (a) Refrigerant - High Pressure - Liquid or Hot Gas.
 - (b) Refrigerant - Low Pressure - Suction, Pumped Liquid Supply or Pumped Liquid Return.
- C. Electrical Requirements: Refer to Division 26 for electrical requirements.
- D. Painting:
 1. All equipment shall be furnished with a factory- applied galvanized, prime paint, or finish paint finish. Touch-up damaged surfaces of equipment immediately.
 2. Paint for galvanized surfaces shall be in accordance with ASTM A780 using zinc rich compound.
 3. Paint wooden mounting backboards with two coats of gray enamel prior to making attachments to the board.
 4. For quality control refer to DIVISION 9 - FINISHES.
 5. Remove all dirt, rust, scale, grease, pipe dope, solder flux, and welding slag from all surfaces to be painted.
 6. Paint immediately, under this Division, all damaged galvanized surfaces. Paint galvanized metal surfaces behind grilles with two coats of flat black paint.
 7. Apply rust inhibitive primer to ferrous surfaces of shop fabricated steel supports.
 8. Paint immediately under this division all field and shop welded joints in piping or equipment supports with 2 coats of grey metal primer.
 9. All exposed piping shall have a PVC jacket, per ANSI Standard with the following colors:
 - a. Chilled water supply Dark blue
 - b. Chilled water return Light blue
 - c. Condensate piping Orange
- E. Concrete Work:
 1. Concrete pads and curbs for supports of equipment shall be a minimum of 4" high with chamfered edges and sized for approved equipment. Furnish drawings to Division 3 Contractor.
 2. Surfaces of concrete shall be troweled smooth. When forms are removed, fill voids with cement and rub smooth with rubbing stone.
 3. Do not pour concrete when ambient temperature is less than 40°F, and falling.
- F. Fabricated Steel Supports:
 1. Because of the small scale of the drawings, details of equipment support are not always shown. It shall be the responsibility of the contractor to provide supports as required for safe and adequate support.
 2. Fabricated steel supports and ladders may be shop or field-fabricated, and shall be in accord with details on drawings.

3. When details are not indicated, the contractor shall submit proposed support detail for review. The contractor shall bear all cost in producing this detail in the bid. This includes but is not limited to structural engineering support.
 4. Steel members shall be saw cut, with corners ground smooth, and shall be assembled with welded or bolted connections at Contractor's option. Connections shall be in accord with specified AISC Publications.
- G. Excavation, Trenching, and Backfilling:
1. Definitions:
 - a. Satisfactory material includes all materials except those classified "unsatisfactory", "unyielding" or "unstable".
 - b. Unsatisfactory material includes those materials containing roots, organic matter, trash, debris, frozen materials, stones larger than 3 inches in any dimension, and materials classified by ASTM D 2487 as OL, OH, and PT.
 - c. Unyielding material consists of rock and gravelly soils with stones greater than 3 inches in any dimension, or as defined by the pipe or tank manufacturer, whichever is smaller.
 - d. Unstable material consists of material too wet to properly support the pipe or tank.
 - e. Select granular material consists of well-graded sand, gravel, crushed gravel, crushed stone, or crushed gravel, crushed stone, or crushed slag composed of hard, tough, and durable particles, and shall contain not more than 10 percent by weight of material passing a No. 200 mesh sieve, and no less than 95 percent by weight passing the 1 inch sieve. The maximum allowable aggregate size shall be 3 inches, or the maximum size recommended by the pipe or tank manufacturer, whichever is smaller.
 2. Excavation, trenching, and backfilling for site utility piping systems as specified in DIVISION 31 - SITEWORK.
- H. Placing of Equipment:
1. Coordinate setting of equipment with the requirements of other trades so as to avoid conflicts and to insure compatibility. Equipment shall not block access for installation of other equipment.
 2. Set base mounted equipment on permanent and finished supports. Temporary support, if any, shall be removed prior to making final pipe, duct, or electrical connections to equipment.
 3. Adjust suspended equipment to final elevation prior to making pipe, duct or electrical connections.
 4. Exercise caution during equipment placing operations to insure that structure is not overloaded.
 5. Do not move heavy equipment across floor or roof of insufficient load bearing capacity to support such equipment. Provide bracing or shoring as required, or use crane to place equipment directly on permanent and finished support.
 6. Secure all roof mounted equipment to the structure adequately to resist overturning, uplift and sliding forces for basic wind speeds indicated for this location in Figure 1609 of the Florida Building Code, Latest Edition.

7. Guards shall be provided where appliances, equipment, fans or other components that require service are located within 10 feet of a roof edge or open side of a walking surface and such edge or open side is located more than 30 inches above the floor, roof or grade below. The guard shall extend not less than 30 inches beyond each end of such appliance, equipment, fan or component and the top of the guard shall be located not less than 42 inches above the elevated surface adjacent to the guard. The guard shall be constructed so as to prevent the passage of a 21-inch-diameter sphere and shall comply with the loading requirements for guards specified in the Florida Building Code.

END OF SECTION

SECTION 23 05 00
COMMON WORK RESULTS FOR HVAC SYSTEMS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.
- B. Comply with Sections 01 33 00 – Submittal Procedures and 01 60 00 – Material Equipment and Approved Equals.

1.2 ARTICLES INCLUDED

- A. Definitions.
- B. Permits, Fees and Notices.
- C. Applicable Publications.
- D. Code Compliance.
- E. Scope of Work.
- F. Record Drawings.
- G. Intent of Drawings and Specifications.
- H. Quality Assurance
- I. Submittals.
- J. Product Requirements, Equals and Substitutions.
- K. Manufacturers Instructions.
- L. Transportation and Handling.
- M. Storage and Protection.
- N. Cutting, Patching and Demolition.
- O. Cleaning Up/Removal of Debris.
- P. Operating and Maintenance Manuals.
- Q. Training of Owners Operators.
- R. Guarantee of Work.
- S. System Testing.

1.3 ARTICLES

- A. Definitions:
 - 1. The term "As indicated" means as shown on drawings by notes, graphics or schedules, or written into other portions of contract documents. Terms such as "shown", "noted", "scheduled" and "specified" have same meaning as "indicated", and are used to assist the reader in locating particular information.
 - 2. The term "Provide", means furnish and install as part of the work covered in Division 23.
 - 3. The term "Furnish" means furnish only, for installation, as part of this contract, by other Divisions.
 - 4. The term "Install only" means to install under the work of Division 23 equipment furnished by other Divisions, or by the Owner.
 - 5. The term "Owner's Representative" when referenced herein shall be the Architect or the Engineer acting as his designated representative unless otherwise noted.

6. The term "design" as it pertains to the work of this division shall describe the basic intent, component sizing, component relationships and overall architecture of the Plumbing system. The design is generally schematic in nature and will require specific detailing after the accepted products are determined.
 7. The term "detail" as it pertains to the work of this division shall describe the work required by the contractor to assure a fully coordinated installation of the material and equipment supplied. When requested, the contractor shall produce detailed shop drawings or sketches indicating the actual placement of the equipment or material supplied; also including how the equipment or material interfaces with work of other sections or divisions within the contract documents.
 8. The term "workman-like manner" as it pertains to the work of this division shall describe a neat well organized high quality installation system (piping, etc.). Routing shall be well thought out providing adequate service clearance and maximum use of space. Equipment placement shall exhibit proper clearances for service. All lines (piping, etc.) shall be run straight and true, parallel or perpendicular to building structure neatly supported.
 9. For additional definitions refer to the General Conditions.
- B. Permits, Fees and Notices: Comply with the General Conditions.
- C. Applicable Publications:
1. Publications listed in each Section form a part of that Section to the extent referenced.
 2. When a standard is specified by reference, comply with requirements of that standard, except when requirements are modified by the Contract Documents, or applicable codes establish stricter standards.
 3. The Publication or Standard is the publication in effect as of the bid date, except when a specific date is listed.
- D. Code Compliance:
1. Life Safety Code - NFPA 101
 2. Florida Building Code 2017
 3. Florida Accessibility Code, 2017
 4. National Electric Code 2014
 5. Florida Mechanical Code 2017)
 6. State Requirements for Educational Facilities (SREF), 2014
 7. NFPA Standards, Latest Edition.
- E. Scope of Work: The work to be performed under this Division consists of the satisfactory completion of all HVAC as indicated in the Contract Documents.
- F. Record Drawings: Comply with the General Conditions.
- G. Intent of Drawings and Specifications:
1. The intent of the drawings and specifications is to establish minimum acceptable quality standards for materials, equipment and workmanship, and to provide operable HVAC systems complete in every respect.
 2. Existing conditions, dimensions, etcetera, depicted on the drawings are taken from the "as-built" drawings of the original construction supplemented by field observation. The contractor is cautioned to field verify all existing conditions, dimensions, etcetera, notifying the Owner's Representative of any discrepancies other than those minor in nature, for direction, prior to ordering or fabricating equipment or materials. Anything mentioned in the specifications and not shown on the drawings, or shown on the drawings and not mentioned in the specifications, shall be of like effect as if shown or mentioned in both. In case of difference between drawing and specifications, the more stringent shall govern, unless the discrepancy conflicts with applicable codes, wherein the code shall govern.

3. The drawings are diagrammatic, intending to show general arrangement, capacity and location of system components, and are not intended to be rigid in detail. Final placement of equipment, other system components, and coordination of all related trades shall be the contractor's responsibility.
 4. Due to the small scale of the drawings, and to unforeseen job conditions, all required offsets and fittings may not be shown but shall be provided at no additional change in contract cost.
 5. In the event of a conflict, the Owner's Representative will render an interpretation in accordance with the General Conditions.
- H. Quality Assurance:
1. All equipment furnished under this Division shall be listed and labeled by U.L., ETL or a nationally recognized testing laboratory (NRTL).
 2. Material furnished under this Division shall be standard catalogued products of recognized manufacturers regularly engaged in the production of such material and shall be the latest design.
 3. Materials shall be the best of their respective kinds. Materials shall be new except where the specifications permit reuse of certain existing materials.
 4. Work provided for in these specifications shall be constructed and finished in every part in a workmanlike manner.
 5. All items necessary for the completion of the work and the successful operation of a product shall be provided even though not fully specified or indicated on the drawings.
 6. All work to be performed by qualified and experienced personnel specifically trained in their respective field.
 7. All work of this division shall be carefully interfaced with the work of other divisions to assure a complete, functioning system or systems.
- I. Submittals:
1. In addition to all other submittal requirements elsewhere in the contract documents, the contractor shall comply with the following.
 2. Submittal for acceptance is required only on those items specifically requested in the specification section that applies.
 3. For products and equipment that do not require a submittal for acceptance, submit a separate letter for each specification section certifying that all products and equipment will be provided in compliance with the contract documents.
 4. Provide submittal data in accordance with the General Conditions and/or as listed below.
 5. Designate in the construction schedule, or in a separate coordinated schedule, the dates for submission and the dates that the submittals will be needed in order to meet construction schedule. This schedule shall be submitted prior to or in conjunction with the first submittal. Processing of submittals may be delayed pending the receipt of this schedule at the reviewer's discretion.
 6. Submittal data shall be presented in a clear and thorough manner and referenced to the specification section.
 - a. Where applicable, data shall be identified by reference to sheet and detail, schedule or room numbers, equipment or unit number as shown on Contract Drawings.
 7. Prepare performance and product data as follows:
 - a. Clearly mark each copy to identify pertinent products or models, delete non-pertinent data.
 - b. Show performance characteristic and capacities.
 - c. Show dimensions and clearances required.
 - d. Show wiring or piping diagrams and controls.

- e. Clearly list any deviation in the submittals from the requirements of the contract documents.
- f. Include installation requirements.
8. Manufacturer's standard schematic drawings and diagrams:
 - a. Modify drawings and diagrams to delete information not applicable to the work of this project.
 - b. Supplement standard information to provide information specifically applicable to the work of this project.
9. Prohibition of Asbestos and PCB:
 - a. The use of any process involving asbestos or PCB, and the installation of any product, insulation, compound of material containing or incorporating asbestos or PCB, is prohibited. The requirements of this specification for complete and operating mechanical systems shall be met without the use of asbestos or PCB.
 - b. Prior to the Final Review field visit the Contractor shall certify in writing that the equipment and materials installed in this Project under this Division 22 contain no asbestos or PCB. Additionally, all manufacturers shall provide a statement with their submittal that indicates that their product contains no asbestos or PCB. This statement shall be signed by a duly authorized agent of the manufacturer.
10. Letter of Certification: Where a submittal is not required, provide letter certifying that the work will be completed in strict accordance of the specified requirements. In the event the contractor wishes to alter the requirements of the specification for whatever reason, this should be clearly explained in this letter noting that this alteration may require additional submittal requirements.
11. Schedules: Where schedules are called for, submit schedule indicating which products will be used and to what extent by system, location, size, etc.
12. Where samples are requested, samples shall be of sufficient size and quantity to clearly illustrate:
 - a. Functional characteristics of the product, with integral related parts and attachment devices.
 - b. Full range of color, texture and pattern.
 - c. Where a mock-up is specified, erect at the Project site, in a location acceptable to the Owner's Representative. Size or area shall be that specified or as agreed upon during pre-construction or other job site meetings.
 - d. Where mock-up is not a permanent part of the installation, remove mock-ups at conclusion of work or when acceptable to the Owner's Representative.
13. The Contractor shall:
 - a. Review Shop Drawings, Product Data and Samples prior to submission.
 - b. Determine and verify:
 - 1) Field measurements.
 - 2) Field construction criteria.
 - 3) Catalog numbers and similar data.
 - 4) Conformance with specifications.
 - 5) All submittals have been properly interfaced with the requirements of this and other divisions of work so as to assure a complete, functioning system in accordance with the contract documents.
 - 6) Provide ¼" drawings of ALL mechanical rooms, with dimensions clearly indicating equipment maintenance clearances and electrical NEC required clearances. NO mechanical room walls shall be built until the engineer and the owner have approved the shop drawings for the mechanical equipment and clearances.

- c. Coordinate each submittal with requirements of the work and of the Contract Documents.
 - d. Clearly identify any deviations in the submittals from requirements of the Contract Documents. Any deviations not specifically disclosed in the submittal shall be solely at the risk of the Contractor, and shall be subject to discovery at any time. Any undisclosed deviations shall be corrected by the Contractor to comply with the requirements of the Contract Documents at no cost to the Owner regardless of the action code accorded the submittal by the Owner's Representative.
 - e. Do not release equipment for shipment, begin fabrication or work on any items requiring submittals for acceptance until all submittals are returned with the Owner's Representative acceptance.
 - f. Make submittals promptly, and in such sequence as to cause no delay in the work or in the work of any other contractor.
14. Number of Submittals: Comply with the Division 1, Specification Section 01 33 00 – Submittal Procedures.
15. Submittals shall contain:
- a. The date of submission and the dates of any previous submissions.
 - b. The Project title and number.
 - c. Contract identification.
 - d. The names and phone numbers including personal contact of:
 - 1) Contractor.
 - 2) Supplier.
 - 3) Manufacturer.
 - e. Identification of the product, with the specification section number and contract document description clearly indicated.
 - f. Field dimensions, clearly identified as such.
 - g. Relation to adjacent or critical features of the work or materials.
 - h. Applicable standards.
 - i. Identification of deviations from Contract Documents.
 - j. Identification of revisions on re-submittals.
 - k. Contractor's stamp, initialed or signed, certifying to review of submittal, verification of products, field measurements and field construction criteria, and coordination of the information within the submittal with requirements of the work and of Contract Documents.
 - l. Each submittal shall be limited to a single specification section. Submittals shall not be grouped with other sections in common binders or under common control sheets except as defined in paragraph m. below. Each submittal shall have a cover/control sheet containing the information listed above (a thru k) and have a minimum of 8" x 3" clear space for the general contractors, engineers and architects review stamp.
 - m. The first group of submittals shall be sent in a minimum of one (or if required) two hard cover view type 3-ring binder(s) White, sized to hold 8-1/2" x 11" sheets:
 - 1) Binder is to be adequately sized to comfortably hold required submittals. Minimum spline size to be 1", maximum spline size to be 3" (provide additional binders if 3" size is not sufficient to properly hold submittals).
 - 2) Binder cover and spline to have outer clear vinyl pockets. Provide correct designation of project in each pocket. Description sheets are to be white with black letters, minimum of 11" high and full width of pocket. Description is to describe project and match project drawing/project manual description.
 - n. Submittals not complying with these requirements may be returned with no action taken at the reviewer's discretion.

16. Re-submittals shall contain:
 - a. The date of re-submission and the dates of all previous submissions.
 - b. A copy of the Engineer's comments from the previous submittal.
 - c. An itemized response to each of the Engineer's comments specifically outlining the changes or corrections being made. As an example; this could be either noting the page(s) of the previous submission that are affected and what changes have been made or noting specific additional information being provided.
 - d. Submittals not complying with these requirements may be returned with no action taken at the reviewer's discretion.
 - e. Turnaround time and copies as indicated in Section 01 33 00 – Submittal Procedures.
17. The Owner's Representative will (if they so desire):
 - a. Review submittals promptly and where special attention is requested, review in accordance with the schedule required.
 - b. Review the submittal for general compliance with the contract documents. The contractor is responsible for quantities, dimensions, placement of the product, coordination with all other trades occupying the space, maintain service clearance, function and compliance with the written installation instructions.
 - c. Turnaround time will be per Division 1.
 - d. Review comments will be per Division 1.
18. Resubmission requirements for "as specified" products.
 - a. Make any corrections or changes in the submittals required by the Owner's Representative and resubmit until accepted.
 - b. A submittal shall only be reviewed a maximum of 3 times. If upon the second resubmission an accepted action cannot be rendered (No Exceptions Noted or Make Corrections as Noted), the contractor shall supply the basis of design product and bear all costs incurred by the Owner's Representative during the review process until an accepted submittal is achieved.
19. The Contractor shall maintain one copy of all accepted submittal data including letters of compliance in a job site file.
- J. Product Requirements, Equals and Substitutions: *Comply with the General Conditions, but the following are in addition to:*
 1. In addition to all other requirements for submittals, equals and substitutions elsewhere in the contract documents, the contractor shall comply with the following.
 2. Product Requirements:
 - a. The specifications sections under Article 2.1 "ACCEPTABLE MANUFACTURER", lists suppliers found acceptable for this project. The names listed are manufacturers who meet the minimum acceptable standards that this project dictates. The list is furnished as a guide. Even though a manufacturer is named, he must still provide the type and quality of equipment specified as well as equipment that will fit within the allotted space and within the design weight allowance, etc. Being named does not imply permission for that manufacturer to provide an alternative product or design. Other manufacturers not named will be considered to be equal providing they furnish a product of the type and quality specified.

- b. In certain cases, foundations and/or structural supports or electrical requirements for equipment specified in this Division are provided under other divisions of the specifications. Where an alternate acceptable manufacturer's product is provided, this contractor shall coordinate the revised requirements and include an allowance for any cost differential.
 - c. If the list, under Article 2.1 "ACCEPTABLE MANUFACTURERS" names only one manufacturer followed by "No Substitutions" that product shall be supplied.
3. Substitutions: *Comply with the General Conditions, but the following are in addition to:*
- a. A substitution is defined as any product not meeting the requirements as outlined in PART 2 - PRODUCTS. A different design accomplishing the same result will be considered a substitution. The same design requiring a larger motor, or more space or a structural change to accommodate larger weight, etc., will be considered a substitution. If a manufacturer who is not listed as an "ACCEPTABLE MANUFACTURER" wants to have his product considered as an equal or as a substitution, he shall submit details to the Engineer 10 days in advance of bid date and a decision will be rendered. If necessary, a clarification will be issued in the form of an Addendum. No substitution requests shall be considered after the Bid.
 - b. Submit a separate request for each product, supported with complete data, with drawings and samples as appropriate, including.
 - 1) Comparison of the qualities of the proposed substitution with that specified in tabulated format.
 - 2) Changes required in other elements of the work because of the substitution.
 - 3) Effect on the construction schedule.
 - 4) Cost, extra credit or statement of no change in contract price.
 - 5) Any required license fees or royalties.
 - 6) Availability of maintenance service, and source of replacement materials.
 - c. The Engineer shall be the judge of the acceptability of the proposed substitution.
 - d. A request for a substitution constitutes that the Contractor:
 - 1) Has investigated the proposed product and determined that it is equal to or superior in all respects to that specified.
 - 2) Will provide the same warranties for the substitution as for the product specified.
 - 3) Will coordinate the installation of the substitution into the work, and make such other changes as may be required to make the work complete in all respects.
 - 4) Waives all claims for additional costs, under his responsibility, which may subsequently become apparent.
 - 5) Will absorb all costs incurred by the substitution when affecting other trades including but not limited to electrical, structural, architectural, etc.
 - 6) Will absorb any cost incurred by the Engineer in review of the substituted product if the acceptance of the substituted item creates the need for system modification and/or redesign, or if the substituting contractor exhibits negligence in his substituting procedure thus submitting inferior, misapplied or miss-sized equipment. In the event of additional engineering costs the billing structure shall be agreed upon prior to review by all involved parties.
 - 7) Will provide drawing to prove substituted manufacturer meets all accessibility requirements.
4. Engineer will review requests for substitutions with reasonable promptness, and will issue an addendum or notify Contractor, in writing, of the decision to accept or reject the requested substitution.

5. Substitutions will not be considered when they are indicated or implied on shop drawing or product data submittals, without separate written request, or if acceptance requires revision to the contract documents.
 6. The engineer will review substitution submittals for compliance a maximum of two times. If the submittal or substituted product does not comply with the contract documents on the second submittal, the submittal and product will be rejected and the specified product will be required.
 7. The contractor may request further review of the substitution after the second submittal rejection if the contractor agrees in writing to accept responsibility for the cost of additional review time and expenses by the Engineer.
 8. In the event a substitution is rejected, supply the products which constituted the basis of design at no change in the contract price.
 9. Installation of substitutions without the Owners approval shall be cause of immediate rejection and removal without extra cost to the Owner.
- K. Manufacturer's Instructions:
1. Installation of work shall comply with manufacturer's printed instructions.
 2. Should job conditions or specified requirements conflict with manufacturer's instructions, consult with Engineer for clarification. Do not proceed with work without clear instructions.
- L. Transportation and Handling: Comply with General Conditions.
- M. Storage and Protection:
1. Store products in accord with manufacturer's instructions, with seals and labels intact and legible.
 2. Store products to prevent damage by the elements. Space temperature shall be controlled as required to prevent condensation and metal corrosion or damage to electrical or electronic parts are the result of condensation.
 3. Arrange storage in a manner to provide easy access for inspection. Make periodic inspections of stored products to assure that products are maintained under specified conditions, and free from damage or deterioration.
 4. Provide protection as necessary to prevent damage after installation.
 5. Products which suffer damage due to improper storage shall not be installed and if found in place, shall be removed and replaced at the contractors expense.
- N. Cutting and Patching: Comply with the General Conditions.
- O. Cleaning Up/Removal of Debris:
1. Comply with the General Conditions.
 2. Maintain a clean work area. Construction debris shall be immediately removed from all newly erected work.
- P. Operating and Maintenance Manuals: *Comply with the General Conditions, but the following are in addition to:*
1. Quantity: Comply with the General Conditions.
 2. Format: Adequately sized for contents, minimum 1" and maximum 3" spline size, hard cover, view type, 8-1/2" x 11 loose leaf binders. Binder covers to have outer clear vinyl pocket on front cover and spline. Provide correct project designation and contents description in each pocket. Use as many as required. Do not overload binders.
 3. Content:
 - a. Cover sheet.
 - b. Table of contents (as follows):
 - 1) Description of systems.
 - 2) Design parameters.

- c. Point by Point System Check-out: Provide tabulated results indicating compliance with contract document requirements.
4. Detailed Preparation Requirements:
 - a. The cover sheet shall list: project name, location, architect, structure engineer, mechanical engineer and electrical engineering firm name with address, telephone number and project manager's name for this project.
 - b. Each major heading in the table of contents shall have a large distinctive, clearly marked, non-erasable, plastic encased tab.
 - c. The description of systems will be provided by the design engineer for insertion at the time of review and turn-over to owner. This description of systems will be an updated version of the narrative included in this Section and will be an overview of the entire system. It will be the basis for the starting of the owner's instruction program.
 - d. Each section shall have the following sub-tabs. Sub-tabs shall be similar to the main tabs but of a different color.
 - 1) Specifications: The specification shall be copied and inserted complete with all addenda.
 - 2) Submittal: This section shall include all accepted submittal data. If submittal was not required, include technical data as specified.
 - 3) Installation Instructions: If the product, such as pipe, etc., does not have any written installation instructions, include a statement "Manufacturer's Written Installation Instructions not Available - Product Installed in Accordance with Specifications and Good Practice".
 - 4) Operation and Maintenance Instructions: These shall be the written manufacturer's data edited to omit reference to products or data not applicable to this installation.
 - 5) Parts List: These shall be edited to omit reference to items not applying to this installation.
 - 6) Equipment Supplier: This section shall include the name, address and telephone number of the manufacturer's agent and/or service agency supplying or installing and starting up of the equipment.
 - 7) System Description: This section shall include that portion of the overall description included in the beginning of the manual as it applies to each sub-section. In sections such as pipe, valves and fittings, a statement shall be included "Not Applicable to this Section." Data for this section will be added by the design engineer when the manuals are submitted for review and forwarded to the owner.
- Q. Training of Owners Operators:
 1. The manufacturer shall provide a comprehensive training outline for the Owner & Engineer to review within 90 days of final completion.
 2. The manufacturer & contractor shall provide 24 hours of training on the plumbing system, plumbing fixtures and all water heating systems.
 3. The owners shall be given comprehensive training in the understanding of the systems and the operation and maintenance of each major piece of equipment.
 4. The contractor shall be responsible for scheduling the training which shall start with classroom sessions followed by hands on training on each piece of equipment. Hands on training shall include start-up, operation in all modes possible, shut-down and any emergency procedures.
 5. The manufacturer's representative shall provide the instructions on each major piece of equipment. These sessions shall use the printed installation, operation and maintenance instruction material included in the O&M manuals and shall emphasize safe and proper operating requirements and preventative maintenance.

- R. Guarantee of Work:
1. Comply with the General Conditions.
 2. Where applicable, furnish manufacturer's written warranty for materials and equipment.
 3. Insert warranties in appropriate locations in operating and maintenance manuals.
 4. Materials and equipment having seasonal operation limitations, shall be guaranteed for a minimum of one year from date of seasonally appropriate test, and acceptance in writing by the Owner, unless specific Division 23 specifications specify a longer period.
- S. System Testing:
1. Provide all necessary labor, materials and equipment to successfully complete all system testing necessary for building occupancy and owner acceptance.
 2. Provide all necessary labor, materials and equipment to assist contractors of other division to complete system testing necessary for building occupancy and owner acceptance, wherever an inter-relationship between Division 23 and the work of other divisions exists.
 3. Tests shall be repeated as necessary until all occupancy and operation permits are granted and the owner accepts the project.
 4. Testing schedule requirements per the Table below:

Training Schedule							
Div.	Training Description	Subcontractor	Demo . Date	Time	Hours	Comments	Personnel to attend training
	Energy Management System				16 hours	On the job owner training conducted by a technician fully qualified to conduct such training.	
	HVAC Systems				80 hours	Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain units. See specifications for complete list of training requirements.	

PART 2 – PRODUCTS (Not Applicable)

PART 3 – EXECUTION (Not Applicable)

END OF SECTION

SECTION 23 05 93
ADJUSTING, BALANCING AND SYSTEM TESTING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Specification Sections, apply to this Section.

1.2 WORK INCLUDED

- A. Checking each piece of equipment for proper installation and operation.
- B. Balancing air and water distribution systems to provide design fluid quantities.
- C. Measuring and recording of fluid quantities.
- D. Electrical measurement.
- E. Verification of performance of all equipment and sequence of operation of automatic controls.
- F. Checking sound levels and vibration isolators for proper function and measurement and correction where a problem or question of acceptability exists.
- G. Recording and reporting results on sub-contractors standard report forms and on commissioning data sheets where these have been provided.
- H. Provide testing of all smoke detectors that are installed in the HVAC system.
- I. The HVAC system shall be tested and balanced twice: once in the summer cooling mode and once in the winter heating mode.

1.3 REFERENCES

- A. Air Diffusion Council (ADC) 1062R3 Equipment Test Code
- B. Associated Air Balance Council (AABC)
National Standards for Field Measurements and Instrumentation, Total Balance System Balance, Air Distribution - Hydronic Systems, Volume 1.

1.4 SUBMITTALS

- A. Submit complete description of procedures, instrument calibration and qualifications of personnel actually doing testing and balancing on this project prior to beginning of any balancing.
- B. Submit schedules of test data readings in organized, schematic, tabulated format. Include schematic drawing showing location of all readings.
- C. Submit as-built drawings showing locations of all readings.

1.5 QUALITY ASSURANCE

- A. Adjusting, balancing and testing procedures and compilation of test data shall be performed by a Certified Test and Balance Engineer or by personnel trained and supervised by a Certified Test and Balance Engineer.
- B. Test and balance personnel shall be qualified to perform testing and balancing in accordance with AABC or NEBB procedures.

1.6 TOLERANCES

- A. Balance final air and water flow to within plus or minus 5 percent of specified quantities. Caution is urged on systems where diversity has been taken and the total flow exceeds the equipment capacity. In this case, the system must be sectioned as necessary to get proper terminal flow.

1.7 GENERAL COMMENTS

- A. Water Balance: Readings from venturi flow meters, or automatic pressure independent flow control devices will be given highest priority as to accuracy. Where neither is specified pump curves and chiller or boiler pressure drops are to be correlated to establish flow. Pressure drop across coils or chillers is to be used to proportion flow. Volt and ampere readings will be used as checks. Temperature data will be used only as a performance check and not for balancing.
- B. Air Balance: Readings from a pitot tube traverse will be given highest priority as to accuracy. Terminal flow shall be as taken from the terminal DDC flow readings. Outlet flow as established by flow hood will be used to pro-rate air flow. Pressure readings as well as voltage and ampere readings will be used for check purposes only. Temperature readings will be used as a check against performance.
- C. All readings shall be cross-checked for accuracy. These cross-checks shall be tabulated within the report.

PART 2 – PRODUCTS (Not Applicable)

PART 3 - EXECUTION

3.1 INTENT OF DRAWINGS AND SPECIFICATIONS

- A. Review drawings and specifications with regard to adjusting and balancing.
- B. Additional balancing devices which, in the opinion of the TAB sub-contractor, would aid in the adjusting and balancing of the systems shall be brought to the attention of the contractor prior to bid time so that the contractor may make allowances to cover the provision of these additional devices in the original bid.
- C. Minor modifications in system design, which in the opinion of the Contractor, would aid in the adjusting and balancing of the systems may be provided subject to approval of the Owner's Representative at no additional cost to the Owner. Design modifications shall not lessen the operating efficiency of the systems.

3.2 WATER BALANCE

- A. Ascertain that piping systems have been cleaned, flushed, drained and properly refilled and that all strainer baskets have been removed, cleaned and properly reinstalled prior to beginning water balancing procedure.
- B. In the event that TAB work is started prior to the completion of the water treatment portion of work, the TAB contractor shall make a random recheck as directed by the Owner's Representative. The results of this re-check shall be included in the final report.
- C. Variable flow pumping systems having two-way control valves and using automatic pressure independent system of flow control for secondary hot water heating and chilled water systems.

1. With one pump running and all manual and automatic control valves open, record GPM stamped on each automatic flow control device and read and record the pressure drop across those which have dual pressure taps, as well as across each coil and applicable equipment.
 2. With pump running as described above and all manual and automatic control valves open read and record pressure drop across each pump. Also read and record pressure drop at shut off. Plot these points on the submitted pump curves using the sum of the flow control device GPM as the total system flow.
 3. Record the pump speed required to get the pressure drop across the flow control valve having the highest pressure drop to 6 PSI. If this is 85% or greater, no pump impeller change will be required. If less than 85%, the pump impeller will have to be trimmed. Advise the Owners Representative before proceeding.
 4. Operate lag pump to be sure performance is the same at each step.
 5. Manually set pump speed to 20% (minimum speed) and record flow and pressure difference.
- D. For constant flow systems without automatic flow control devices, using manual valves with memory stop. Before balancing the system, the following procedures shall be executed. Where multiple cooling towers and chillers are shown, all systems shall be in operation.
1. With all balancing devices and all manual and automatic control valves wide open, read and record pressure drop across each chiller.
 2. With all balancing devices and all manual and automatic control valves wide open, read and record pressure drop across each pump. Also read and record pressure drop across pump at shut off. Plot point on submitted pump curve.
 3. If pressure drop exceeds the design and the pump pressure readings indicated a flow in excess of design, the pump impeller may have to be trimmed. Submit this data to the Owners Representative for early review, before proceeding with balancing to determine if an impeller trim is warranted.
 4. In multiple unit systems, balance with all units in operation. Then record readings with each possible combination in use, i.e., in a three chiller installation, balance with all three in operation, then record each combination of two and finally each individual unit operating alone.

3.3 AIR BALANCE

- A. Check system visually and audibly for leakage and proceed with balancing as outlined by AABC or NEBB.
- B. Balance for full flow shall be based on dirty friction loss across the filters. Artificially blank-off sections on a uniform pattern as required to simulate this condition.
- C. Variable Volume Systems:
 1. With supply fan running at 100% speed and all terminals calling for full airflow, read and record flow and fan suction and discharge static pressure readings. Pressure readings shall be obtained using procedures outlined in AMCA Publication 203-90 Field Performance Measurement of Fan Systems. Plot on submitted fan curve.
 2. Set flow at each terminal for maximum values as indicated in terminal schedule using hand held operators terminal (HHOT) furnished with the terminal controls. Provide actual measured outlet flow to temperature controls sub-contractor for setting calibration constants in DDC controls. Normally diversity is taken in the fan selection. Close other terminals as required to get full flow as required for balancing. Pro-rate terminal flow to diffusers.
 3. Set minimum flow to values as indicated in terminal schedule.
 4. Where applicable, adjust return fan for specified differential flow. Record fan signal fan speed and other data at full flow and at minimum flow.

5. Record all data on terminals and supply and return fan including voltage and amperage on primary air fans and return fans at full flow.

D. Constant Volume Systems:

1. Adjust each fan to deliver the specified quantity of air at the specified temperatures to all areas of the building served by the air system. Where the installed drive can not be adjusted to obtain the required flow, advise the contractor so that the necessary drive change can be made. Adjust speed, in direct proportion to actual vs. required cfm. Exercise caution because amps vary with the cube of speed.
2. Determine air volume in ducts by use of pitot tube, and inclined manometer. Plug all holes in duct.
3. Determine air quantity through air grilles or diffusers by use of flow hood with direct readout meter calibrated in CFM. If use of flow hood is not possible, use velometer nozzle as recommended by air device manufacturer. Calculate air quantity based on air device area factors provided by the air device manufacturer.
4. Compare duct traverse to accumulated airflow at diffusers. If the two do not reconcile, examine system for leaks and, report to contractor so that he can repair and repeat.

3.4 AIR HANDLING UNIT PERFORMANCE TESTING

- A. Recognizing that it will be unlikely that the performance testing will be done on a design day, cooling and heating coil performance shall be recorded as follows.
 1. With fan delivering design air flow and control valves open to deliver design water flow, read and record entering and leaving drybulb and wetbulb temperatures, air and waterside flow, pressure loss values and water temperatures.
 2. Through the contractor, request performance data from the equipment supplier based on the measured air flow and entering air temperatures and measured water flow and entering water temperature. Submit this data with test data for review.

3.6 CONTROLS ADJUSTMENT

- A. Check the automatic temperature controls to ascertain that the specified sequence of operation is occurring. Record thermostat set point and room conditions in each space. This includes checking each terminal box to ensure that supply air goes to minimum position before heat comes on.
- B. Compare temperature of space (taken with test instrument) to temperature read by thermostat or temperature sensor. Tabulate results.

3.7 TEST DATA SCHEDULES

- A. Submit typewritten schedules of test data readings.
- B. Schedules shall record the specified reading, the first reading taken and the final balanced reading for the following items.
- C. Where Commissioning Forms are provided, equipment data shall be recorded on these forms for comparison with submitted design data.
- D. In the case of off season performance testing of air handling equipment and refrigeration equipment, include manufacturer's projected performance for comparison.
- E. Pumps (Provide all parameters in the normal and ice making modes):
 - 1 Mark number
 - 2 Manufacturer and model number
 - 3 gpm flow - specified and actual

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- 4 Shut-off head
 - 5 Pump heat and full load amperage - specified and actual
 - 6 Motor hp - specified and actual
 - 7 Voltage, phase, and cycles - specified and actual
- F. Fans:
- 1 Mark number
 - 2 Manufacturer and model number
 - 3 Total cfm supply and rpm - specified and actual
 - 4 Static pressure (discharge static - suction static)
 - 5 Full load amperage - specified and actual
 - 6 Voltage, phase, and cycles - specified and actual
- G. Air Devices (Grilles, Registers, Diffusers, and Louvers):
- 1 Mark number
 - 2 Room number
 - 3 cfm - specified and actual
 - 4 Size
 - 5 Effective area
 - 6 Velocity FPM - specified and actual
- H. Chiller (Provide all parameters in the normal and ice making modes):
- 1 Mark number
 - 2 Unit manufacturer and model number
 - 3 Total chilled water and condenser water gpm - specified and actual
 - 4 Chilled water entering and leaving temperature - specified and actual - one hour log
 - 5 Cooler and condenser pressure drop - specified and actual
 - 6 Compressors full load amperage - specified and actual
 - 7 Voltage, phase, and cycle - specified and actual
 - 8 Ambient temperature, DB/WB, time of day, and weather conditions at time of test
 - 9 Cooler tons, condenser tons, and operating kW compared to specified conditions
- I. Variable Volume Boxes:
- 1 Mark number
 - 2 Unit manufacturer and model number
 - 3 Location and room number
 - 4 Air handler number
 - 5 Maximum / minimum and heating supply cfm - specified and actual
 - 6 For DDC controls: measure and record computer readout and calibration factor at design conditions.
 - 7 Electric heat, KW – specified and actual
 - 8 Voltage, phase and cycles – specified and actual
- J. Air Monitor:
- 1 Mark number
 - 2 Unit manufacturer and model number
 - 3 Duct size/monitor size factor
 - 4 Cfm - specified and actual.
 - 5 Velocity or velocity pressure
- K. Direct Expansion Cooling Coil:
1. Designation.
 2. Nameplate data.
 3. Entering air DB (F).
 4. Entering air WB (F).
 5. Leaving air DB (F).

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6. Leaving air WB (F).
 7. Evaporative pressure (PSIG).
 8. Air flow (CFM).
 9. Load calculation (tons).
- L. Heat Exchangers:
1. Designation.
 2. Nameplate data.
 3. Pressure, entering and leaving ice water.
 4. Calculated/measured flow (GPM) ice water.
 5. Temperature, entering and leaving chilled water.
 6. Pressure, entering and leaving chilled water.
 7. Calculated/measured flow (GPM) chilled water.
 8. Temperature, entering and leaving chilled water.
 9. Heat balance: ice water tons vs. chilled water tons.
- M. Kitchen Exhaust Hoods:
1. Designation.
 2. Nameplate data.
 3. Exhaust air CFM, from pilot tube traverse.
 4. CFM and velocity in capture area.
 5. All final readings used to determine cfm.
- N. Motors:
1. Designation.
 2. Nameplate HP, voltage and full load amperes.
 3. RPM.
 4. Motor amperes and voltage under operating conditions.
 5. For belt drive applications, motor amperes and voltage under no load condition.
- O. Fans:
1. Designation.
 2. Nameplate data.
 3. RPM.
 4. Static pressure, inlet and discharge.
 5. CFM from pitot tube traverse of discharge duct.
 6. Final pitot tube traverse sheets showing all readings.
- P. Main and Sub-main Ducts:
1. Designation and location.
 2. CFM from pitot tube traverse.
 3. Final pitot tube traverse sheets showing all readings.
- Q. Air Handlers:
1. Mark number
 2. Unit manufacturers and model number
 3. Total supply air cfm and rpm - specified and actual
 4. Return air cfm - specified and actual
 5. Outside air cfm - specified and actual
 6. Unit static pressure profile, including total fan static
 7. Specified total and external static pressure
 8. Water gpm flow, coil pressure drop, and entering and leaving temps - specified and actual
 9. Coil - entering and leaving air DB/◆F and WB/◆F - specified and actual
 10. Outside air DBF and WBF at time of test
 11. Voltage, phase, and cycle specified load conditions

12. Hand calculations of the BTUh at test conditions of Total cooling, Latent cooling and Sensible cooling.
13. Btu per hour when converted to specified load conditions gpm by means of heat transfer test

3.8 OPERATING TESTS

- A. Operate systems to demonstrate that systems have been properly adjusted and balanced, and to demonstrate that the systems' performance conforms with the intent of the specifications and drawings.
- B. The balancing contractor shall make available to the Owner's operating personnel a Certified Test and Balance Engineer for a minimum of 16 hours, two working days, not necessarily consecutive, with all necessary equipment to demonstrate that all systems operate as intended and that the balancing reports are accurate.
- C. This demonstration will occur after the balancing contractor has submitted his reports to confirm that all systems or portions of the systems that coincide with the building's occupancy schedule, are adjusted and balanced.
- D. Conduct tests with natural building heating and/or cooling loads for a minimum 4 hours duration.

END OF SECTION

SECTION 23 07 00
HVAC INSULATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.
- B. Refer to Division 1 for all requirements pertaining to General Provisions.

1.2 WORK INCLUDED

- A. Duct Systems Insulation.
- B. Piping Systems Insulation.
- C. Equipment Insulation.
- D. Underground Pipe Insulation.
- E. Cold Pipe Hanger Support Blocks.
- F. Accessories.

1.3 QUALITY ASSURANCE

- A. All products within the conditioned air stream or active plenums shall comply with the NFPA 90A Flame/Smoke rating of 25/50 and comply with UL 181 erosion limitations. Fire hazard ratings shall be as determined by NFPA-255, "Method of Test of Surface Burning Characteristics of Building Materials" - ASTM E84 or UL 723.
- B. All adhesives, cements, finishes, jackets, etc., shall be UL listed or labeled for use as applied to insulation and designed specifically for use in the installation.
- C. All insulation shall be installed in accordance with National Commercial & Industrial Insulation Standards (NCIA).
- D. Kitchen hood exhaust duct fireproofing system shall have specific acceptance by ICBO, and SBCCI. Material shall be non-hazardous and contain no asbestos or toxic materials. Suitable for 2 hour fire rating.

1.4 SUBMITTALS

- A. Submit schedule indicating type of insulation, thickness, vapor barrier or coating by system and size.
- B. Product data, along with installation operation and maintenance instructions, shall be included in the operation and maintenance manuals.
- C. Submit details of insulated removable covers using the actual equipment dimensions, concrete base sizes and piping arrangements.
- D. Submit in accordance with Division 1 requirements.

1.5 GENERAL REQUIREMENTS

- A. Factory-applied insulation is specified under the applicable equipment Section of these specifications. It is listed here for reference only.
- B. Acoustical duct liner is specified under Section 23 31 01 - Shop Fabricated Ductwork. It is listed here for reference only.

- C. Packages and standard containers of materials shall be delivered unopened to job site and shall have the manufacturer's label attached giving a complete description of the material.

1.6 DEFINITIONS

- A. The term "exposed" means exposed to view in finished spaces, in equipment rooms, in fan rooms, in closets, in utility corridors, in tunnels, on roof, in storage rooms, and in other spaces as indicated.
- B. The term "concealed" means concealed from view, and includes all spaces not defined as exposed.
- C. The term "unconditioned" space shall mean all places where the temperature surrounding the pipe or duct has not been conditioned consistent with conditioned spaces, and shall include mechanical equipment rooms, non-active ceiling plenums, and non-accessible chases. This term shall also include conditioned spaces where the humidity levels are allowed to rise above 65% RH.

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

- A. Fiberglass Insulation:
 - 1. Owens-Corning Fiberglas
 - 2. Knauf Fiberglass
 - 3. CertainTeed
 - 4. Johns Manville
- B. Closed Cell Elastomeric Insulation:
 - 1. Armacell LLC
 - 2. Johns Manville
 - 3. Rubatex
- C. Foamglass Insulation:
 - 1. Pittsburgh Corning
 - 2. Cell-U-Foam Corp.

2.2 DUCT INSULATION AND FIREPROOFING REQUIREMENTS

- A. Refer to the drawings for insulation size and type requirements. Please contact the engineer prior to bid with any questions regarding the insulation requirements.

2.3 PIPE INSULATION REQUIREMENTS

- A. Refer to Section 23 02 00 for PVC jacket color specifications requirements on all piping exposed or concealed.

2.4 MATERIALS

- A. Duct Insulation: Blanket Fiberglass: Flexible fibrous glass, flame retardant factory laminated foil-skrim-kraft (FSK) vapor barrier, 2" stapling flange, maximum vapor permeance of .02 perm/in., minimum density of 1.5 lb/cf, maximum conductivity per 1" thickness of .28 at 75°F mean temperature. Based on Knauf Duct Wrap.
- B. Pipe Insulation (to 450°F):

1. Rigid Fiberglass: Resin bonded fibrous glass, flame retardant, factory applied all service jacket vapor barrier with self sealing pressure sensitive lap joints, molded to accommodate pipe, maximum vapor permeance of .02 perm/in. and a puncture resistance of 50 units, minimum density 4.0 lb/cf, maximum conductivity per 1" thickness of .23 at 75°F, .29 at 200°F and .43 at 400°F mean temperature. Based on Knauf Pipe Insulation.
 2. Closed Cell Elastomeric (Small Pipe Sizes up to 5 Inches): Flexible, elastomeric, closed cellular, tubular molded to accommodate piping, smooth outer surface suitable for painting with vinyl lacquer type coating, water resistant, non absorbent, ozone resistant, minimum density of 4 lb/cf, maximum conductivity per 1" thickness of .27 at 75°F mean temperature. Based on Armacell LLC AP Armaflex and Self-seal Armaflex 2000.
 3. Closed Cell Elastomeric (Large Pipe Sizes, 6" and Larger): Sheet type, flexible, elastomeric, closed cellular, smooth outer surface suitable for painting with vinyl lacquer type coating, water resistant, non absorbent, ozone resistant, minimum density of 4 lb/cf, maximum conductivity per 1" thickness of 2.7 at 75°F mean temperature. Based on Armacell LLC Armaflex II.
 4. Foamglas: Rigid, preformed sections of 100% rigid cellular glass dimensionally complying with ASTM C585 standards, non-absorptive of moisture after immersion, water vapor permeability 0.00 perm/in. impervious to common acids (except hydrofluoric), non-combustible, 100 PSI compressive strength when capped with hot asphalt, 8.5 #/cu.ft. density, thermal conductivity 0.33 BTU-In./Hr./Sq.Ft./F @ 50°F. Based on Pittsburgh Corning Foamglas.
- C. Equipment Insulation:
1. Closed Cell Elastomeric Sheet type, flexible, elastomeric, closed cellular, smooth outer surface suitable for painting with vinyl lacquer type coating, water resistant, non absorbent, ozone resistant, minimum density of 6 lb/cf, maximum conductivity per 1" thickness of .27 at 75°F mean temperature. Based on Armacell LLC Armaflex II.
 2. Foamglas: Sections of 100% rigid cellular glass, non-absorptive of moisture after immersion, water vapor permeability 0.00 perm/in., impervious to common acids (except hydrofluoric), non-combustible, 100 PSI compressive strength when capped with hot asphalt, 8.5 #/cu. ft. density, thermal conductivity 0.32 BTU-In./Hr./Sq. Ft./F @ 50°F. Based on Pittsburgh Corning Foamglas.
- D. Insulation Accessories: Aluminum Pipe Jacket and Fitting Covers: Jacket shall be 0.016" thick (26 gauge) embossed aluminum, sized to provide a 2" (min.) lap joint both longitudinally and circumferentially, with 3/4" min. wide x 0.015" min. (30 gauge) thick draw bands. Fitting covers shall be aluminum, 0.025" (22 gauge), min., thickness.
- E. Cold Pipe Hanger Support Blocks: Lightweight, rigid, closed cell material having 100 lb/sq.in. compressive strength when capped with hot asphalt according to ASTM C240. Based on Pittsburgh Corning Foamglas.
- F. Accessories:
1. Aluminum Pipe Jacket and Fitting Covers: Jacket .016" thick (28 ga.) embossed aluminum sized to provide a minimum 2" lap joint both longitudinal and circumferentially, minimum 3/4 inch x .015 inch thick (30 ga) draw bands. Covers .024 inch thick.
 2. PVC pipe jacket and fitting covers used with insulation for pipe, elbows, tees, couplings, 25/50 flame/smoke ratings, suitable for temperatures to 500°F.
 3. Glass Cloth Pipe, Duct and Equipment Jacket: Glass lagging cloth, 8 oz/sy treated weight. Secure with elastomeric insulating adhesive on elastomeric insulation, for fiberglass insulation use appropriate mastic finish as recommended by the insulation manufacturer with the perm rating of the mastic equal to or less than that of the insulation it is sealing.
 4. Corner angles shall be minimum 28 gauge, 1 inch by 1 inch aluminum adhered to 2 inch by 2 inch heavy kraft paper.

5. Glass tape shall be a minimum density of 1.6 ounces per square yard, 4 inch wide with a 10 x 10 thread count per inch of width. Glass cloth shall be untreated.
6. Staples shall be outward clinching type, Type 304 or 316 stainless steel in accord with ASTM A 167 or Monel® coated.
7. Wire shall be soft annealed galvanized, or copper, 16 gauge, or nickel copper alloy.
8. Closed cell elastomeric insulated finish shall be a white water based flexible, acrylic latex enamel equal to WB Armaflex finish.
9. Insulation Tape: Closed cell elastomeric insulation: 2" wide x 1/8" thick.
10. Elastomeric Insulation Adhesive: Air drying contact adhesive for securing sheets to flat or curved metal surfaces and joining seams and butt joints of elastomeric insulation. Suitable for temperatures to 180°F, dried film not to exceed 25 for flame spread and 50 for smoke development when tested per ASTM E 84-84A method.
11. Vapor Barrier Mastic: Air drying flexible water based mastic used for applying a vapor barrier joint with glass cloth at insulation joints. Suitable for temperatures to 180°F, wet and dried film not to exceed 25 for flame spread and 50 for smoke development when tested per ASTM E 84-84A method. Maximum Perm rating of 0.08. , Childers Products Company, Inc. CP-35 Chil Therm® WB, Foster Products Corp. Product Data 30-80 Foster Vapor Safe® Coating, Marathon Industries, Inc. 590 LO-PERM, Richard's Paint Manufacturing CO., Inc. VBM-4, Vimasco Corp. 749 Vapor-Blok, or equal.
12. Acrylic Latex Finish and Sealers:
 - a. Elastomeric Insulations: Air drying flexible water based finish used for finishing flexible elastomeric insulation. Suitable for temperatures to 180°F, wet and dried film not to exceed 25 for flame spread and 50 for smoke development when tested per ASTM E 84-84A method. Armacell LLC WB Armaflex finish.
 - b. Foamglass Insulation: Air drying flexible water based sealer used for applying a vapor barrier seal over microscopic cracks that develop in the insulation. Suitable for temperatures to 180°F, wet and dried film not to exceed 25 for flame spread and 50 for smoke development when tested per ASTM E 84-84A method. Maximum Perm rating of 0.08. , Childers Products Company, Inc. CP-35 Chil Therm® WB, Foster Products Corp. Product Data 30-80 Foster Vapor Safe® Coating, Marathon Industries, Inc. 590 LO-PERM, Richard's Paint Manufacturing CO., Inc. VBM-4, Vimasco Corp. 749 Vapor-Blok, or equal.

PART 3 - EXECUTION

3.1 GENERAL REQUIREMENTS

- A. Install all insulation in strict accordance with the manufacturers written installation instructions.
- B. Provide a PVC jacket on all exposed rain leader piping, including but not limited to the Gym.
- C. All insulation work shall be performed by skilled mechanics regularly engaged in the insulation trade.
- D. Properly coordinate the insulation work with the other trades so that installation is performed with a minimum of conflict.
- E. Insulation shall not be applied on any piping or duct system requiring testing until testing is completed and approved by Engineer.
- F. Insulation shall not be applied until all systems are clean, dry, free of dirt, dust or grease.
- G. The finished installation shall present a neat and acceptable appearance which includes but is not limited to: all jackets smooth, all vapor barriers sealed properly, no evidence of "ballooning" of the jackets, or sagging insulation, all valves, dampers, gauges, unions, etc. accessible. The Engineer shall be the final judge of acceptance of workmanship.

- H. All equipment nameplates on hot equipment shall be left uncovered. All equipment nameplates on cold equipment shall have a removable section sized to expose the nameplate. This section shall be clearly marked "NAMEPLATE".
- I. If proper maintenance procedures require access to the insulated equipment removable panels, sections or covers shall be provided to accomplish this. These access devices shall be constructed in a manner to assure easy access and sturdy construction. The contractor shall assume the responsibility to coordinate all equipment requiring insulation to be either factory or field insulated.
- J. Insulation and accessories shall be applied only at suitable application temperature and conditions as recommended by the manufacturer. Do not apply insulation to any surface while it is wet.
- K. Insulation shall be protected from moisture and weather during storage and installation.
- L. Insulation which has sustained moisture damage, torn jackets, or other damage due to improper storage or other reasons shall not be used. If evidence of this is sighted the Owner's representative reserves the right to require the insulating contractor to remove any and/or all insulation until the Engineer is satisfied that there is no longer any inferior insulation installed on this project.
- M. Insulation, fabric and jacketing shall be protected from damage during construction. Damage by the insulator shall be repaired without cost to the Owner. Damage by others shall be reported in writing to the contractor.
- N. The insulation subcontractor is responsible for proper material storage at the work site.
- O. Work performed prior to receipt of approved documents or submittals, which later proves to be incorrect or inappropriate, shall be promptly replaced by the contractor without cost to the purchaser.
- P. Insulation shall not be installed until adequate access and clearances at control mechanisms, dampers, sleeves, columns and walls have been provided.
- Q. All insulation at handholes, access doors or other openings, and adjacent to flanges and valves shall be neatly finished where exposed to view.
- R. All materials, accessories and methods of installation and fabrication are subject to the Owner's Representatives inspection and approval during any phase of the work.
- S. The insulation subcontractor shall prevent the accumulation of insulation debris in the buildings and on the premises of the Owner.
- T. The insulation subcontractor shall be responsible for his own safety program at the work site, and shall provide instruction on safe practices for his workers assigned to the project. All employees are subject to the work rules at the job site.
- U. The insulation subcontractor shall familiarize himself with the progress and execution of the job and notify the proper parties of interferences and any problems with the proper installation of his materials.

3.2 INSTALLATION

- A. Duct Insulation:
 - 1. General:
 - a. Insulate or internally line all flexible duct connectors equal to or greater than adjacent insulation thickness.
 - b. The tops of all diffusers shall be insulated same as connecting ductwork to prevent condensation.
 - c. Duct insulation at fire dampers shall be extended over supporting angle iron and sealed to wall.
 - 2. Blanket Fiberglass Insulation:

- a. Insulation shall be tightly wrapped on the ductwork with all circumferential joints butted and longitudinal joints lapped 2 inches and stapled. Joints shall be finished with two coats of an approved vapor barrier mastic, reinforced with glass cloth extending 2 inches onto adjacent insulation. One coat of mastic shall be applied to the insulation prior to the application of the glass cloth, which shall be embedded in the mastic to ensure complete adhesion of the cloth. Additionally, secure insulation to bottom of rectangular ducts over 24 inches wide with weld pins at no more than 18 inches on center.
 - b. Insulation shall be butted with facing overlapping all joints shall be finished with two coats of an approved vapor barrier mastic, reinforced with glass cloth extending 2 inches onto adjacent insulation. One coat of mastic shall be applied to the insulation prior to the application of the glass cloth, which shall be embedded in the mastic to ensure complete adhesion of the cloth. Breaks, punctures, pin penetrations in facing shall be sealed with vapor barrier tape and vapor barrier adhesive.
3. Rigid Fiberglass Insulation:
- a. Use boards in largest possible size to minimize seams. Do not use "scraps".
 - b. Shall be installed in all non-public exposed areas up to 10'-0" above finished floor.
 - c. Provide corner angles where insulation is subject to harm.
 - d. All fasteners shall be non corroding.
 - e. The insulation shall be applied by use of cup head weld pins. Such fasteners shall be spaced in accordance with NCIA recommendations, where NCIA standards do not address exact dimensions, cup head weld pins shall be spaced on 12" centers. Pin caps shall be covered with a round vapor seal patch that matches the jacket on the ASJ board. On cold ducts, these shall be coated so as to not cause condensation.
 - f. Ducts having sharp bends shall have the insulation scored as required to conform to the curved surfaces to provide a neat and acceptable appearance when finished.
 - g. Insulation edges and joints shall be finished with two coats of an approved vapor barrier mastic, reinforced with glass cloth extending 2 inches onto adjacent insulation. One coat of mastic shall be applied to the insulation prior to the application of the glass cloth, which shall be embedded in the mastic to ensure complete adhesion of the cloth.
 - h. Generally, rigid fiberglass material will only be used in finished or exposed areas, and it is intended that the finish present a neat and uniform appearance as to color and workmanship.
 - i. In finished areas, molded glass fiber insulation shall be used to insulate round ducts where commercially available sizes can be used.
 - j. Fittings on round ducts in finished areas shall be covered with premolded fiberglass fitting insulators equal to Insul-Coustic where sizes are available. For sizes where premolded fittings are not available use miter-cut segments of molded pipe insulation, wired in place, with all joints sealed with adhesive and smoothed out with a coat of insulating cement.
 - k. On cold ducts, the fittings shall be finished with two coats of an approved vapor barrier mastic, reinforced with glass cloth extending 2 inches onto adjacent insulation. One coat of mastic shall be applied to the insulation prior to the application of the glass cloth, which shall be embedded in the mastic to ensure complete adhesion of the cloth. Hot ducts shall be finished in a similar manner, except the mastic need not be of the vapor barrier type.

B. Pipe Insulation:

1. General:

- a. All locations where the insulated surface is supported by hangers, the insulation shall be protected by shields or saddles properly skimmed to maintain a smooth outer surface, and proper insulation thickness. Chilled water piping, 3" and over shall have a section of foamglas insulation installed between the pipe and shield. 3 and 4" to be 12" long, 5" and 6" to be 18" long and 8" and over, 24" long. If the possibility exists that the hanger may conduct the temperature of the conveyed medium and thus cause condensation or personal injury due to high temperature, the hanger shall also be insulated. Joints between foamglas and pipe insulation shall be properly sealed.
 - b. All devices connected to or in line with the piping system shall be insulated greater than or equal to the connecting piping. This includes but is not limited to valves, air separators, expansion tanks, control valves, control devices, gauge connections, thermometer stems, chemical feed equipment, piping flexible connectors, etc. This is particularly important on ice water and refrigerant lines.
 - c. The insulation at threaded unions in steam and hot water piping shall be tapered and terminated with cement and glass lagging cloth and lagging adhesives.
 - d. Insulate exterior surfaces of all anchors and guides for chilled water and dual temperature piping systems.
 - e. A complete moisture and vapor barrier shall be installed wherever insulation is penetrated by hangers or other projections through insulation and in contact with cold surfaces for which a vapor seal is specified.
 - f. Cover fittings, flanges, unions, valves, anchors, and accessories with premolded or segmented insulation of the same thickness and material as the adjoining pipe insulation. Where nesting size insulation is used overlap pipe insulation 2 inches or one pipe diameter. Fill voids with insulating cement and trowel smooth. Elbows shall have not less than 3 segments per elbow. Secure insulation with wire or tape until finish is applied. Blanket inserts in lieu of premolded or segmented insulation is not allowed. Cover fittings with preformed PVC fitting covers.
 - g. Wrap all pressure gauge taps, thermometer wells and all other penetrations through insulation with closed cell insulation tape so as to prevent condensation.
 - h. Seal all raw edges of insulation.
 - i. For piping supported by hangers outdoors, apply a rainshield to prevent water entry.
2. Rigid Fiberglass:
 - a. Provide PVC fitting covers for all fittings.
 - b. Align all jacket seams.
 - c. Assure all vapor barriers are properly sealed.
 - d. Provide PVC jacket over all exposed insulation in the equipment room.
 - e. All corner angles below 6'-10" shall have padded insulation and be marked with yellow stripes.
 3. Closed Cell Elastomeric:
 - a. All joints shall be sealed with adhesives.
 - b. Where the thickness is to be obtained by use of two layers of insulation, install with staggered joints.
 - c. Finish:
 - 1) Concealed Indoors: No additional finish.
 - 2) Exposed Indoors: Provide PVC jacket over all insulation.
 - 3) Concealed Indoors: Provide PVC jacket over fittings fabricated from insulation sections or sheet.
 - 4) Outdoors: Provide aluminum pipe jacket.
 4. Foamglas:

- a. All joints, both longitudinal and circumferential shall be sealed with a vapor barrier mastic.
 - b. Thickness shown for refrigeration pipe to be obtained by use of two layers of insulation with staggered joints.
 - c. Finish:
 - 1) Exposed Indoors: Provide PVC jacket over all insulation that shall be sealed with an acrylic latex finish.
 - 2) Concealed: Provide PVC jacket over fittings fabricated from insulation sections or sheet. Provide ASJ over all other.
 - 3) Exposed Outdoors: Provide acrylic latex finish and aluminum pipe jacket.
- C. Equipment Insulation:
1. Vessel and Large Pipe Insulation:
 - a. Insulation shall be of the same material as the piping which serves it and it shall be layered to obtain the required thickness. Maximum of 1-1/2" thick per layer.
 - b. All joints shall be staggered to avoid thermal gaps.
 - c. Sheet size shall be as large as possible to minimize seams. Do not use "scraps".
 - d. Securing shall be by welded studs and/or non-corrosive banding wire. Do not weld brackets, clips or other devices to ASME coded pressure vessels or piping. Insulation pins or studs shall be as specified and installed in accordance with NCIA standards.
 - e. Finish shall be with PVC jacket or galvanized steel mesh wire and a finish coat of insulating cement minimum of 1/4" thick. After cement has cured apply glass lagging cloth and proper coating as directed by manufacturer. All corners shall have metal corner beads and provide acrylic latex finish.
 2. Removable Covers:
 - a. Equipment specified to have removable covers shall have insulation as specified in Paragraph 2.4, fastened to the inside surfaces of a 20 gauge galvanized sheet metal equipment cover.
 - b. The covers shall be of a sectionalized design, and shall be custom-fitted around each piece of equipment. For ease of removal, joints between sections shall coincide with the splits or joints in the equipment. Joints between sections of the cover shall be held together with quick-connect trunk latches, and shall be gasketed to form a vapor-tite seal cover (for the passage of pipes, etc.) shall be provided with closed cell elastomeric collars to ensure a tight fit.
 - c. The box shall be fitted around each piece of equipment and split for removal to coincide with the split in the casing. The sections of the box shall be held together with quick disconnect trunk latches. Joints between box sections shall be gasketed to form a vapor seal. Void spaces in the box shall be packed with flexible fiberglass insulation. Openings around pump casing shall be provided with closed cell elastomeric collar to ensure tight fit.
 - d. Provide acrylic latex finish.
 - e. Coordinate the piping of the drain, vent, gauge, and control lines to exit through the base or back section of the removable cover. The insulation of these pipes shall be totally independent of the removable cover.
 3. Chilled Water Compression Tank and Filtering Systems: Surfaces shall be insulated with 1 inch thick closed cell elastomeric insulation board or pipe insulation, as applicable. Finish as specified for vessel and large pipe insulation.
- D. Cold Pipe Hanger Support Blocks:
1. Provide on all chilled fluid systems pipe hangers and supports.
 2. Apply Pittcote 404 acrylic latex mastic filler over insulation and on ends.

3. Apply Pittseal 444 butyl joint and penetration sealant at joint between foamglas and adjacent insulation.
 4. Provide vapor barrier system to match the vapor barrier on the adjacent system.
 5. Provide 20 gauge (min.) galvanized shield between the insulation and the hanger or support.
- E. PVC Jacket:
1. Provide PVC sheet jacket over all exposed, indoor piping or insulation.
 2. Provide PVC pipe jacket over all exposed, indoor foamglas or elastomeric pipe insulation.
 3. Provide PVC fitting covers over all fittings fabricated from insulation sections or sheet material.
 4. PVC pipe jacket shall be applied with special attention given to achieving positive seal at all longitudinal and circumferential joints using a welding solvent on the longitudinal joint as recommended by the manufacturer. Slip joints to have 4" minimum lap and no welding solvent.
- F. Glass Cloth Jacket:
1. Provide where specified.
 2. Provide acrylic latex finish.
- G. Flexible Acrylic Latex:
1. Apply two coats to glass cloth jacket, concealed foamglas and closed cell elastomeric insulation.
 2. Refer to Division 9 for color to be used. If no instructions are given, provide a white finish.

3.3 MISCELLANEOUS ITEMS

- A. General: Provide insulation of any portion of a system or piece of equipment not previously discussed where ambient operating conditions will allow condensation to occur or whose surface temperature exceeds 115°F. Insulation materials and method shall be as directed by the Designer.
- B. Final Inspection: At final inspection, the finished surfaces of all exposed insulation shall be clean and without stains or blemishes. Repair and clean the insulation surfaces and, if necessary, to obtain a new appearance, shall coat discolored surfaces with off-white latex water-base semi-gloss paint or lagging adhesive, without a change in the contract price.

END OF SECTION

SECTION 23 31 00
HVAC DUCTS AND CASINGS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.
- B. Refer to Division 1 for all requirements pertaining to General Provisions.

1.2 WORK INCLUDED

- A. Single Wall Round Ductwork and Fittings.
- B. Single Wall Round Snaplock Seam Galvanized Steel Ductwork and Fittings.
- C. Double Wall Round Ductwork and Fittings.
- D. Round Stainless Steel Ductwork and Fittings.
- E. Single Wall Round Flexible Ductwork.
- F. Insulated Round Flexible Ductwork.

1.3 QUALITY ASSURANCE

- A. All ductwork shall be fabricated within the guidelines established by the Sheet Metal and Air Conditioning Contractors National Association, Inc. (SMACNA) HVAC Duct Construction Standards - Metal and Flexible, latest edition.
- B. All ductwork shall be fabricated to withstand the pressure and velocity required on this project.
- C. All components, fasteners, sealants, adhesives, etc. in the conditioned air stream or exposed in active or non- active plenums shall conform to the NFPA 90A Standard for the Installation of Air Conditioning and Ventilating Systems and Standard for Flame/Smoke/Fire Contribution of 25/50/0.
- D. All ductwork shall conform to UL standard UL 181 Factory Made Air Duct Materials and Duct Connectors, latest edition. Applicable sections shall apply to shop fabricated ductwork.
- E. After fabrication and installation of all shop fabricated ductwork the fabricator and installer, if not the same, shall certify in writing to the Owner's representative that all shop fabricated ductwork and installation of same meets or exceeds the quality standards established by SMACNA.

1.4 SUBMITTALS

- A. Submission for acceptance is required.
- B. Product data, along with installation operation and maintenance instructions, shall be included in the operation and maintenance manuals.
- C. Submit in accordance with Division 1 requirements.

1.5 SHOP DRAWINGS

- A. Shop Drawings: Provide shop drawings of ductwork as follows:
 - 1. Draw to a scale of not less than 1/4 inch to one foot on the same size sheets as the contract drawings.
 - 2. Show duct sizes.

3. Show fitting details.
4. Show lighting and ceiling diffusers.

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

- A. Single Wall Round Ductwork and Fittings:
 1. Autoduct, Inc.
 2. Eastern Sheetmetal
 3. Hamlin Sheetmetal, Inc.
 4. Impulse Air.
 5. Lindab
 6. Semco Manufacturing, Inc.
 7. United McGill
- B. Single Wall Round Snaplock Seam Galvanized Steel Ductwork and Fittings:
 1. Alco Manufacturing Company.
 2. Crown Products Company.
 3. Hughes.
- C. Double Wall Round Ductwork and Fittings:
 1. Autoduct, Inc.
 2. Eastern Sheetmetal
 3. Hamlin Sheetmetal, Inc.
 4. Impulse Air.
 5. Lindab
 6. Semco Manufacturing, Inc.
 7. United McGill
- D. Round Stainless Steel Ductwork and Fittings:
 1. Autoduct, Inc.
 2. Eastern Sheetmetal
 3. Hamlin Sheetmetal, Inc.
 4. Impulse Air.
 5. Lindab
 6. Semco Manufacturing, Inc.
 7. United McGill
- E. Single Wall Round Flexible Ductwork:
 1. ATCO Rubber Products, Inc.
 2. Flexmaster USA, Inc.
 3. Flexible Technologies - Thermaflex®
- F. Insulated Round Flexible Ductwork:
 1. ATCO Rubber Products, Inc.
 2. Flexmaster USA, Inc.
 3. Flexible Technologies - Thermaflex®

2.2 FABRICATION

- A. Single Wall Round Ductwork and Fittings:
 1. Materials: Hot rolled, continuously annealed, hot dipped galvanized steel minimum of G-90, 0.90 oz/sf coating, conforms to ASTM A653.

2. Metal Gauges: Conform to the Sheet Metal and Air Conditioning Contractor's National Association, Inc. (SMACNA) HVAC Duct Construction Standards - Metal and Flexible, latest edition. The following table shall establish a minimum guideline unless the manufacturer has U.L. Standard 181 test results that show that lighter gages (thinner wall thickness) with intermediate corrugations (ribs) allow the gage reduction:

Pipe Diameter	Positive Internal Static Pressure in W.G.					
	0" - 2.0"		2.1" - 4.0"		4.1" - 10.0"	
	Spiral		Spiral		Spiral	
	Pipe	Fittings	Pipe	Fittings	Pipe	Fittings
6" - 10"	28	26	28	24	28	24
12"	28	26	28	24	26	24
14"	28	26	26	24	26	24
16"	26	24	26	22	24	22
18" - 26"	26	24	24	22	24	22
27" - 36"	24	22	22	20	22	20
37" - 50"	22	20	20	20	20	20
51" - 60"	20	18	18	18	18	18
61" - 84"	18	16	18	16	18	16

3. Duct Construction: Spiral wound, lockseam construction, slip joint or flanged connections as noted below under couplings.
4. Fitting Construction:
- a. 90 Deg. and 45 Deg. Ells: Solid - welded seam construction for dust collector use, Solid - welded seam or spot welded and bonded for general use. Radiused ells to be full radiused unless otherwise noted, mitered ells to have single thickness, turning vanes, slip joint or flanged connections.
 - b. Tees or Crosses: Solid - welded seam construction for dust collector use, Solid - welded seam or spot welded and bonded for general use. Tangential, unless otherwise noted or detailed, conical take off or reduction, slip joint or coupled ends. 180 Deg. or 45 Deg. as indicated.
 - c. Bellmouth: Solid - welded seam construction for dust collector use, Solid - welded seam or spot welded and bonded for general use. Spun metal, smooth converging bellmouth, round, gauge equal or greater than connecting duct.
 - d. Access Section:
 - 1) 7" Diameter and Less: Minimum 12" long flanged section, minimum four bolts per flange.
 - 2) 8" Diameter and Larger: Round or rectangular access cover, on welded raised section, pressure sensitive release suitable for manual release or emergency vacuum release, chain retainer, (see Para. 3.5: Schedules for Sizes).
 - e. Couplings:
 - 1) Joints 36" or less shall have 2" slip coupling.
 - 2) 38" or over shall be spiral mate.
 - f. Based on United McGill
- B. Single Wall Round Snaplock Seam Galvanized Steel Ductwork and Fittings:
1. Materials: Hot rolled, continuously annealed, hot dipped galvanized steel minimum of G-90, 0.90 oz/sf coating, conforms to ASTM A653.

2. Metal Gauges: Minimum of 26 gauge, with remaining sizes conforming to the Sheet Metal and Air Conditioning Contractor's National Association, Inc. (SMACNA) HVAC Duct Construction Standards Metal and Flexible, latest edition. The following table shall establish a minimum guideline:

Round Ducts:

<u>Duct Diameter</u>	<u>Spiral Pipe</u>	<u>Fittings and Longitudinal Seam Pipe</u>
3" thru 14"	26	24
15" thru 26"	24	22
27" thru 30"	22	20

3. Duct Construction: Snaplock seam construction, slip joint or flanged connections.
 4. Fitting Construction:
 a. 90 Deg. and 45 Deg. Ells: Adjustable ells to be full radiused unless otherwise noted, slip joint or flanged connections.
 b. Tees or Crosses: Adjustable, unless otherwise noted or detailed, conical take off or reduction, slip joint or coupled ends. 180 Deg. or 45 Deg. as indicated.

C. Double Wall Round Ductwork and Fittings:

1. Materials:

- a. Outer Duct: Hot rolled, continuously annealed hot dipped galvanized steel, minimum G- 90, 0.90 oz/sf (.001 inch thick/side) coating, conforms to ASTM 653.
 b. Liner: 1" thickness flexible fibrous glass minimum density 1.5 lb/cf, maximum conductivity per 1" thickness of .27 at 75°F mean temperature with a mylar coating.
 c. Inner Duct: Hot rolled continuously annealed, perforated hot dipped, galvanized steel, minimum G-90, 0.90 oz/sf (.001 inch thick/side) coating, conforms to ASTM 653.

2. Metal Gauges:

- a. Outer Duct: Conform to the Sheet Metal and Air Conditioning Contractor's National Association, Inc. (SMACNA) Duct Construction Standards, Metal and Flexible, latest edition. The following table shall establish a minimum guideline unless the manufacturer has U.L. Standard 181 test results that show that lighter gages (thinner wall thickness) with intermediate corrugations (ribs) allow the gage reduction:

Round Ducts:

<u>Spiral Pipe Inside Dia.</u>	<u>Shell</u>	<u>Round Ducts:</u>		
		<u>Perf. Liner</u>	<u>Longitudinal Shell</u>	<u>Fittings and Seam Pipe Perf. Liner</u>
3" thru 8"	24	26 Non-Ribbed	24	24
9" thru 12"	24	28 Ribbed	24	24
13" thru 24"	22	28 Ribbed	22	24
25" thru 34"	20	28 Ribbed	20	24
35" thru 48"	20	28 Ribbed	20	22
49" thru 52"	18	28 Ribbed	18	22
53" thru 58"	18	26 Ribbed	18	22
59" thru 62"	16	26 Ribbed	16	22
63" thru 82"	16	22 Non-Ribbed	16	22

3. Duct Construction:

- a. Outer Duct: Spiral wound, lockseam construction, slip joint or flanged connections as noted below under couplings.
 b. Inner Duct: Spiral wound, lockseam construction, slip joint connections, mechanically bound to outer duct for vertical installation.

4. Fitting Construction:
 - a. 90 Deg. and 45 Deg. Ells: Die formed or welded segmented construction, radiused ell to be full radiused unless otherwise noted, mitered ell to have single thickness turning vanes, liner and inner duct continuous.
 - b. Tees or Crosses: Tangential unless otherwise noted, conical take off or reduction coupled ends, 180 Deg. or 45 Deg. as indicated.
 - c. Bellmouth: Spun metal smooth converging bellmouth, round, single wall gauge equal to or greater than connecting duct.
 - d. Access Section:
 - 1) 7" Diameter and Less: Flanged section, minimum four bolts per flange. Double wall section.
 - 2) 8" Diameter and Larger: Round or rectangular access cover, on welded raised sections, pressure sensitive release suitable for manual release or emergency vacuum release, chain retainer, (see Para. 3.5 - Schedules for Sizes).
 - e. Couplings:
 - 1) Joints 36" or less shall have 2" slip coupling.
 - 2) 38" or over shall be spiral mate.
 - f. Based on United McGill
- D. Round Stainless Steel Ductwork and Fittings:
 1. Materials: Exhaust duct shall be constructed of 304 or 316 stainless steel as scheduled with a 2B mill finish.
 2. Metal Gauges: Conform to the Sheet Metal and Air Conditioning Contractor's National Association, Inc. (SMACNA) Duct Construction Standards, Metal and Flexible, latest edition. The following table shall establish a minimum guideline unless the manufacturer has U.L. Standard 181 test results that show that lighter gages (thinner wall thickness) with intermediate corrugations (ribs) allow the gage reduction:

Pipe Diameter	Negative Internal Static Pressure in W.G.					
	0" - 2.0"		2.1" - 6.0"		6.1" - 10.0"	
	Pipe	Fittings	Pipe	Fittings	Pipe	Fittings
9" - 15"	26	24	24	22	24	22
16" - 26"	24	22	22	20	20	18
28" - 36"	22	20	20	18	18	16
38" - 50"	20	18	18	16	18**	16
52" - 60"	18	16	16	14	18**	16*

* Companion angle rings required.
 ** Girth rings required 60" O.C.

 3. Duct Construction: Round and oval ducts shall be of the spiral lockseam or all welded construction.
 4. Fitting Construction: Fittings shall be factory fabricated with all seams continuously welded.
 5. Fitting Type: Refer to Section 2.2.A.4.
 6. Joints:
 - a. Joints 36" or less shall have 2" slip coupling.
 - b. 38" or over shall be spiral mate.
- E. Uninsulated Round Flexible Ductwork:

1. High Pressure Application: Factory fabricated assembly of a trilaminate of aluminum foil, fiberglass and polyester with a perm rating of .02 high tear strength and properties to resist temperature change, mildew and age hardening. It shall be mechanically locked, without adhesives, into a formed aluminum helix on the ducts outside surface and be U.L. listed 181 Class 1 and comply with NFPA 90A and 90B. The material shall have a pressure rating of 12" w.g. positive pressure and -5" w.g. negative pressure through a temperature range of -20°F to +250°F. Based on Type NI-35 as manufactured by Flexmaster U.S.A., Inc., ATCO Rubber Products UPC #7 or Flexible Technologies – Thermaflex S-LP-10.
- F. Insulated Round Flexible Ductwork:
1. High Pressure Application:
 - a. Factory fabricated assembly of a trilaminate of aluminum foil, fiberglass and polyester with a perm rating of .02, high tear strength and properties to resist temperature change, mildew and age hardening. It shall be mechanically locked, without adhesives, into a formed aluminum helix on the ducts outside surface and be U.L. listed 181 Class 1 and comply with NFPA 90A and 90B. The material shall have a pressure rating of 12" w.g. positive pressure and -5" w.g. negative pressure through a temperature range of -20°F to +250°F.
 - b. The duct material shall be factory wrapped in a blanket of fiberglass insulation with a C factor of .23 or less. The insulation shall be encased in a fire retardant reinforced aluminum material vapor barrier with a perm rating of not over .05 grains per square ft. per hour per inch of mercury.
 - c. Based on Type 3M as manufactured by Flexmaster U.S.A., Inc., ATCO Rubber Products UPC #036 or Omni Air 1200, or Flexible Technologies – Thermaflex M-KF.
 2. Low Pressure Application:
 - a. Factory fabricated assembly of a tri-laminate of aluminum foil, fiberglass and polyester with a perm rating of .02, high tear strength and properties to resist temperature change, mildew and age hardening. It shall be mechanically locked, without adhesives, into a formed aluminum helix on the ducts outside surface. It shall be U.L. listed 181 Class 1 and comply with NFPA 90A and 90B. The material shall have a pressure rating not less than 6" w.g. positive pressure and -3" w.g. negative pressure through a temperature range of -20°F to +250°F.
 - b. The duct material shall be factory wrapped in a blanket of fiberglass insulation with a C factor of .23 or less. The insulation shall be encased in a fire retardant reinforced aluminum material vapor barrier with a perm rating of not over .05 grains per square ft. per hour per inch of mercury.
 - c. Based on Type 5M as manufactured by Flexmaster U.S.A., Inc., ATCO Rubber Products UPC #036 or Omni Air 1200, or Flexible Technologies – Thermaflex M-KF.
- G. Ductwork, General: Each duct section shall have both ends covered with polyethylene or other suitable material to protect against the entrance of dirt, debris or water during shipment and storage prior to installation.
- H. DUCT SEALANT: Water-Based Joint and Seam Sealant: Flexible, adhesive sealant, used indoors or outdoors. Foster 32-19 Duct Fas, Childers CP-146 Chil Flex or Duro Dyne SAS.

PART 3 - EXECUTION

3.1 GENERAL REQUIREMENTS:

- A. Install in strict accordance with the manufacturer's written installation instructions.
- B. The drawings, due to their small scale, are diagrammatic in nature and are not necessarily complete in all details. For this reason not all necessary offsets, rises or falls are shown. Coordinate the installation of the ductwork with all other trades and to provide all necessary offsets, etc. as required for completion of this project without any additional cost to the Owner, Architect or Engineer.
- C. All ductwork shall be run parallel or perpendicular to building structure and seams or spirals shall be aligned whenever possible.
- D. All sizes indicated on the drawings are inside clear dimensions.
- E. All ductwork shall be properly sealed in a neat clean manner with all excess sealer wiped clean.
- F. Coordinate the location of, provide the necessary access and install all devices provided in other specification sections within Division 23, including but not limited to fire, smoke and/or balancing dampers, access and mounting for control devices, air flow measuring stations, etc., as apply to this project.
- G. All ducts passing through partitions or walls shall be properly and neatly sealed. If partition or wall carries a fire rating (fire damper indicated or if architectural plans indicate a rated wall) the duct shall be sleeved with the space between the sleeve and duct properly sealed with firestopping material (Refer to Division 7 for firestopping material). The sleeve shall be permanently affixed to the wall (see Section 23 05 29 - Supports, Hangers, Anchors and Sleeves for sleeve specification).
- H. Coordinate the proper duct pressure classification with the system served and to provide the proper ductwork to withstand these pressures. (See Para. 3.5 Schedules: System Pressure Classification and Duct Material Schedule.)

3.2 CLEANING AND PROTECTION

- A. During construction, ductwork shall be cleaned of dirt and debris internally section by section as it is installed. At end of each day, ductwork not finally connected to equipment shall be provided with a temporary closure of polyethylene film or other covering material that will prevent entrance of dust, debris or water. Clean exterior surfaces of any material which might cause corrosion or if the duct is to be painted, it shall be cleaned suitable for painting. After substantial completion of the ductwork system the system shall be operated with filters in place to blow-out any remaining dust from the system. Protect all equipment and property from damage or fouling during this cleaning. All prefilters used during cleaning shall be replaced prior to turning the system over to the Owner.

3.3 LEAK TESTING

- A. Duct Leakage Report: The Contractor shall make all the supply, return, outside air, and exhaust duct systems (limited to 1,500 cfm and greater) operationally air-tight, with no more than 2% leakage for duct systems rated at 2" w.c. pressure class, and 1% leakage for systems exceeding 2" w.c. pressure class. Leakage test to be performed by Contractor with all air device openings and fan connections sealed airtight. Test the systems prior to applying any insulation or concealing in soffits or chases. Use a portable fan capable of producing a static pressure equal or greater than the duct test pressure. This fan to have a flow measuring assembly consisting of a straight section of duct with an orifice plate, pressure taps, and a calibrated performance curve for determining leakage rates.

1. Test each section equal to the external static pressure indicated for that fan or air handler with the portable fan assembly. After the fan achieves that steady state design pressure, record the air flow quantity across the orifice and the percent of design air flow. If the test fails, the Contractor shall reseal and retest at no additional cost to the Owner.
2. Repair all duct leaks that can be heard or felt, even if the system has passed the leakage test.
3. Submit duct leakage reports to the Balancer and the Engineer for their review and approval.
4. Refer to specification section 23 05 93 for more information.

3.4 INSTALLATION

A. General:

1. Install generally as indicated.
2. Conceal ductwork in finished spaces unless indicated otherwise.
3. Do not install ductwork in or allow to enter or pass through electrical rooms, elevator machine room, or spaces housing switchboards, panelboards or distribution boards, except ductwork that serves electrical rooms, elevator machine rooms or spaces.
4. Exercise special care to provide tight fitting well fabricated, well braced ductwork systems.
5. Field assemble rectangular, round or flat oval ductwork as follows:
 - a. Use slip joints, couplings, etc. sealed with adhesive pre-applied to couplings or duct mate spiralmate or oval mate on duct sizes 1" and larger.
 - b. Isolate dissimilar metals with elastomeric sealant tape or fiber gaskets and gaskets and washers for bolts.
6. In high pressure ductwork (above 2" w.g.), do not use 2 piece mitered 90 degree elbows with or without vanes unless approved by engineer.
7. Make duct connections from hoods, openings, fans and other devices.

B. Double Wall Round Ductwork and Fittings:

1. Coordinate the liner and/or exterior insulation requirements to assure a continuous vapor barrier and uniform thermal resistance. See Para. 3.5 Schedules for liner/insulation thickness requirements.
2. In unconditioned, non-accessible areas such as chases and dry wall ceiling the lined ducts shall also have an additional layer of duct wrap (See Section 23 07 00 - Insulation) at all joints to assure condensation control, wrap will extend a minimum of 6" on either side of joint.

C. Uninsulated Round Flexible Ductwork:

1. Provide where indicated or required on return air duct connections only.
2. Maximum length shall be 5'-0".
3. Maximum turn or bend shall be no more than 90 Deg. Provide rigid elbows where 90 Deg. turns are indicated on the drawings.
4. Flexible ductwork shall be cut to the proper length. Coiling or unnecessary offsets will not be permitted.
5. Secure inner liner to terminal collar or duct coupling with duct sealer and sheet metal screws. Wrap with three wraps of duct tape following helix path.
6. Rigid round ductwork may be substituted in lieu of flex unless the flex duct is used for vibration isolation or otherwise detailed.

D. Insulated Round Flexible Ductwork:

1. Provide where indicated or required on supply air ducts.
2. Coordinate the insulation requirements as to assure a continuous and consistent thermal resistance and vapor barrier.
3. Maximum length shall be 5'-0".

4. Maximum turn or bend shall be no more than 90 Deg. Provide rigid elbows where 90 Deg. turns are indicated on the drawings or more than one 90 Deg. turn is required.
5. Flexible ductwork shall be cut to the proper length. Coiling or unnecessary offsets will not be permitted.
6. Secure inner liner to terminal collar or duct coupling with duct sealer and sheet metal screws. Provide Stainless steel draw band to seal inner liner tight to connecting duct. Pull insulation over inner liner and fold vapor barrier over end of insulation. Secure with two coats of an approved vapor barrier mastic, reinforced with glass cloth extending 2 inches onto adjacent insulation. One coat of mastic shall be applied to the insulation prior to the application of the glass cloth, which shall be embedded in the mastic to ensure complete adhesion of the cloth.
7. High pressure flexible duct to be provided upstream of all terminal boxes. Low pressure flexible duct may be used downstream of terminal box.
8. Rigid round ductwork may be substituted in lieu of flex unless the flex duct is used for vibration isolation or otherwise detailed. If omitted, external insulation must be provided per Section 23 07 00 - Insulation.

3.5 SCHEDULES

A. System Pressure Classification and Duct Material Schedule:

<u>System I.D. No.</u>	<u>System</u>	<u>Section</u>	<u>Maximum Pressure</u>	<u>Duct Material</u>
1.	Supply	AHU to Terminal	4" pos.	A
2.	Supply	Terminal to Diffuser	2" pos.	A
3.	Return	Terminal to AHU	2" neg.	A
4.	Emergency Exhaust	Exhaust Fan		

Schedule Legend:

Duct Material

- A Galvanized Steel
- B PVC Coated Galvanized Steel
- C 304 Stainless Steel

B. Access Door Schedule:

1. Round Duct:

	<u>Duct Size</u>	<u>Access Door Size</u>
a.	up to 7" dia.	12" long removable section
b.	8" to 12" dia.	8" x 12"
c.	13" to 18" dia.	12" x 12"
d.	19" dia. and up	14" x 20"

END OF SECTION

SECTION 23 31 01
SHOP FABRICATED DUCTWORK

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.
- B. Refer to Division 1 for all requirements pertaining to General Provisions.
- C. Refer to Division 7 for all requirements pertaining to firestopping materials.

1.2 WORK INCLUDED

- A. Galvanized Steel Rectangular Ductwork.
- B. Aluminum Ductwork.
- C. Stainless Steel Ductwork.
- D. Duct Liner.

1.3 QUALITY ASSURANCE

- A. All ductwork shall be fabricated within the guidelines established by the Sheet Metal and Air Conditioning Contractors National Association, Inc. (SMACNA) HVAC Duct Construction Standards - Metal and Flexible, latest edition.
- B. All ductwork shall be fabricated to withstand the pressure and velocity required on this project.
- C. All components, fasteners, sealants, adhesives, etc. in the conditioned air stream or exposed in active or non- active plenums shall conform to the NFPA 90A Standard for the Installation of Air Conditioning and Ventilating Systems and Standard for Flame/Smoke/Fire Contribution of 25/50/0.
- D. All ductwork shall conform to UL standard UL 181 Factory Made Air Duct Materials and Duct Connectors, latest edition. Applicable sections shall apply to shop fabricated ductwork.
- E. After fabrication and installation of all shop fabricated ductwork the fabricator and installer, if not the same, shall certify in writing to the Owner's representative that all shop fabricated ductwork and installation of same meets or exceeds the quality standards established by SMACNA.

1.4 SUBMITTALS

- A. Submission for acceptance is required.
- B. Product data, along with installation operation and maintenance instructions, shall be included in the operation and maintenance manuals.
- C. Submit in accordance with Division 1 requirements.

1.5 SHOP DRAWINGS

- A. Shop Drawings: Provide shop drawings of sheet metal ductwork as follows:
 - 1. Draw to a scale of not less than 1/4 inch to one foot on the same size sheets as the contract drawings.
 - 2. Show duct sizes.
 - 3. Show fitting details.

4. Show lighting and ceiling diffusers.
- B. Floor Plans: Provide sheet metal floor plans drawn to the same scale as the contract drawings.
 1. Use contract drawing sheet size.
 2. Show on each floor plan the floor penetrations, fire dampers and access doors, ducts with sized and bottom elevations, terminal types and air quantities.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Galvanized Steel Ductwork:
 1. Interior, exposed or concealed: Hot rolled steel continuously annealed and hot dipped galvanized sheet or coil, minimum G-90, 0.90 oz/sf coating suitable for forming without flaking or peeling, suitable for welding or soldering. Zinc coating shall not be impaired from double seaming, breaking or roll forming. 14 ga. and lighter conforming to ASTM A653. 13 ga and heavier conforming to ASTM A653.
 2. Exterior or Areas Requiring Painting: Hot rolled steel continuously annealed and hot dipped galvanized sheet or coil, minimum G-90, 0.90 oz/sf (.001 inch thick/side) coating with a mill applied phosphate film suitable for insulating the paint from the drying action of the zinc, capable of forming without flaking or peeling, suitable for welding or soldering. Zinc coating shall not be impaired from double seaming, breaking or roll forming. 14 ga. and lighter conforming to ASTM A653. 13 ga. and heavier conforming to ASTM A653.
 3. Double Wall Galvanized Steel Ductwork:
 - a. Outer Duct: Hot rolled, continuously annealed hot dipped galvanized steel, minimum G-90, 0.90 oz/sf (.001 inch thick/side) coating, conforms to ASTM 653.
 - b. Liner: 1" thickness flexible fibrous glass minimum density 1.5 lb/cf, maximum conductivity per 1" thickness of .27 at 75°F mean temperature with a mylar coating.
 - c. Inner Duct: Hot rolled continuously annealed, perforated hot dipped, galvanized steel, minimum G-90, 0.90 oz/sf (.001 inch thick/side) coating, conforms to ASTM 653.
- B. Aluminum Ductwork: Interior or Exterior: Non heat treatable (common) alloy 1100, commercially pure (99.00% minimum). Corrosion resistant, suitable for welding, shows no signs of cracking when seaming, braking or roll forming, tensile strength range: 14,000 to 24,000 psi tensile strength, conforming to Federal Specification QQ-A-250/1.
- C. Stainless Steel Ductwork:
 1. Interior Concealed or Exterior: Type 304, finish No. 2D conforming to ASTM A 240 and Federal Specification QQ-S-766.
 2. Interior Exposed: Type 304, finish No. 4, conforming to ASTM A 240 and Federal Specification QQ-S-766.

2.2 FABRICATION

- A. Galvanized Steel Ductwork:
 1. Fabricate ductwork as indicated on the drawings. Sizes given are inside clear dimensions. Allowances must be made for duct liner if indicated. Unless otherwise indicated on the drawings, the metal gauge shall be in accordance with SMACNA-HVAC Duct Construction Standards - Metal and Flexible, Latest Edition.
 2. Elbow Fabrication:
 - a. 90 deg. elbows 12" or less in width shall be radiused whenever possible.
 - b. All radiused elbows shall be full radiused (R=1.5).

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- c. All mitered 90 deg. elbows shall have turning vanes. Ducts with a width/depth ratio of 1 or more shall have double thickness turning vanes; single thickness is permissible for less than 1.
 3. Tee or Take-off Fabrication:
 - a. Take-off to round run-outs shall be conical or bell mouth. Where conical or bellmouth fittings can not be used due to take-off size to main, provide factory fabricated side takeoff fitting equal to Flexmaster U.S.A., Inc. Type "STO". Provide with handle extension for insulated ducts to clear the insulation thickness specified.
 - b. Take-off to square or rectangular shall be 45 deg. clinch collar or proportional divisions.
 - c. A volume damper shall be located downstream of each take off on square and rectangular take-offs, and integral to round run-outs.
 4. Transitions:
 - a. Concentric Transition: Maximum angle 45 deg. diverging, 60 deg. converging (SMACNA Fig. 2-7).
 - b. Eccentric Transition: Maximum angle 30 deg. diverging or converging (SMACNA Fig. 2-7).
 5. At the Contractor's option, ductwork may be joined at the transverse joints with prefabricated galvanized Ductmate Industries, Inc. ("25" or "35") or Ward Industries, Inc. sections, or with fabricated TDF or TDC T-24 type flanged transverse joints with bolted corners, gaskets, and sealants, constructed in accordance with the SMACNA HVAC Duct Construction Standards - Metal and Flexible, latest edition, Table 1-12. Ductmate "25" may be used only on ductwork with a pressure classification of 2" w.g. or less on the discharge side of air handling units or fan power terminal units. Plastic joint clips are not acceptable. Flanged and prefabricated joints by different manufacturers shall not be jointed. Formed on flanges shall not be used.
- B. Aluminum Ductwork:
 1. Fabricate ductwork as indicated on the drawings. Sizes given are inside clear dimensions. Allowances must be made for duct liner if indicated. Unless otherwise indicated on the drawings, the metal gauge shall be in accordance with SMACNA-HVAC Duct Construction Standards - Metal and Flexible, Latest Edition.
 2. Elbow Fabrication:
 - a. 90 deg. Elbows 12" or less in width shall be radiused whenever possible.
 - b. All radiused elbows shall be full radiused (R=1.5).
 - c. All mitered 90 deg. Elbows shall have single thickness turning vanes.
 3. Tee or Take Off Fabrication:
 - a. Take off to round run-outs shall be conical or bell mouth.
 - b. Take off to square or rectangular shall be 45 deg. clinch collar or proportional divisions.
 - c. A volume damper is to be located downstream of each take off.
 4. Transitions:
 - a. Concentric Transition: Maximum angle 45 deg. diverging, 60 deg. converging (SMACNA Fig. 2-7).
 - b. Eccentric Transition: Maximum angle 30 deg. diverging or converging (SMACNA Fig. 2-7).
 5. All seams shall be welded or sealed to provide watertight construction and all joints to be flanged and gasketed.
 6. All attachment of turning vane, balancing dampers, etc. shall be welded whenever possible.
 7. Access doors when required, will be installed on the side of the duct, not the bottom.
 8. Provide welded tabs for hanging, spacing as required.

- C. Stainless Steel Duct:
 - 1. Fabricate ductwork as indicated on the drawings. Sizes given are inside clear dimensions. Allowances must be made for duct liner if indicated. Unless otherwise indicated on the drawings, the metal gauge shall be in accordance with SMACNA-HVAC Duct Construction Standards - Metal and Flexible, Latest Edition.
 - 2. Elbow Fabrication:
 - a. All elbows shall be full radiused whenever possible.
 - b. All elbows required to be mitered shall have single thickness turning vanes. Vanes shall be welded in place. No protruding screws will be permitted.
 - 3. All seams shall be welded with interior weld ground smooth and all slag and/or splatter removed.
 - 4. All joints shall be constructed using Ductmate DM35 or equal stainless steel flange connections of the same grade as the duct material. All joints shall be sealed completely (externally or internally) with United Duct Sealer or an approved equal. No duct leakage will be allowed.
 - 5. Unless otherwise noted all material shall be 18 gauge.
 - 6. Provide welded tabs for hanging. Spacing as required.
- D. Ductwork, General: Each duct section shall have both ends covered with polyethylene or other suitable material to protect against the entrance of dirt, debris or water during shipment and storage prior to installation.

PART 3 - EXECUTION

3.1 GENERAL REQUIREMENTS

- A. Install in strict accordance with the Sheet Metal and Air Conditioning Contractor's National Association, Inc.'s (SMACNA) recommendations.
- B. The drawings, due to their small scale, are diagrammatic in nature and are not necessarily complete in all details. For this reason not all necessary offsets, risers or falls are shown. Coordinate the installation of the ductwork with all other trades and to provide all necessary offsets, etc. as required for completion of this project without any additional cost to the Owner, Architect and/or Engineer.
- C. All ductwork shall be run parallel or perpendicular to building structure whenever possible.
- D. All ductwork shall be properly sealed.
- E. Coordinate the location, provide the necessary access and install all devices provided in other specification sections within Division 23. Including but not limited to fire, smoke and/or balancing dampers, access and mounting for control devices, air flow measuring stations, etc. as apply to this project.
- F. All ducts passing through partitions or walls shall pass through at a 90 degree angle. The duct shall be sleeved with the space between the sleeve and duct properly sealed with firestopping material (Refer to Division 7 for Firestopping materials). The sleeve shall be permanently affixed to the wall (see Section 23 05 29 - Hangers and Supports for HVAC Systems for sleeve specifications).
- G. Coordinate the proper duct pressure classification with the systems served and to construct the ductwork to withstand these pressures. (See 3.6 Schedules; System Pressure Classification and Duct Material Schedules.)
- H. All ducts located outdoors and not of welded construction shall have seams and transverse joints sealed water tight with duct sealer, arranged to shed water and finished with insulating duct coating as specified in Section 23 33 00 – Air Duct Accessories.

3.2 CLEANING AND PROTECTION

- A. During construction, ductwork shall be cleaned of dirt and debris internally section by section as it is installed. At end of each day, ductwork not finally connected to equipment shall be provided with a temporary closure of polyethylene film or other covering material that will prevent entrance of duct, debris or water. Clean exterior surfaces of any material which might cause corrosion or if the duct is to be painted, it shall be cleaned suitable for painting. After substantial completion of the ductwork system, the system shall be operated with filters in place to blow-out any remaining dust from the system. Protect all equipment and property from damage or fouling during this cleaning. All prefilters used during cleaning shall be replaced prior to turning the system over to the Owner.

3.3 DUCT SEALING REQUIREMENTS

- A. All ducts shall have SMACNA Seal Class A (all transverse joints, longitudinal seams and duct wall penetrations).

3.4 LEAK TESTING

- A. Ductwork rated at over 3" positive pressure shall be leak tested using a test rig as described in the SMACNA Balancing Manual.
- B. Test ductwork that is rated over 3" positive pressure at 25% above specified operating pressure. Ductwork to be tested in segments and CFM leakage shall be limited to 5% of the system airflow for that section.
- C. Leaks must be located and sealed. All audible leaks, regardless of size, must be sealed.
- D. Duct Leakage Report: The Contractor shall make all the supply, return, outside air, and exhaust duct systems (limited to 1,500 cfm and greater) operationally air-tight, with no more than 2% leakage for duct systems rated at 2" w.c. pressure class, and 1% leakage for systems exceeding 2" w.c. pressure class. Leakage test to be performed by Contractor with all air device openings and fan connections sealed airtight. Test the systems prior to applying any insulation or concealing in soffits or chases. Use a portable fan capable of producing a static pressure equal or greater than the duct test pressure. This fan to have a flow measuring assembly consisting of a straight section of duct with an orifice plate, pressure taps, and a calibrated performance curve for determining leakage rates.
 - 1. Test each section equal to the external static pressure indicated for that fan or air handler with the portable fan assembly. After the fan achieves that steady state design pressure, record the air flow quantity across the orifice and the percent of design air flow. If the test fails, the Contractor shall reseal and retest at no additional cost to the Owner.
 - 2. Repair all duct leaks that can be heard or felt, even if the system has passed the leakage test.
 - 3. Submit duct leakage reports to the Balancer and the Engineer for their review and approval.
 - 4. Refer to specification section 23 05 93 for more information.

3.5 INSTALLATION

- A. Galvanized Steel Ductwork:
 - 1. Install ductwork as indicated on the drawings. If any conflict occurs notify the Owner's Representative prior to any extensive rerouting.
 - 2. Install ductwork to allow clearance for the installation of duct insulation.
 - 3. Provide duct liner as specified and/or detailed. (See 3.6 Schedule for liner requirements.)

- B. Aluminum Ductwork:
 1. Connect to equipment served with a solid duct connection.
 2. Slope horizontal runs to inlets at a minimum of 1/4" -/10 LFT. If not possible, slope away from the inlet and provide a continuous drain at the first rise. Coordinate the trapping and drain piping requirements.
 3. All joints shall be sealed water tight.
 4. Do not use penetrating screws or rivets for hanging. Support duct from welded clips or from flanges.
- C. Stainless Steel Ductwork:
 1. Connect to equipment served with a solid connection.
 2. Slope horizontal runs to inlet at a minimum of 1/4 inch per one (1) linear foot.
 3. All joints shall be sealed air and water tight.
- D. Duct Liner:
 1. Coordinate the proper duct liner thickness with the liner thickness schedule included in Para. 3.6 - Schedules.
 2. The liner shall be applied with fire resistant adhesive and weld pin mechanical fasteners on a maximum of 15" centers for velocities less than 1500 FPM and 12" centers for velocities above 1501 FPM. Adhered or clinched pinched type pins not permitted. When installed, fastener heads shall not compress the insulation more than 1/8" based on the nominal insulation thickness.
 3. The liner shall be butted and sealed at all joints, seams and exposed edges to ensure continuous thermal resistance, and condensation control. In unconditioned, non-accessible areas such as chases and dry wall ceilings, the lined duct shall also have an additional layer of duct wrap at the joints for a minimum of 6" either side of the joint to assure condensation control.

3.6 SCHEDULES

- A. Ductwork shown to be round or oval is to be provided under Section 23 31 00 - Pre-Fabricated Ductwork.
- B. System Pressure Classification and Duct Material Schedule for Shop Fabricated Ductwork:

	<u>System</u>	<u>Section</u>	<u>Maximum Pressure</u>	<u>Duct Material</u>
1.	Outside Air Plenum	All	2" neg.	A
2.	Outside Air Duct	All	2" neg.	A
3.	Supply	AHU to terminal	3" pos.	A
4.	Supply	Terminal to Diffuser	2" pos.	A
5.	Return	All AHU Return	2" neg.	A
6.	Gen. Exhaust	Inlet to Unit	2" neg.	A
7.	Kit. Hood Exhaust	All	3" neg.	C
8.	Locker/Shower.	All	2" neg.	B
9.	Laundry Rm. Exh.	All	2" neg.	B
10.	Air Transfer Duct	All	2" neg.	A
11.	Laboratory	Inlet Grille	2" neg.	C
	General Exhaust	To Air Valve		

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Schedule Legend:

Duct Material

- A Galvanized Steel
- B Aluminum
- C Stainless Steel - Type 304

END OF SECTION

SECTION 23 33 00
AIR DUCT ACCESSORIES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.
- B. Refer to Division 1 for all requirements pertaining to General Provisions.

1.2 WORK INCLUDED

- A. Duct access doors.
- B. Fire doors.
- C. Fire dampers.
- D. Smoke dampers.
- E. Smoke/Fire dampers.
- F. Backdraft dampers.
- G. Volume dampers.
- H. Prefabricated casing panels.
- I. Flexible duct connectors.
- J. Roof mounted air outlets and inlets.
- K. Louver (Exhaust).
- L. Louver (Outside Air Intake).
- M. Hardware Cloth.
- N. Aluminum Brick vent
- O. Install miscellaneous control devices.

1.3 QUALITY ASSURANCE

- A. All products provided for enhancement of Life Safety shall be UL listed and bear the appropriate label stating compliance.
- B. All Products to have a Florida Product Approval Number, as required by the Florida Building Code.
- C. All products located in the conditioned air stream or located in return air plenums shall conform to the NFPA 90A Flame/Smoke/Fuel Contribution of 25/50/0 and all other applicable requirements of NFPA 90A.
- D. Smoke and Smoke/Fire dampers shall be provided with a 60 month from the date of shipment parts only warranty, including freight for all components, including damper operators.
- E. Quality Assurance for Louvers:
 - 1. Source Limitations: Obtain louvers and vents through one source from a single manufacturer where indicated to be of same type, design, or factory-applied color finish.
 - 2. Welding: Qualify procedures and personnel according to the following:
 - a. AWS D1.2, "Structural Welding Code--Aluminum."
 - b. AWS D1.6, "Structural Welding Code - Stainless Steel."
 - 3. SMACNA Standard: Comply with recommendations in SMACNA's "Architectural Sheet Metal Manual" for fabrication, construction details, and installation procedures.

1.4 PERFORMANCE REQUIREMENTS FOR LOUVERS

- A. Structural Performance: Louvers shall withstand the effects of gravity loads and the following loads and stresses within limits and under conditions indicated without permanent deformation of louver components, noise or metal fatigue caused by louver blade rattle or flutter, or permanent damage to fasteners and anchors. Wind pressures shall be considered to act on vertical projection of louvers.
 - 1. Wind Loads: Determine in accordance with Florida Building Code (current edition).

1.5 SUBMITTALS

- A. Submission for acceptance is required.
- B. Product data, along with installation operation and maintenance instructions, shall be included in the operation and maintenance manuals.
- C. Submit in accordance with Division 1 Requirements.
- D. Submittals for Louvers:
 - 1. Product Data: For each type of product indicated.
 - 2. Shop Drawings: For louvers and accessories. Include plans, elevations, sections, details, and attachments to other Work. Show blade profiles, angles, and spacing.
 - a. For installed louvers and vents indicated to comply with design loads, include structural analysis data signed and sealed by the qualified professional engineer responsible for their preparation. Include summary of forces and loads on walls and jambs.
 - 3. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency or by manufacturer and witnessed by a qualified testing agency, for each type of louver.
 - a. Wind-Driven Rain.
 - b. Air-Performance.

1.6 PROJECT CONDITIONS FOR LOUVERS

- A. Field Measurements: Verify louver openings by field measurements before fabrication and indicate measurements on Shop Drawings.
 - 1. Established Dimensions: Where field measurements cannot be made without delaying the Work, establish opening dimensions and proceed with fabricating louvers without field measurements.

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

- A. Duct Access Doors:
 - 1. Air Balance, Inc.
 - 2. Cesco Products
 - 3. Greenheck, Inc.
 - 4. Nailor Industries, Inc.
 - 5. Nystrom
 - 6. Prefco Products, Inc.
 - 7. Ruskin Manufacturing, Co.

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8. Safe Air Inc.
- B. Fire Doors:
 1. Air Balance, Inc.
 2. Cesco Products
 3. Greenheck, Inc.
 4. Nailor Industries, Inc.
 5. Nystrom
 6. Prefco Products, Inc.
 7. Ruskin Manufacturing, Co.
 8. Safe Air Inc.
- C. Fire Dampers:
 1. Air Balance, Inc.
 2. Cesco Products
 3. Greenheck, Inc.
 4. Nailor Industries, Inc.
 5. Prefco Products, Inc.
 6. Ruskin Manufacturing, Co.
 7. Safe Air Inc.
- D. Smoke Dampers:
 1. Air Balance, Inc.
 2. Cesco Products
 3. Greenheck, Inc.
 4. Nailor Industries, Inc.
 5. Prefco Products, Inc.
 6. Ruskin Manufacturing, Co.
 7. Safe Air Inc./Dowco
- E. Smoke/Fire Dampers:
 1. Air Balance, Inc.
 2. Cesco Products
 3. Greenheck, Inc.
 4. Nailor Industries, Inc.
 5. Prefco Products, Inc.
 6. Ruskin Manufacturing, Co.
 7. Safe Air Inc./Dowco
- F. Backdraft Dampers:
 1. Air Balance, Inc.
 2. Cesco Products
 3. Greenheck, Inc.
 4. Nailor Industries, Inc.
 5. Prefco Products, Inc.
 6. Ruskin Manufacturing, Co.
 7. Safe Air Inc./Dowco
- G. Volume Dampers:
 1. Greenheck, Inc.
 2. Air Balance, Inc.
 3. Arrow United Industries, Inc.
 4. Cesco Products
 5. Nailor Industries, Inc.
 6. Prefco Products, Inc.
 7. Ruskin Manufacturing, Co.

8. Safe Air Inc./ Dowco
- H. Prefabricated Casing Panels:
 1. IAC
 2. Ruskin
 3. Semco
 4. United Sheetmetal
 5. Vibro Acoustics
- I. Flexible Duct Connectors:
 1. Ductmate Industries, Inc.
 2. Duro-Dyne
 3. Elgen
 4. Ventfabric
- J. Roof Mounted Air Outlets and Inlets:
 1. Air Balance, Inc.
 2. Cesco Products
 3. Greenheck, Inc.
 4. Leader, Inc.
 5. Loren Cook
 6. Ruskin Manufacturing Company
- K. Louvers (Exhaust)- No Substitutions Accepted:
 1. Greenheck, Inc.
 2. Ruskin Company; Tomkins PLC.
 3. United Enertech
- L. Louvers (Outside Air Intake)- No Substitutions Accepted:
 1. Greenheck, Inc.
 2. Ruskin Company; Tomkins PLC.
 3. United Enertech
- M. Hardware Cloth:
 1. McNichols Co.
 2. or equal.
- N. Aluminum Brick Vent
 1. Greenheck, Inc.
 2. Ruskin Manufacturing Company
 3. United

2.2 FABRICATION

- A. Duct Access Doors:
 1. Low Pressure Ductwork:
 - a. Rating up to 2" wg positive or negative.
 - b. Frame: Minimum 22 gauge galvanized steel or aluminum, minimum 5/8" knock over edge, neoprene gasket between frame and duct and frame and door.
 - c. Door: Minimum 24 gauge galvanized steel or aluminum, continuous hinge and cam latches or minimum 2 cam latches, double wall construction, fiberglass insulated thickness to match ductwork.
 - d. Based on Ruskin Manufacturing Co. ADH24. High Pressure Ductwork:
 - a. Rating: Up to 10" wg positive pressure.
 - b. Frame: Minimum 16 gauge galvanized steel with "Z" shaped reinforced corners, polyurethane gasket between frame and duct and frame and door.

- c. Door: Minimum 16 gauge galvanized steel or aluminum, minimum 2 spring latches, double wall construction, fiberglass insulated with thickness to match ductwork.
 - d. Based on Ruskin Manufacturing Co. ADHP-3.
- B. Fire Doors:
1. Rating: 3 hours (UL approved for installation in Class "A" wall construction).
 2. Minimum 24 gauge galvanized steel frame suitable for connection to ductwork without transition, minimum 24 gauge galvanized steel curtain type blades located out of the airstream, thickness coordinated with wall construction. Where an active smoke control system exists (refer to Section 23 09 93) the damper shall be capable of closing in an airstream moving at a minimum of 2000 feet per minute and operating at 4" w.g. pressure (dynamic damper).
 3. Sleeves: UL listed minimum gauge galvanized steel with welded construction corners. Rollformed sleeves will not be acceptable unless contractor guarantees in writing to seal voids in sleeve with UL approved sealer to limit air leakage. Length of sleeve shall be coordinated with the wall or floor.
 4. Operation: Stainless steel constant force closure spring.
 5. Link Setting: 160°F or 165°F
 6. Based on Ruskin Manufacturing Co., IBD23 Style B (Static Systems).
 7. Based on Ruskin Manufacturing Co., DIBD23 Style B (Active smoke control systems only).
- C. Fire Dampers:
1. Rating: 1-1/2 hours (UL approved for installation in 2 hour walls).
 2. Construction: Minimum 24 gauge galvanized steel frame suitable for connection to ductwork without transition, minimum 24 gauge galvanized steel curtain type blades located out of the airstream, thickness coordinated with wall construction. Where an active smoke control system exists (refer to Section 23 09 93) the damper shall be capable of closing in an airstream moving at a minimum of 2000 feet per minute and operating at 4" w.g. pressure (dynamic damper).
 3. Sleeves: UL listed minimum gauge galvanized steel with welded construction corners. Rollformed sleeves will not be acceptable unless contractor guarantees in writing to seal voids in sleeve with UL approved sealer to limit air leakage. Length of sleeve shall be coordinated with the wall or floor.
 4. Operation: Stainless steel constant force closure spring.
 5. Link Setting: 160°F or 165°F.
 6. Based on Ruskin Manufacturing Co. IBD2 Style B. (Static Systems).
 7. Based on Ruskin Manufacturing Co., DIBD2 Style B. (Active smoke control systems only).
- D. Smoke Dampers:
1. Low and Medium Pressure Ductwork:
 - a. UL labeled under UL 555S low leakage rated, no more than 10 CFM/SF @ 1" w.g. (UL Class II) after exposure to 1000°F for 1 hour (non-degradable). Classified for both horizontal and vertical mounting.
 - b. Construction:
 - 1) Frame 16 galvanized steel.
 - 2) Damper Blades: 14 gauge true airfoil design constructed of galvanized steel of low leakage non-heat degradable design with friction free silicone rubber edge type for a smoke seal to 450°F incorporated into blade and frame shapes. Blade shall be suitable for installation in systems with a maximum velocity of 4,000 FPM and 8" w.g. pressure at closure.

- c. Damper operation by means of an electric actuator 120V AC, 24V AC or signal from smoke detector alarm circuit. Electric motor actuator to be UL listed with damper assembly for power open, spring closed operation with a maximum travel time of 15 seconds. Motor furnished with all connecting linkage and mounting hardware.
 - d. Damper and actuator shall be provided with a 60 month warranty as described in Paragraph 1.3.C.
 - e. Based on Ruskin Manufacturing Co., SD60-II.
- E. Smoke/Fire Dampers:
- 1. Low and Medium Pressure Ductwork:
 - a. UL labeled under the following standards:
 - 1) UL 555 - 1-1/2 hr. fire endurance.
 - 2) UL 555S - Low leakage rated, no more than 10 CFM/SF @ 1" w.g. (UL Class II) after exposure to 1000°F for 1 hour (non-degradable).
 - 3) Classified for both horizontal and vertical mounting.
 - b. Construction: Single damper designed and rated for combination smoke/fire duty.
 - 1) Frame: 16 ga. galvanized steel.
 - 2) Damper Blades: 14 gauge true airfoil design constructed of galvanized steel of low leakage non-heat degradable design with friction free inflatable silicone coated fiberglass material to maintain smoke leakage rating to a minimum of 450°F and galvanized steel for flame seal to 1900°F. Blade shall be suitable for installation in systems with a maximum velocity of 2,000 FPM and 4" w.g. pressure at closure.
 - 3) Duct sleeve provided by others.
 - c. Operation:
 - 1) Smoke/fire damper operation by means of an integral resettable and re-useable UL listed electric-ambient temperature link, UL listed releasing device and mechanical lock assembly. Link activated by either electric, 120V AC or 24V AC signal from smoke detector alarm circuit or 350°F duct ambient temperature. Damper shall be capable of being reopened by remote signal when the duct temperature drops to 150°F. Electric motor actuator shall be UL listed with the damper assembly for power open/spring closed operation. Motor actuator shall be factory furnished with all connecting linkage and mounting hardware and shall be factory tested for proper operation.
 - 2) Damper and actuator shall be provided with a 60 month warranty as described in Paragraph 1.3.C.
 - d. Based on Ruskin Manufacturing, Co., FSD60-2.
- F. Backdraft Dampers:
- 1. Low Pressure Ductwork:
 - a. Rating: Up to 1" wg positive or negative.
 - b. Frame: Minimum 16 gauge (.064") galvanized steel or extruded aluminum.
 - c. Blades: Minimum 16 gauge (.064") galvanized steel or extruded aluminum parallel blade action, brass bearing, non-ferrous or de-iron pivot pins, gasketed blades.
 - d. Accessories: Counter balance and weights suitable for assisting or retarding as indicated on the drawings.
 - e. Based on Ruskin Manufacturing, Co. CBD4.
- G. Volume Dampers:
- 1. Provide volume dampers where indicated, in all branch ductwork and construct as follows:
 - a. Provide single blades to a maximum of 10 inch blade width.

- b. Provide inside end synthetic bearings and locking quadrants with wing nuts.
- c. Friction locks are not permitted.
- d. Break damper blades on both edges for stiffness.
- e. Provide multi-blades on dampers 12 inches and larger with inside pins and molded synthetic bearings, and 2 inches wide by 1/8 inch thick structural galvanized channel frame.
- f. Provide galvanized connecting bar with molded synthetic bearings on multi-blade dampers.
- g. Provide stand off bracket for installation in externally insulated duct.
- h. Based on Ruskin Manufacturing, Co. MD35 for rectangular ducts (MDSR25 for round ducts) with velocities up to 1500 feet per minute.
- i. Based on Ruskin Manufacturing, Co. CD30AF1 for rectangular ducts (CDR82 for round ducts) with velocities over 1501 feet per minute.

H. Prefabricated Casing Panels:

1. Panel sections shall consist of an outer sheet of 18 gauge and an inner sheet of 22 gauge galvanized steel. Inside panel surfaces shall have 3/32 inch diameter perforations on 3/16 inch centers.
2. Panels shall be completely metal enclosed; shall be minimum (2) (4) inches thick; and the space between inner and outer surfaces shall be filled with acoustic material which will not settle, shed or dust.
3. Housing shall be factory fabricated and field assembled with joining members serving to provide structural rigidity to 10 inches water pressure differential, either positive or negative. Structure shall be tested and rated for known structural deflection.
4. The joining members shall be fabricated from galvanized sheet steel, minimum 20 gauge, and shall be arranged to provide a pressure tight air seal against 10 inches pressure differential, either positive or negative. Use Sealing Mastic when joining parallel panels, roof to wall panels, joints and corner joints. Housing shall be fabricated to withstand floor and roof loads of 40 pounds per square foot plus any concentrated loads.
5. Assembly shall be secured against the separation forces of air pressure with cadmium plated metal fasteners.
6. The panel shall have minimum airborne sound transmission loss when tested according to ASTM E90-70.

Transmission Loss in DB

Octave

Band HZ	63	125	250	500	1K	2K	4K
Loss	30	16	24	35	45	52	58

7. The thermal conductivity of the panel shall not exceed 0.07 Btu/hr-square foot-degrees F.
8. Insulated access doors shall be provided. Doors shall be constructed of 20 gauge galvanized steel, adequately hinged. Doors shall open against the pressure force and be equipped with safety features such as latches operable from both sides of door and wire glass double pane windows not less than 6 inches x 6 inches square. Doors shall seat against neoprene gaskets. Doors shall have Ventfabrics No. 260 "Ventlok" latches.
9. All openings in the casing for ductwork connections shall be cut and framed at the factory by the panel manufacturer. All openings shall be sealed to prevent air leakage and condensation in accordance with the manufacturer's instructions.
10. All joints, corners, etc., in the panels and floor shall be so designed that no direct path for sound or air leakage can occur.
11. The casing manufacturer shall guarantee that the casings, doors and housings shall meet the acoustical, thermal and air pressure performance specified, when installed in accordance with the manufacturer's recommendations and as noted herein.

- I. Flexible Duct Connectors (Required on all duct transitions from AHU to ductwork):
 1. Indoor Applications:
 - a. Material: Heavy glass fabric double - Coated with neoprene, Minimum of 30 oz/sy, Resistant to abrasion and damage due to repeated flexing, waterproof and air tight, minimum 26 gauge galvanized steel or .032" aluminum edge a minimum of 2-1/2" wide each side. Coordinate the flex width with the schedule in 3.3 - Schedule.
 - b. Rating:
 - 1) Temperature: -10°F to 200°F
 - 2) Pressure: 10" positive
10" negative
 - c. Based on Ventfabric and Ventglass
 2. Outdoor Applications:
 - a. Heavy glass fabric double - Coated with neoprene, Minimum of 30 oz/sy, resistant to abrasion and damage due to repeated flexing, water proof, airtight and resistant to damage from direct sunlight, minimum 26 gauge galvanized steel or .032" aluminum edge at minimum of 2-1/2" wide each side. Coordinate the flex width with the schedule in 3.3 - Schedule.
 - b. Rating:
 - 1) Temperature: -10°F to 250°F
 - 2) Pressure: 10" positive
10" negative
 - c. Based on Ventfabrics Ventlon.
- J. Louvers (Exhaust):
 1. Subject to compliance with requirements, provide either of the following unless a specific orientation is indicated:
 2. Horizontal Storm-Resistant Louver.
 3. Frame and Blade Nominal Thickness: As required to comply with structural performance requirements, but not less than 0.080 inch (2.0 mm).
 4. Performance Requirements:
 - a. Wind-Driven Rain Performance: Not less than 99 percent effectiveness when subjected to a rainfall rate of 3 inches (75 mm) per hour and a wind speed of 29 mph (13 m/s) at a core-area intake velocity of 700-fpm (3.6-m/s).
 - b. Air Performance: Not more than 0.10-inch wg (25-Pa) static pressure drop at 600-fpm (3.0-m/s) free-area intake velocity.
 - c. Free Area: Not less than 7.0 sq.ft. (0.65 sq.m) for 48-inch-(1220-mm-) wide by 48-inch-(1220-mm-) high louver.
 5. AMCA Seal: Mark units with AMCA Certified Ratings Seal.
 6. Acceptable Products – Horizontal:
 - a. Greenheck EHH-501-X.
 - b. Ruskin EME-520-MD.
 - c. UEC SED-5.
Must be Miami Dade NOA approved and also have a Florida Product Approval Number.
 7. EHPA Acceptable Products – Vertical:
 - a. Based on Ruskin Manufacturing, Co. EME6325D /CD-50 Miami Dade/Hurricane Tested & Missile Impact Tested and approved. (Vertical Blade). This louver shall be used on ALL EHPA Buildings as specified on the Architectural Drawings.

- K. Louvers (Outside Air Intake):
1. Subject to compliance with requirements, provide either of the following unless a specific orientation is indicated:
 - a. Horizontal Storm-Resistant Louver.
 2. Frame and Blade Nominal Thickness: As required to comply with structural performance requirements, but not less than 0.080 inch (2.0 mm).
 3. Performance Requirements:
 - a. Wind-Driven Rain Performance: Not less than 99 percent effectiveness when subjected to a rainfall rate of 3 inches (75 mm) per hour and a wind speed of 29 mph (13 m/s) at a core-area intake velocity of 700-fpm (3.6-m/s).
 - b. Air Performance: Not more than 0.10-inch wg (25-Pa) static pressure drop at 600-fpm (3.0-m/s) free-area intake velocity.
 - c. Free Area: Not less than 7.0 sq.ft. (0.65 sq.m) for 48-inch-(1220-mm-) wide by 48-inch-(1220-mm-) high louver.
 4. AMCA Seal: Mark units with AMCA Certified Ratings Seal.
 5. Acceptable Products – Horizontal:
 - a. Greenheck EHH-501-X.
 - b. Ruskin EME-520-MD.
 - c. UEC SED-5.
Must be Miami Dade NOA approved and also have a Florida Product Approval Number.
 6. EHPA Acceptable Products – Vertical:
 - a. Based on Ruskin Manufacturing, Co. EME6325D /CD-50 Miami Dade/Hurricane Tested & Missile Impact Tested and approved. (Vertical Blade).
This louver shall be used on ALL EHPA Buildings as specified on the Architectural Drawings.
- L. Hardware Cloth: 4 mesh galvanized steel, plain weave with .035 wire.
- M. Aluminum Brick Vent
1. Extruded aluminum, 0.100” minimum wall thickness for frame and blades. Frame depth 4”.
 2. 8-1/8”W x 7-3/4”H with 1-1/2 flanged frame and aluminum mesh screen.
 3. Finish to be “Kynar 500” fluoropolymer coating having dry thickness of approximately 1.2 mils when baked at 450°F. Color to be selected by Architect.
 4. Minimum free area shall be 39% of nominal size.
 5. Based on Ruskin Manufacturing, Co. BV100 or Greenheck Model BVF.

2.3 MATERIALS FOR LOUVERS

- A. Aluminum Extrusions: ASTM B 221 (ASTM B 221M), alloy 6063-T5 or T-52.
- B. Aluminum Sheet: ASTM B 209 (ASTM B 209M), alloy 3003 or 5005 with temper as required for forming, or as otherwise recommended by metal producer for required finish.
- C. Aluminum Castings: ASTM B 26/B 26M, alloy 319.
- D. Stainless-Steel Sheet: ASTM A 666, Type 304, with No. 4 finish.
- E. Fasteners: Of same basic metal and alloy as fastened metal or 300 Series stainless steel, unless otherwise indicated. Do not use metals that are incompatible with joined materials.
 1. Use types and sizes to suit unit installation conditions.
 2. Use Phillips flat-head, hex-head or Phillips pan-head screws for exposed fasteners, unless otherwise indicated.

- F. Postinstalled Fasteners for Concrete and Masonry: Torque-controlled expansion anchors, made from stainless-steel components, with capability to sustain, without failure, a load equal to 4 times the loads imposed, for concrete, or 6 times the load imposed, for masonry, as determined by testing per ASTM E 488, conducted by a qualified independent testing agency.
- G. Bituminous Paint: Cold-applied asphalt emulsion complying with ASTM D 1187.

2.4 FABRICATION, GENERAL FOR LOUVERS

- A. Assemble louvers in factory to minimize field splicing and assembly. Disassemble units as necessary for shipping and handling limitations. Clearly mark units for reassembly and coordinated installation.
- B. Vertical Assemblies: Where height of louver units exceeds fabrication and handling limitations, fabricate units to permit field-bolted assembly with close-fitting joints in jambs and mullions, reinforced with splice plates.
- C. Continuous Vertical Assemblies: Fabricate units without interrupting blade-spacing pattern.
- D. Maintain equal louver blade spacing to produce uniform appearance.
- E. Fabricate frames, including integral sills, to fit in openings of sizes indicated, with allowances made for fabrication and installation tolerances, adjoining material tolerances, and perimeter sealant joints.
- F. Frame Type: As indicated.
- G. Include supports, anchorages, and accessories required for complete assembly.
- H. Provide vertical mullions of type and at spacings indicated, but not more than recommended by manufacturer, or 72 inches (1830 mm) o.c., whichever is less.
- I. Provide subsills or extended sills made of same material as louvers where indicated or required for drainage to exterior and to prevent water penetrating to interior.
- J. Provide with optional wire mesh filter rack and filters.
- K. Join frame members to each other and to fixed louver blades with fillet welds, threaded fasteners, or both, as standard with louver manufacturer, concealed from view, unless otherwise indicated or size of louver assembly makes bolted connections between frame members necessary.

2.5 LOUVER SCREENS

- A. General: Provide screen at each exterior louver.
 - 1. Screen Location for Fixed Louvers: Interior face.
 - 2. Screening Type: Insect screening, unless otherwise indicated; bird screening where indicated.
- B. Secure screens to louver frames with stainless-steel machine screws, spaced a maximum of 6 inches (150 mm) from each corner and at 12 inches (300 mm) o.c.
- C. Louver Screen Frames: Fabricate with mitered corners to louver sizes indicated.
 - 1. Metal: Same kind and form of metal as indicated for louver to which screens are attached. Reinforce extruded-aluminum screen frames at corners with clips.
 - 2. Finish: Same finish as louver frames to which louver screens are attached.
 - 3. Type: Rewirable frames with a driven spline or insert for securing screen mesh.
- D. Louver Screening for Aluminum Louvers:
 - 1. Insect Screening: Aluminum, 18-by-16 (1.4-by-1.6-mm) mesh, 0.012-inch (0.30-mm) wire.
 - 2. Bird Screening: Aluminum, 1/2-inch- (12.7-mm-) square mesh, 0.063-inch (1.6-mm) wire.

2.6 CLOSURE ANGLES AND CLOSURE PLATES FOR LOUVERS

- A. Fabricate from minimum 0.074-inch (2 mm) thick stainless steel or aluminum.
- B. Provide continuous closure angles and closure plates on inside head, jambs and sill of exterior wall louvers.
- C. Secure angles and plates to louver frames with screws, and to masonry or concrete with fasteners as specified.
- D. Provide minimum 0.032-inch (0.8 mm) thick stainless steel or aluminum sleeves in cavity walls and elsewhere as shown.

2.7 BLANK-OFF PANELS

- A. Uninsulated, Blank-Off Panels:
 - 1. Aluminum sheet for aluminum louvers, not less than 0.050-inch (1.2-mm) nominal thickness, unless otherwise indicated.
 - 2. Panel Finish: Same finish applied to louvers.
 - 3. Attach blank-off panels to back of louver frames with clips or stainless-steel, sheet metal screws.
- B. Insulated, Bland-off Panels: Laminated metal-faced panels consisting of insulating core surfaced on back and front with Metal sheets:
 - 1. Thickness: 2 Inch (50 mm).
 - 2. Metal Facing Sheets: Aluminum sheet, not less than 0.032-inch (0.8-mm) nominal thickness.
 - 3. Insulating Core: Foamed-plastic rigid insulation board.
 - 4. Edge Treatment: Trim perimeter edges of blank-off panels with louver manufacturers standard extruded-aluminum-channel frames, not less than 0.080-inch (2.0-mm) nominal thickness, with corners mitered and with same finish as panels.
 - 5. Seal perimeter joints between panel faces and louver frames with 1/8-by-1-inch (3.2-by-25-mm) PVC compression gaskets.
 - 6. Panel Finish: Same finish applied to louvers.
 - 7. Attach blank-off panels to back of louver frames with clips or stainless steel, sheet metal screws.

2.8 ALUMINUM FINISHES

- A. Finish louvers after assembly.
- B. High-Performance Organic Finish: 2-coat fluoropolymer finish complying with AAMA 2605 and containing not less than 70 percent PVDF resin by weight in color coat. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers written instructions.
 - 1. Color and Gloss: As selected by School Board from manufacturers full range if not indicated as part of the Design Build Package.

PART 3 - EXECUTION

3.1 GENERAL REQUIREMENTS

- A. Install all products in strict accordance with the manufacturer's written installation instructions.
- B. Coordinate the installation of products provided within other sections of Division 15 including but not limited to control dampers, airflow measuring stations, etc.

3.2 INSTALLATION

- A. Duct Access Doors:
 - 1. Coordinate the proper class access door with the system requirements.
 - 2. Duct access doors shall be mounted so as to allow maximum access and/or door swing while also providing easy access from the floor or other personal accessible structures.
 - 3. Duct access doors shall be provided wherever required for proper maintenance of equipment, access to duct mounted control devices, or visual inspection and setting of dampers, etc. All doors, due to the small scale of the drawings, may not be shown, it is the contractor's responsibility to coordinate with all trades concerned to provide the necessary quantity and properly locate all doors.
- B. Fire Doors:
 - 1. Fire doors shall be provided where indicated.
 - 2. Review the architectural drawings to determine the wall construction rating so as to provide the proper rated damper.
 - 3. All fire doors shall be mounted within a 16 gauge steel sleeve permanently affixed to the wall by means of perimeter retaining angles.
 - 4. The fire door shall be permanently attached to the sleeve. All voids around the sleeve and damper and sleeve and wall shall be properly firestopped under Division 07 Section "Firestopping."
 - 5. Ductwork shall be attached to the fire door by means of a UL approved break away connection.
 - 6. Access doors or access sections shall be provided at all fire door locations.
- C. Fire Dampers:
 - 1. Fire dampers shall be provided where indicated.
 - 2. Review the architectural drawings to determine the wall construction rating so as to provide the proper rated damper.
 - 3. All fire dampers shall be mounted within a UL approved thickness galvanized steel sleeve permanently affixed to the wall by means of perimeter retaining angles.
 - 4. The fire damper shall be permanently attached to the sleeve. All voids around the sleeve and damper and sleeve and wall shall be properly firestopped under Division 07 Section "Firestopping."
 - 5. Ductwork shall be attached to the fire damper by means of a UL approved break away connection.
 - 6. Access doors or access sections shall be provided at all fire damper locations.
- D. Smoke Dampers:
 - 1. Provided where indicated. See combination smoke/fire damper for assemblies in fire rated barriers.
 - 2. Review the architectural drawings to determine the wall construction rating so as to provide the proper rated damper.
 - 3. Provide access doors or access sections at all damper locations.
 - 4. Coordinate the provision of the smoke damper actuator with the automatic temperature control and fire alarm system and ensure adequate space for the mounting of the actuator during installation of the damper and ductwork.
- E. Smoke/Fire Damper:
 - 1. Provided where indicated. All smoke dampers in fire rated barriers to be combination type.
 - 2. Review the architectural drawings to determine the wall construction rating so as to provide the proper rated damper.

3. All smoke/fire dampers shall be mounted within a UL approved thickness galvanized steel sleeve permanently affixed to the wall by means of perimeter retaining angles.
 4. The smoke/fire damper shall be permanently attached to the sleeve. All voids around the sleeve and damper and sleeve and wall shall be properly firestopped under Division 07 Section "Firestopping."
 5. Ductwork shall be attached to the smoke/fire damper by means of a UL approved break away connection.
 6. Access doors or access sections shall be provided at all smoke/fire damper locations.
 7. Coordinate the provision of the smoke damper actuator with the Building Control System and assure adequate space for the mounting of the actuator during installation of the smoke/fire damper and ductwork.
- F. Backdraft Damper:
1. Securely attach backdraft damper to wall with a suitable sleeve and retaining angles and seal all voids between damper and wall.
 2. Adjust damper to open or close under the design conditions.
- G. Volume Dampers: Install at all branch take-offs.
- H. Prefabricated Casing Panels:
1. Casing shall be constructed as detailed on drawings. All necessary structural steel bracing required but not shown shall be provided.
 2. Casing shall be sealed air tight both positive and negative to ± 10 in. w.g.
 3. Install in accordance with SMACNA duct construction standards for the pressure indicated.
 4. Set access doors minimum 6 inches above floor as detailed on drawings. Arrange door swings so that fan static pressure holds door in closed position.
 5. In casing sections subject to collection of water, where deep seal traps are shown, coordinate with other trades to be certain that traps are properly located.
 6. All openings in casing shall be framed. All pipes shall be sleeved and area between pipe and sleeve sealed.
- I. Flexible Duct Connectors:
1. Flexible duct connectors shall not be omitted where air handling units are provided with internally isolated fans and internal isolation.
 2. Provide flexible duct connectors immediately adjacent to all in-line or ductwork connected fans and/or fan equipped units with or without internal vibration isolation.
 3. Flexible duct connectors shall be properly selected and installed to ensure against collapsing under negative pressure and unacceptable ballooning under positive pressure. Leakage is not permissible. See width schedule in 3.3 - Schedules.
- J. Roof Mounted Air Outlets and Inlets:
1. Install in accordance with manufacturers written installation instructions.
 2. Coordinate installation requirements with roofing sub-contractor.
- K. Hardware Cloth: Install over all open ended ducts. Provide sheet metal pocket over raw edges and secure with sheet metal screws through the metal edge cover.
- L. Aluminum Brick Vent: Receive an unload louvers and deliver to general contractor at jobsite for storage and installation by general contractor.
- M. Install Miscellaneous Control Devices:
1. Install dampers furnished under Section 23 09 00. Provide necessary blank off sections where dampers are installed in factory fabricated mixing box openings.
 2. Install air flow measuring stations furnished under Section 23 09 00. Coordinate size and location with proper access before approving release of units for fabrication and shipment.
 3. Install duct smoke detectors provided under Division 26.

3.3 INSTALLATION FOR LOUVERS

- A. Locate and place louvers level, plumb, and at indicated alignment with adjacent work and in accordance with manufacturer's recommendations to meet requirements of article titled "Performance Requirements".
- B. Use concealed anchorages where possible. Provide brass or lead washers fitted to screws where required to protect metal surfaces and to make a weather-tight connection.
- C. Form closely fitted joints with exposed connections accurately located and secured.
- D. Install closure angles and closure plates.
- E. Provide perimeter reveals and openings of uniform width for sealants and joint fillers, as indicated.
- F. Repair finishes damaged by cutting, welding, soldering, and grinding. Restore finishes so no evidence remains of corrective work. Return items that cannot be refinished in the field to the factory, make required alterations, and refinish entire unit or provide new units.
- G. Protect galvanized and nonferrous-metal surfaces from corrosion or galvanic action by applying a heavy coating of bituminous paint on surfaces that will be in contact with concrete, masonry, or dissimilar metals.
- H. Install concealed gaskets, flashings, joint fillers, and insulation as louver installation progresses, where weather-tight louver joints are required. Comply with Division 7 Section "Joint Sealants" for sealants applied during louver installation.

3.4 ADJUSTING AND CLEANING FOR LOUVERS

- A. Clean exposed surfaces of louvers and vents that are not protected by temporary covering, to remove fingerprints and soil during construction period. Do not let soil accumulate until final cleaning.
- B. Before final inspection, clean exposed surfaces with water and a mild soap or detergent not harmful to finishes. Thoroughly rinse surfaces and dry.
- C. Restore louvers and vents damaged during installation and construction so no evidence remains of corrective work. If results of restoration are unsuccessful, as determined by Architect, remove damaged units and replace with new units.

3.5 SCHEDULES

- A. Access Door Schedule: Square or Rectangular Duct work: Access Door Mounting

	<u>Surface Max. Dim.</u>	<u>Access Door Size</u>
1.	6"	12" long Remov. Section
2.	7" to 8"	6" x 6"
3.	9" to 12"	8" x 8"
4.	13" to 18"	12" x 12"
5.	19" and up	16" x 16"
6.	Special Situations	See Plans

B. Flexible Duct Connector Schedule: Indoor and Outdoor Material Width Schedule

	<u>Duct Size</u> <u>(Max. Dim.)</u>	<u>Pressure</u> <u>(Max.)</u>	<u>Width</u>
1.	12" and less	positive	3"
2.	13" and up	positive	6"
3.	12" and less	negative	3"
4.	13" and up	negative	3"

END OF SECTION

SECTION 23 37 13
GRILLES, REGISTERS AND DIFFUSERS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.
- B. Refer to Division 1 for all requirements pertaining to General Provisions.

1.2 WORK INCLUDED

- A. Grilles.
- B. Registers.
- C. Diffusers.

1.3 QUALITY ASSURANCE

- A. Manufacturer shall certify cataloged performance and ensure correct application of all air outlet types.
- B. All components within the conditioned air stream or exposed in active or non-active plenums shall conform to the NFPA 90A standard for Flame/Smoke/Fire Contribution of 25/50/0.
- C. Manufacturers shall fully comply with LEED IEQ Prerequisite 3 minimum acoustical performance.

1.4 SUBMITTALS

- A. Submit schedule and product data for acceptance. Coordinate submittal by "G" number and include construction details, capacity ratings including airside pressure drops and NC levels.
- B. Product data, along with installation operation and maintenance instructions, shall be included in the operation and maintenance manuals.
- C. Submit in accordance with Division 1 requirements.

PART 2 – PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

- A. Grilles:
 - 1. Titus
 - 2. Anemostat
 - 3. Krueger
 - 4. Metal Aire Division of Metal Industries, Inc.
 - 5. Nailor
 - 6. Price
 - 7. Trox
- B. Registers:
 - 1. Air Concepts
 - 2. Anemostat
 - 3. Krueger

4. Metal* Aire Division of Metal Industries, Inc.
 5. Nailor
 6. Price
 7. Titus
 8. Trox
- C. Diffusers:
1. Anemostat
 2. Krueger
 3. Metal* Aire Division of Metal Industries, Inc.
 4. Nailor
 5. Price
 6. Titus
 7. Trox.

2.2 FABRICATION

- A. Grilles:
1. Sidewall or Ceiling Mounted Return/Exhaust Grille:
 - a. Construction: Heavy gauge aluminum border. Size as indicated.
 - b. Baked enamel finish.
 - c. Based on Titus Model 272FL.
 2. Sidewall Double Deflection Supply Grille:
 - a. Construction: Aluminum frame with aluminum shaped blades having long blades on front. Size as indicated.
 - b. Baked enamel finish.
 - c. Based on Titus Model 7DCA-AA.
 3. Ceiling Mounted Return Air Filter Grille:
 - a. Construction: Heavy gauge aluminum border. Concealed hinged core with integral filter frame and start-up plus spare filter. Border suitable for use in ceiling specified in Contract Documents. Size as indicated.
 - b. Baked enamel finish.
 - c. Based on Titus Model 4FL.
- B. Registers:
1. Sidewall or Ceiling Mounted, Return Register (G-5 & G-6):
 - a. Construction: Heavy gauge frame and horizontal bars. Bars set at 45° fixed deflection. Allen key operated opposed blade damper.
 - b. Baked enamel finish.
 - c. Based on Titus Model 350FL (aluminum) with/without Model AG-35AA opposed blade aluminum damper (refer to schedule and drawings for requirements).
- C. Diffusers:
1. Square Ceiling Diffuser (G-1):
 - a. Construction: Surface or lay-in mounted, 3 cone diffuser. Round collar size as indicated. Aluminum construction only.
 - b. Baked enamel finish.
 - c. Based on Titus TMS-AA (aluminum).

PART 3 - EXECUTION

3.1 GENERAL

- A. Install all devices in strict accordance with the manufacturer's written installation instructions.
- B. Coordinate the proper grille style and frame style with the final approved ceiling construction and install grilles, registers and diffusers in accordance with the requirements of the architectural reflected ceiling plan.
- C. Due to the small scale of the drawings the contractor shall assume the responsibility to coordinate the air outlet and inlet locations with the reflected ceiling plans, lighting plans, sections and or details.
- D. Any unlined or otherwise exposed parts beyond the grille, register or diffuser face exposed to sight shall be painted black.
- E. Coordinate the color requirements for all grilles, registers and diffusers with the Owner's Representative.
- F. Insulate the back pans of all diffusers per the requirements of Specification Section 23 07 00.
- G. Air distribution devices installed in lay-in ceilings shall have a 24"x24" extended panel.
- H. Devices installed in sheetrock or other hard ceilings shall be surface mount type.

END OF SECTION

26

DIVISION

ELECTRICAL

SECTION 26 00 00 – SCOPE OF WORK

PART 1: GENERAL

1.1 DESCRIPTION OF SYSTEMS

- A. The work included consists of all supervision, labor, materials, equipment, facilities and installation required for the complete and approved electrical system installation and modifications as indicated on the Contract Documents and called for in this Specification, or as may be reasonably implied by and for the installation of this project.
- B. All notes on the drawings pertaining to the work of this trade shall be considered as part of this specification and contract.
- C. In general, the Electrical Contractor shall make final line voltage connections to equipment furnished by other trades or by Owner. Miscellaneous equipment is to be provided by the Owner, installed, and utilities connected by the Contractor.
- D. Refer to entire Contract Documents for coordination and demolition. The Contractor shall coordinate phasing and staging of all work with all affected trades. Provide demolition as necessary to completely remove all electrical items within the area of work.
- E. Contractor shall confirm existing utilities are capped or shutdown prior to excavation or demolition.
- F. It is the Contractor's responsibility to visit the job site to inspect and confirm field conditions and systems. Advise Consultant of inconsistencies prior to bidding.
- H. The Contractor shall install complete and operating electrical systems as required for the scope of work, including but not limited to, the following:
 - 1. New power feeds to electrical terminal devices and equipment.
 - 2. Installation/relocation of miscellaneous lighting, power, and systems components as required for the renovation/completion.
 - 3. Where indicated, an empty raceway system for telecommunications. Outlet devices, cabling, and hardware to be provided and installed by the Owner.
 - 4. Where indicated, extension of the existing nurse paging system, and fire alarm system, including all raceways, conductors, devices, equipment start-up and testing, as required for the proposed space modifications.
 - 5. Miscellaneous items required for complete and operating systems, but not specifically called for on the drawings or in the specifications, such as fastening devices, supports, scaffolding, welding, drilling, etc.
 - 6. Miscellaneous raceways, junction boxes, and interconnections to medical equipment provided by third party vendors.

Martin County School District
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PART 2 - PRODUCTS Not Applicable

PART 3 - EXECUTION Not Applicable

END OF SECTION

SECTION 26 00 01 - BASIC ELECTRICAL REQUIREMENTS

PART 1 GENERAL

1.1 SECTION INCLUDES:

- A. Basic Electrical Requirements specifically applicable to Division 16 in addition to Division 1 -General requirements.

1.2 QUALITY ASSURANCE

- A. Electrical supervision shall have a current Local County Journeyman Electricians Certificate of Competency, be licensed to do work in the project location, and be present on site while work is being performed.
- B. Coordinate with other trades to provide adequate working clearance about equipment.
- C. Materials, where applicable, shall bear the label of an approved testing agency, such as:
 - 1. E.T.L. (Electrical Testing Laboratories).
 - 2. U.L. (Underwriters Laboratories, Inc.)
 - 3. F.M. (Factory Mutual).
- D. Materials subject to corrosion shall be protected.

1.3 RELATED WORK

- A. Continuity of Service:

Service or circuits shall not be interrupted or changed without authorization from the Architect and the Owner. Written authorization shall be obtained before work is started.

- B. Demolition:

- 1. Equipment to be removed and turned over to the Owner shall be delivered to the Owner at a place and time mutually agreed upon.
- 2. Materials to be turned over to the Owner or reused and installed, shall be maintained in the condition equal to that existing before work began. Repair or replace damaged materials or equipment at no additional cost to the Owner.

- C. Outdoor equipment to be secured to wall surface shall be mounted on stainless steel channel or supports.

1.4 TEMPORARY WIRING

- A. New Construction: Install according to National Electrical Code.
- B. Remodel: Remove temporary wiring upon completion of project. Install according to National Electrical Code.

- C. Grounding: Equipment grounding conductors shall be bonded to available electrodes at each building.

1.5 EQUIPMENT

- A. Equipment of a similar nature shall be identical and of the same manufacturer.
- B. Equipment shall be set level. Where grouped, shall be mounted at the same height, properly aligned, bolted together in sections and fastened in place. Tighten screws, bolts, nuts, clamps, fittings or other fastening devices. Install all covers, plates, fittings and accessories.

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

3.1 COMMISSIONING SUPPORT

- A. Perform all required commissioning sub tasks as specified in the Commissioning specifications noted in Division 1, General Requirements and 23 08 00, "Commissioning".
The contractor shall designate an individual to serve on the commissioning team and shall cooperate as required concerning all commissioning related activities, meetings, documentation, field tests, etc. The contractor shall provide all technically qualified personnel, equipment, instrumentation, and materials on a continuous basis in order to perform their required tasks at the required time period and provide all required or requested assistance by the commissioning provider to complete the commissioning process. The contractor is required per referenced specifications to complete all applicable Pre-Functional Test Report forms on the systems being commissioned. This may include as well, start-up check list forms. The Contractor is required, per referenced specifications, to perform all functional performance tests as required by the Commissioning Authority.

END OF SECTION

SECTION 26 01 27 - CODES, FEES, AND STANDARDS

PART 1: GENERAL

1.1 CODES AND STANDARDS

- A. Unless specifically noted to the contrary, the Contractor shall furnish all equipment, materials, labor, and install and test in accordance with these specifications.
- B. The Contractor shall comply with the latest applicable editions of the following:
 - Florida State Fire Marshall's Rule Chapter 69A-3.012 FAC and Rule Chapter 69A-60 (FAC)
 - NFPA 101 (2015 Edition)
 - Florida Building Code 6th Edition
 - NFPA-70 - National Electrical Code (2014)
 - NFPA-72 - National Fire Alarm Code (2013)
 - U.L. - Underwriter's Laboratories
 - NEMA - National Electrical Manufacturer's Association
 - ASTM - American Society for Testing and Materials
 - IEEE - Institute of Electrical and Electrical Engineers
 - ANSI - American National Standards Institute
 - ADA - Americans with Disabilities Act
 - NFPA-780 – Lightning Protection (2011)
 - Florida Statute Section 633.022
 - Florida Administrative Code 69A – 43.004 and 69A-3.012
- C. Reference to standards shall mean and intend the latest edition of such standards adopted and published at the date of bidding documents.
- D. Materials and installation, as a minimum, shall conform with local and state codes and ordinances.

1.2 FEES, CHARGES, COSTS

- A. It is the contractor's responsibility to contact the appropriate Utility Company and/or Building Department to determine if any fees, charges or costs will be due to them. This fee, charge or cost shall be included in this contractor's bid price.

END OF SECTION

SECTION 26 05 00 - BASIC MATERIALS AND METHODS

PART 1 - GENERAL

1.1 WORK INCLUDES

- A. Contractor shall provide:
 - 1. Work shown on the drawing and specified herein.

1.2 RELATED WORK

- A. Specified Elsewhere
 - 1. Division 1 - Drawings and general provisions of Contract, including, but not limited to, General, Special, and Supplementary Conditions and other Division-1 Specification Sections, apply to the work of this Section.
 - 2. Division 23 - applicable sections.
 - 3. Division 26 - applicable sections.

1.3 QUALITY ASSURANCE

- A. All work and materials shall be in accordance with the requirements and codes of the State of Florida, and all other applicable bodies having jurisdiction.
- B. If, in the opinion of the Contractor, any part of the specification or plans do not comply with the laws, codes and regulations, that matter shall be referred in writing to the attention of the Engineer for a decision before proceeding with that part of the work. There shall be no changes in the drawings or specifications made without approval of the Engineer. Where a discrepancy exists between the drawings and this specification, the more stringent shall apply.
- C. This Contractor shall secure and pay for all permits required by local authorities and shall provide the Owner with satisfactory interim and final inspection certificates.
- D. Bidders shall visit the site and familiarize themselves with existing conditions and satisfy themselves as to the nature and scope of the work and the difficulties that attend its execution. The submission of a bid will be construed as evidence that such an examination has been made and that the existing conditions have been allowed for in hid bid.

Before opening any material or doing any work, examine Architectural, Structural, Electrical and Mechanical and Equipment drawings, verify all conditions of project. Any differences which occur between drawings or between them and specifications, or between both of these and actual field measurements shall be reported in writing to Consultant and written instructions for changes obtained before proceeding with work.

1.4 SUBMITTALS

- A. In accord with Division One.
 - 1. Product Data
 - a. Fire Stopping Material
 - b. Conduit seals.

2. Corrections or comments made on the shop drawings during the review do not relieve this Contractor from compliance with requirements of contract documents, plans and specifications. Shop drawings will be checked for general conformance with the design concept of the project and general compliance with information given in the contract documents. Review of the shop drawings shall not relieve the Contractor from responsibility for details and accuracy, confirming and correlating all quantities and dimensions, selecting fabrication processes, for techniques of assembly and construction, coordinating his work with that of all other trades, and performing his work in a safe and satisfactory manner. Review of shop drawings shall not permit any deviation from plans and specifications.
 3. Contractor shall submit point to point wiring diagram for all signal and control systems, control panels, terminal cabinets, etc., for complete systems to be provided under this contract. Shop Drawings shall indicate terminal identification, and barrier strip layout.
- B. Coordination drawings shall be provided showing routing of ALL trades and systems above ceilings and in chases. Objective of coordination drawings is to identify any conflicts and provide resolution, prior to the start of construction. Division 26 subcontractor shall coordinate with the General Contractor for requirements relating to this submittal. This requirement shall not conflict with requirements for coordination drawings as mandated in any other sections of this specification.
- C. In accord with Division One, at the completion of the project, Contractor shall submit operating instructions and maintenance manuals. Submit model number, catalog information, technical data sheets, shop drawings, test reports, wiring diagrams, parts lists and maintenance instructions where applicable for each of the following items of equipment:
1. Fire Alarm System
- D. Throughout the progress of construction, keep a complete and detailed record of all deviations in the electrical installation from that indicated on the Drawings, specifications and/or shop drawings. At the completion of the project and prior to final payment this marked set of drawings shall be submitted to Engineer. As-Builts shall be legible and clearly indicating depths, dimensions of raceways from unknown points. Provide one mylar set of reproducibles to the Owner, certified and signed, by the Contractor as to their accuracy.
- E. Comply with the following for all work specified in Division 26. As-built information shall be shown to scale, using standard symbols listed in the legend. As a minimum show the following:
1. Location of stub-outs, dimensioned from permanent building lines.
 2. All routing of raceways, dimensions from building, depths.
 3. Corrected panelboard and equipment schedules.
 4. Corrected circuit numbers as they appear on panelboard directories.
 5. Number, size, type of insulation and number of wires in each conduit or multi-conductor cable whether in conduit or exposed.
 6. Location of junction boxes and splices.
 7. Location of access panels.

1.5 GUARANTEE

- A. Guarantee all materials and workmanship for a period of one year in accord with the General Conditions.

1.6 DELIVERY, STORAGE AND HANDLING

- A. Materials shall be suitably packaged by manufacturer to prevent damage during shipment. Damaged materials will not be acceptable for use.
- B. Store materials on site in clean, dry storage area; when outside, elevated above grade and enclosed with durable watertight wrapping.
- C. Handle all materials carefully to prevent damage. Minor scratches, marks or blemishes to finish shall be repaired by Contractor.

PART 2 - PRODUCTS

2.1 MATERIALS

A. General

- 1. All equipment and material for permanent installation shall be new unless specifically indicated otherwise. In addition, material shall:
 - a. Be without blemish or defect.
 - b. Not be used for temporary power or lighting without prior written authorization from the Owner.
 - c. Be in accordance with NEMA Standards.
 - d. Bear Underwriter's Label where subject to U.L. label service.
 - e. U.L. listed for its intended service and application.
- 2. Equipment and materials of the same type of classification and used for the same purposes, shall be products of the same manufacturer.
- 3. Materials and equipment shall conform in all respects to the requirements set forth in these specifications and the accompanying drawings. However, wherever a product is identified by name, equal products which meet the Consultants written approval may be used (per contract document procedures).
- 4. Except as otherwise specified, materials and equipment shall be new and bear the approval label of Underwriter's Laboratories, Inc., where applicable.
- 5. Where equipment and materials are specified or designated on drawings by trade names and catalog numbers, the intent is to establish a standard of quality, appearance, performance and dimension. Material and equipment of other manufacturers will be considered, provided they are equal in all respects to that specified. However, it will be the Contractor's responsibility to demonstrate equality of substituting with materials or equipment specified by the Consultant. Compensations for "as-built" drawings or contract documents requiring additional engineering services due to Contractor substitutions shall be paid directly by the Contractor to the Consultant. The Consultant shall be compensated by the Contractor for multiple reviews (more than two) of any shop drawing submission.

B. Fire Stopping Material

- 1. Fire stopping materials shall consist of commercially manufactured products capable of passing ASTM E-814 (UL 1479) Standard Method of Fire Test for Through Penetration Fire Stops.
- 2. Fire stopping materials shall maintain the rating of the wall, partition or floor opening that penetration is made.

3. Fire stopping materials shall be U.L. classified.
 4. Acceptable Products
 - a. 3M - Fire Barrier
 - b. Thomas & Betts - Flame Safe
 - c. Nelson Electric - Flameseal
- C. Water Seal
1. Seal penetrations of perimeter walls or floors below grade to prevent entry of water. Use materials compatible with wall or floor construction.
 2. Seal penetrations of roof, with flashings compatible with roof design.
- D. Nameplates
1. General: Furnish and install nameplates wherever indicated as "required" in these specifications. Wording shall be submitted to the Engineer for review prior to purchase of nameplates.
 2. Material: Refer to Section 26 05 53 for requirements.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. All equipment and materials shall be installed and completed in a first-class workmanlike manner. The right is reserved to direct the removal and replacement of any item, which in the opinion of the Owner's Representative and/or Engineer does not present an orderly and reasonably neat or workmanlike appearance, provided such items can be properly installed in an orderly way by usual methods in such work.
- B. Electrical drawings are diagrammatic but shall be followed as closely as actual construction of the building and the work of other trades will permit. Do not scale drawings. Consult Architectural drawings and details for exact location of fixtures and equipment and building element dimensions. Because of the small scale of drawings, it is not possible to indicate all of the offsets, fittings and accessories required. This Subcontractor shall investigate the structural and finish conditions affecting his work and shall arrange such work accordingly, providing fittings, bends, junction boxes, pull boxes, access panels and accessories required to meet such conditions.
- C. No deviations for the plans and specifications shall be made without the full knowledge and consent of the Consultant. Should the Contractor find at any time during the progress of the work that, in his judgment, a modification of the requirements of any particular item is needed, he shall report such item promptly to the Consultant for his decision and instruction.
- D. Discrepancies in Electrical and Mechanical Drawings - it is recognized that locations of piping, ductwork, etc., shown on Mechanical and Electrical drawings are diagrammatic, except for figured dimensions, and that field conditions may arise that will prevent their being installed as noted on drawings, such as runs of pipe crossovers, risers, panelboards, electric outlets, machinery, etc. within limits established by figures on Architectural Drawing. It is the duty of each and all subcontractors to consult with each other, verifying existing conditions and in each case where there is any questions or doubt as to space conditions or location of outlets, etc., to submit a workable solution to the Consultant for their approval before installing any work which is questionable.

- E. The Contractor is specifically directed to the mechanical section of the contract documents for coordination.
- F. The Contractor shall refer to the entire set of contract documents for bidding purposes and completeness of proposal. Items not shown on the electrical project documents, but shown on mechanical requiring wiring, components, raceways, etc., must be included in bid proposal to provide a complete working system. Systems and devices shown on one portion of documents shall be included as if they are shown on all portions of the contract documents.
- G. The Contractor shall, prior to rough-ins, confirm location of all devices with Owner Representative and Architect. Coordinate with architectural drawings and interior elevations for exact locations, mounting heights and dimensions for installation of all items. Coordinate with wall coverings, furniture, etc.
- H. Install all equipment in accord with manufacturer's recommendations.
- I. Provide all necessary anchoring devices and supports.
 - 1. Use structural supports suitable for equipment, or as indicated.
 - 2. Check loadings and dimensions of equipment with shop drawings.
 - 3. Do not cut or weld to building structural members.
- J. Verify that equipment will fit support layouts indicated.
 - 1. Where substitute equipment is used, revise indicated supports to fit.
- K. Arrange for necessary openings to allow for admittance of equipment.
 - 1. Where equipment cannot be installed as structure is being erected, provide and arrange for building-in of boxes, sleeves or other devices to allow later installation.
- L. Make all penetrations through roofs prior to installation of roofing. For penetrations required after installation of roofing:
 - 1. In built-up roofing (BUR), provide all curbs, cants and base flashings.
 - 2. In elastic sheet roofing (ESR), arrange and pay for base flashing work by authorized roofer.
- M. Install rain hoods and metal counter flashings as indicated and to make all penetrations of electrical work through walls and roof water- and weather-tight.
 - 1. Furnish all clamps, waterproofing material and labor necessary.
 - 2. Where metal flashings are applied over concrete, paint concrete with 1/8 IN of mastic cement first.
 - 3. Set flashing in mastic cement, watertight.
- N. Repair and replace roof construction, damaged by this work, in manner which will not nullify roof guarantee.
- O. Provide equipment guards at all belts, couplings, moving machinery and equipment provided under this division in accord with OSHA.

1. Use suitable structural frames with 12 ga, 3/4 inch maximum opening galvanized mesh, or expanded metal mesh.
 2. Attach to equipment by removable clips and bolts with wing nuts, or other approved connectors.
- P. Install equipment to permit easy access for normal maintenance.
1. Maintain easy access to switches, motors, drives, pull boxes, receptacles, etc.
 2. Relocate items which interfere with access.
- Q. Provide concrete foundations or pads required for electrical equipment, as indicated or as follows:
1. Where drawings do not show special foundations, install 4 IN high concrete pads.
 2. Use 3,000 PSI concrete.
 3. Reinforce with 6 x 6 x 10 x 10 mesh, with short dowels into floor at 12 IN OC around perimeter.
 4. Chamfer top edges 3/4 IN.
 5. Rub all faces smooth with carborundum block.
 6. Set anchor bolts for equipment.
- R. All connections shall be tightened to the torque values recommended by that device manufacturer's instructions. If these values are not listed, tighten to pound-inch or pound-foot values recommended in UL Standard 486B, a summary of which may be found in Section 110-4 of the National Electric Code Handbook. Record the torque values of all main pieces of equipment and include in the maintenance manuals.

3.2 LOCATION OF EQUIPMENT

- A. The approximate location of all equipment and devices is shown on the Drawings. The Owner's Representative and/or Engineer reserves the right to change the location of all equipment or devices 8 feet in any direction at no additional cost provided such changes are requested before final installation.
- B. Install all equipment with ample space allowed for removal and repair. Provide ready accessibility to removable parts of equipment and to all wiring without moving equipment which is installed or which is already in place. Provide access panels for all devices installed above non-accessible ceilings and/or within walls or partitions.
- C. In mechanical and electrical equipment spaces, expose ceiling outlets and conduit with due consideration to ventilating ducts and mechanical piping. Where numerous ducts occur, install conduits and outlets after the ventilating ducts. Puncturing of duct work or hanging equipment such as light fixtures, ceiling hangers and conduits from duct work is prohibited unless specifically noted otherwise.
- D. Electrical equipment shall be installed to maintain minimum clearances per Article 110 of NEC and ANSI C2 (National Electrical Safety Code and recommendations of manufacturer/vendor).
- E. Dimensions indicated on documents are limiting dimensions. Do not provide equipment exceeding dimensions indicated or equipment arrangements that reduce required clearances or exceed specified maximum dimensions.

3.3 COORDINATION

- A. Provide day-to-day coordination with the work of other contractors engaged in this project. Execute the work in a manner not to interfere with other contractors.
- B. Coordinate with other contractors regarding the location and size of pipes, raceways, ducts, openings, and devices, so that there may be no interferences between installations or of the progress of any contractor.
- C. If conflict arises in the installation of work, the following preference schedules shall be followed:
 - 1. Recessed lighting fixtures.
 - 2. Sanitary drainage.
 - 3. Chilled water piping.
 - 4. Low pressure ductwork.
 - 5. Domestic water, storm and vent lines.
 - 6. Electric conduits.
- D. This Contractor shall notify all other contractors of any deviations or special conditions necessary for the installation of his work. Interferences between the work of various contractors shall be resolved prior to installation. Work installed not in compliance with the plans and specifications and without properly checking and coordinating as specified above shall, if necessary, be removed and properly reinstalled by this Contractor without additional cost to the Owner. The Consultant or his representative shall be the mediating authority in all deviation and confliction disputes arising on the project.
- E. Insofar as it is possible to determine in advance, this Contractor shall consult with the masonry contractor and others as to leaving the proper chases and openings for his work; and he shall place all of his outlets, anchors, sleeves and supports prior to pouring concrete or masonry work. Should this Contractor neglect doing this, any cutting and/or patching shall be done at this Contractor's expense.
- F. Contractor must notify owner prior to excavation and exercise due caution with regard to disturbance of utilities and services.
- G. Contractor shall be held responsible for any damage and restoration to utilities and services. Restoration shall be made immediately with methods and materials that are approved for the intended use. Provide written report to the Owner detailing occurrence and corrective action.
- H. The locations of existing underground utilities are not shown, and have not been independently verified by the Owner or it's representative. The Contractor shall determine the exact location of all existing utilities before commencing work in the vicinity and agree to be fully responsible for any and all damage which might be occasioned by the Contractor's failure to exactly locate and preserve any and all utilities.

3.4 WALL, ROOF AND FLOOR PENETRATIONS AND SLEEVE INSTALLATION

- A. Provide sleeves for all electrical raceways, and wiring passing through walls and floors and roof. Sleeves shall be of sufficient length to extend through the wall, roof and floors. Wall sleeves shall have ends flush with finished thickness of walls and floor sleeves shall extend 1 inch above finish floor. Interior diameter of sleeves shall provide 1/2 inch clearance all around conduit.
 - B. Below grade wall and roof penetration shall be made watertight. Below grade wall penetration shall be sealed with compression type conduit sealing bushings. Roof penetration shall be sealed and flashed per roof manufacturers published recommendations.
 - C. Where cutting is required to facilitate construction, this contractor shall patch and repair cut items to the original state. However, structural work shall not be cut without the written approval of the Engineer or his representative.
 - D. Holes through concrete and masonry in new and existing structures shall be cut with a diamond core drill or concrete saw. Pneumatic hammer impact, electric hand or manual hammer type drills, shall not be allowed, except where permitted by Engineer as required by limited working space.
- E. CUTTING AND PATCHING
- 1. Any damage caused by cutting or in any other way caused by this Contractor in the performance of his contract shall be repaired or replaced under the separate heading for the type material required in a manner satisfactory to the Engineer/Owner.
 - 2. Any unnecessary damage caused by this Contractor, due to installation of the electrical work, brought about through carelessness or lack of coordination, shall be corrected under the heading for the type of materials involved, and shall be paid for by this Contractor.

F. ACCESS PANELS

- 1. The Contractor's attention is called to access panels. It is a requirement of these specifications that all access panels required in architectural finishes or surfaces to provide access to junction boxes, smoke detectors, strip heaters, ballasts or other devices be provided and installed by this Contractor. Advise Consultant of locations and size of all panels.

3.5 FIRESTOPPING

- A. Where conduits, wireway, bus duct and other electrical raceways pass through fire partitions, fire walls or floors, install a firestop that provides an effective barrier against the spread of fire, smoke and gases. Fire-stop material shall be packed tight, and completely fill clearances between raceways and openings. Fire-stop material shall conform to the following:
 - 1. Fire-stopping material shall maintain its dimension and integrity while preventing the passage of flame, smoke and gases under conditions of installation and use when exposed to the ASTM #119 time-temperature curve for a time period equivalent to the rating of the assembly penetrated. Cotton waste shall not ignite when placed in contact with the non-fire side during the test. Fire-stopping material shall be non-combustible as defined by ASTM E136, and, in addition, for insulation materials, melt point shall be a minimum of 1700° F for 2-hour protection.

2. Unused, spare sleeves in electrical closets shall be sealed with threaded steel caps on each end.

- B. Fire stopping materials shall be installed in accordance with manufacturers written instructions.

3.6 PROTECTION OF WORK

- A. Protect work from injury by keeping all conduit and boxes capped and plugged or otherwise protected. This includes damage by water and/or stoppage from building materials, sand, dirt, or concrete.
- B. Protect all equipment and fixtures from damages during the project, provide all tarpaulins, drop cloths, barricades, or auxiliary equipment.
- C. All materials or equipment damaged during construction shall be repaired or replaced with new items to the satisfaction of the Engineer.

3.7 IDENTIFICATION

- A. Electrical Identification shall be in accordance with Section 26 05 53.

3.8 PAINTING

- A. Finish painting shall be as specified in Division 9.
- B. Provide touch-up painting of all electrical equipment marred in any way during shipment or installation.

3.9 CONNECTIONS TO EQUIPMENT

- A. Equipment: The Contractor shall make final electrical connections to all items of equipment. All power wiring from power source through starters, disconnects and control panels to equipment shall be provided.

3.10 SAMPLES

- A. Physical samples of material and equipment proposed for installation in this project shall be submitted to the Consultant upon request.
- B. Samples shall be submitted through the General Contractor with all shipping and handling charges prepaid. Any expense incurred in securing, delivery and return of samples, is the responsibility of Contractor. Samples shall be delivered to location designated by Consultant.
- C. Samples shall remain the possession of the Contractor except as follows:
 1. Approved samples, without physical damage, may be installed on the project.
 2. Samples not called for within 14 days after notification will be disposed of by the Consultant.

3.11 SPARE PARTS AND TOOLS

A. Furnish to Owner and obtain receipt for same, the following:

1. One spare set of fuses for each size and type installed on project; including overload relays for magnetic starters.
2. One set of special tools required for equipment furnished, spare keys, etc.
3. See other sections for spare parts relative to specific systems.

3.12 FINAL INSPECTION AND TESTS

A. As precedent to final inspection and acceptance, the Contractor shall have all previously listed defects corrected, complete all work, test all systems and submit results of such tests to the Engineer, install all directories, and labels and post all instructions and comply with applicable paragraphs of this section. Refer to Section 26 05 70 for additional information.

3.13 PERFORMANCE

- A. The Contractor shall employ a competent foreman on the job throughout the entire period of construction to see that his work will not conflict with other trades and that it is properly performed/
- B. The foreman shall have a thorough knowledge of the work to be installed under this contract, be a skilled mechanic who has had a minimum of four (4) years previous successful experience on projects of comparable sizes and complexity. Foreman shall be present at all times that work under this Division is being installed or affected. Foreman shall be a State of Florida licensed Journeyman and shall have a valid Palm Beach County Electrical Journeyman Certificate of Competency.

END OF SECTION

SECTION 26 05 01 - WORK INCLUDED

PART 1 GENERAL

1.1 DESCRIPTION OF SYSTEMS

- A. The work required under this Division shall include all materials, labor and auxiliaries required to install, start up and test a complete and properly operating electrical system. The electrical systems required under this Division consist basically of, but are not limited to, the following:
1. Complete distribution system for power including service entrance, main switchboards and distribution panels, feeders, branch circuits, convenience outlets and connections to motors and other power loads.
 - a. The Contractor shall submit at the shop drawing submittal stage, 2-inch scale, dimensioned drawings of actual electrical equipment layouts in all electrical and mechanical rooms, based on the equipment being provided. Any conflicts shall be resolved between the General Contractor and the respective subcontractors to provide for the equipment location and required working clearances.
 - b. Conduit routing is not shown on the documents. It shall be the Contractor's responsibility to field route all raceways, and coordinate such routing with all disciplines to resolve any conflicts, as necessary to provide the intended connections. It shall be assumed that the design was based on the shortest possible route. Where conduit or duct routing follows other than direct paths, the conductors and raceways shall be adjusted accordingly to account for voltage drop.
 2. Complete distribution system for lighting including the necessary feeders, branch circuits, lighting fixtures, control switches and receptacles.
 3. Complete system of empty raceways (with pull lines) and cabinets for telephones and data network structured cabling.
 4. Complete fire alarm system.
 5. Complete power distribution system for HVAC equipment including wiring, conduits, and disconnect switches.
 6. Complete system of empty raceways (with pull lines) and terminal cabinets and power requirements for EMCS (Energy Management and Control System), security systems, and cable TV.
 7. Furnishing and installing all necessary access panels.
 8. Concrete work for equipment pads or encased raceways.
 9. Painting (of special equipment).
 10. Temporary power.

11. Contractor shall check site and existing conditions thoroughly before bidding. Advise Architect of discrepancies or questions note.
12. Whether indicated on the drawings or not, if a requirement is listed, mentioned, or described in this specification, the cost for its provision and complete installation and connection, shall be included in the Contractor=s bid.
13. The Contractor is cautioned to consult drawings of all disciplines to ascertain electrical requirements for systems that may not be on the electrical plans. Specific attention is directed to special systems such as fire alarm, security, EMCS, etc. The Contractor shall include in his bid, the cost for providing and installing all electrical provisions for a complete, operating system.
14. Perform all required commissioning sub tasks as specified in the Commissioning specifications noted in Division 1, General Requirements and 23 08 00, “Commissioning”. The contractor shall designate an individual to serve on the commissioning team and shall cooperate as required concerning all commissioning related activities, meetings, documentation, field tests, etc. The contractor shall provide all technically qualified personnel, equipment, instrumentation, and materials on a continuous basis in order to perform their required tasks at the required time period and provide all required or requested assistance by the commissioning provider to complete the commissioning process. The contractor is required per referenced specifications to complete all applicable Pre-Functional Test Report forms on the systems being commissioned. This may include as well, start-up check list forms.

END OF SECTION

SECTION 26 05 13 - BUILDING WIRE AND CABLE

PART 1: GENERAL

1.1 SECTION INCLUDES

- A. Building wire and cable.
- B. Wiring connectors and connections.

1.2 REFERENCES

- A. ANSI/NFPA 70 - National Electrical Code.

1.3 SUBMITTALS

- A. Submit under provisions of Division One.
- B. Product Data: Provide for each cable assembly type.
- C. Test Reports: Indicate procedures and values obtained.
- D. Manufacturer's Installation Instructions: Indicate application conditions and limitations of use stipulated by product testing agency specified under Regulatory Requirements.

1.4 QUALIFICATIONS

- A. Manufacturer: Company specializing in manufacturing products specified in this Section with minimum three years documented experience.

1.5 REGULATORY REQUIREMENTS

- A. Conform to requirements of ANSI/NFPA 70.
- B. Furnish products listed and classified by Underwriters Laboratories, Inc., as suitable for purpose specified and shown.

1.6 FIELD SAMPLES

Where required, provide as per the following:

- A. Provide under provisions of Division One.
- B. Submit one length, each 18 inches of cable assembly from each reel.
- C. Select each length to include complete set of manufacturer markings.
- D. Attach tag indicating cable size and application information.

1.7 PROJECT CONDITIONS

- A. Verify that field measurements are as shown on Drawings.
- B. Conductor sizes are based on copper.
- C. Wire and cable routing shown on Drawings is approximate unless dimensioned. Route wire and cable as required to meet Project Conditions.
- D. Where wire and cable routing is not shown, and destination only is indicated, determine exact routing and lengths required.

1.8 COORDINATION

- A. Coordinate Work under provisions of Division One.
- B. Determine required separation between cable and other work.
- C. Determine cable routing to avoid interference with other work.

PART 2: PRODUCTS

2.1 BUILDING WIRE AND CABLE

- A. Description: Solid or stranded insulated wire.
- B. Conductor: Copper.
- C. Insulation Voltage Rating: 600 volts.
- D. Insulation: ANSI/NFPA 70, Type THW, THWN.

2.2 WIRING CONNECTORS

- A. Solderless Pressure Connectors:
 - 1. IlSCO Model PDB.
 - 2. Substitutions: Under provisions of Division One.
- B. Spring Wire Connectors:
 - 1. Ideal
 - 2. Scotchloc
 - 3. Holub
 - 4. Substitutions: Under provisions of Division One.
- C. Compression Connectors:
 - 1. Panduit
 - 2. Burndy
 - 3. 3M

4. Substitutions: Under provisions of Division One.
- D. Split-bolt, insulation piercing or push-in type connectors shall not be used.

PART 3: EXECUTION

3.1 EXAMINATION

- A. Verify that mechanical work likely to damage wire and cable has been completed.

3.2 PREPARATION

- A. Completely and thoroughly swab raceway before installing wire.

3.3 INSTALLATION

- A. Install products in accordance with manufacturer's instructions.
- B. All wire shall be installed in conduit unless specifically noted otherwise.
- C. Use stranded conductors for control circuits.
- D. Use conductor not smaller than 12 AWG for power and lighting circuits.
- E. Use conductor not smaller than 12 AWG to supply a single fixture.
- F. Use conductor not smaller than 16 AWG for control circuits.
- G. Conductors of the essential electrical system shall be run in separate raceways and be isolated from conductors of the normal power system.
- H. Use 10 AWG conductors for 20 ampere, 120 volt branch circuits longer than 75 feet.
- I. Pull all conductors into raceway at same time.
- J. Use suitable wire pulling lubricant for installing all building wire.
- K. Protect exposed cable from damage.
- L. Use suitable cable fittings and connectors.
- M. Neatly train and lace wiring inside boxes, equipment, and panelboards.
- N. Clean conductor surfaces before installing lugs and connectors.
- O. Make splices, taps, and terminations to carry full ampacity of conductors with no perceptible temperature rise.

- P. Use antioxidant compound on splices and termination of 2 AWG and larger.
- Q. Use sealed weatherproofing kits for underground splices.
- R. Provide 8 inches of free conductor at outlet, switch, pull and junction boxes.
- S. Use insulated spring wire connectors with plastic caps for copper conductor splices and taps, 8 AWG and smaller.
- T. Use IIsco or Polaris type bolted lugs with covers for copper conductor taps, and hy-press type sleeves with shrink-sleeve insulation, 6 AWG and larger. Do not splice in underground hand holes.
- U. In new conduit installation, do not install more than five wires in the same conduit unless specifically noted otherwise. Conduits containing control wires or switch legs may contain more than 5 wires to a maximum fill of 40%.
- V. All bushings shall be installed prior to pulling wire. Any wire pulled-in prior to installation of bushings will be required to be removed and replaced at the Contractor's expense.
- W. Each current carrying phase conductor of 120v branch circuits and 277V lighting circuits shall have a dedicated neutral conductor paired with it. Do not "share" neutral conductors among alternate phase conductors.

3.4 INTERFACE WITH OTHER PRODUCTS

- A. Identify wire and cable under provisions of Division One.
- B. Identify each conductor with its circuit number or other designation indicated on Drawings.

3.5 FIELD QUALITY CONTROL

- A. Perform field inspection and testing under provisions of Division One.
- B. Inspect wire and cable for physical damage and proper connection.
- C. Measure tightness of bolted connections and compare torque measurements with manufacturer's recommended values.
- D. Verify continuity of each branch circuit conductor.
- E. Megger all feeders and all branch circuits larger than 200 amp. Coordinate all testing with Section 26 05 70.

END OF SECTION

SECTION 26 05 26 - GROUNDING

PART 1 - GENERAL

1.1 WORK INCLUDES

- A. Base Bid:
 - 1. Electrical Contractor provide:
 - a. Grounding for Separately Derived Systems
 - b. Grounding for equipment.

1.2 SYSTEM DESCRIPTION

- A. Ground each separately derived system neutral to structural member of building.
- B. Ground raceways and electrical equipment; use double locknuts at all panels; use bonding jumpers where conduits are installed in concentric knockouts. Ground panels, switches, motor frames, motor starters fixtures, and outlets with separate ground conductor in conduit system.
- C. Bond together system neutrals, service entrance enclosures, exposed non-current carrying metal parts of electrical equipment, metal raceway systems, grounding conductor in raceways and cables, receptacle ground terminals.

1.3 QUALITY ASSURANCE

- A. Regulatory Requirements:
 - 1. Comply with NFPA 70, National Electric Code.
 - 2. UL 467: Grounding and Bonding Equipment.

1.4 SUBMITTALS

- A. In accord with Division One.
- B. Test data in accord with 26 05 70.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Materials used for grounding conductors shall be in accordance with N.E.C. Article 250-91.
- B. Ground Rods: Steel, copper-encased, 3/4 inch O.D. x 10'-0".
- C. Connections: Exothermic weld type for inaccessible locations, mechanical clamp type for accessible locations.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Use driven ground rod where shown on drawings.
- B. Bond all grounding systems together.
- C. Separately Derived Systems: Provide connection to building steel bonded to neutral of transformer.
- D. Provide green equipment grounding conductor sized in accordance with Table 250-95 of the N.E.C., in all raceways including conduits, wireways, ducts, and boxes. Bond equipment grounding conductor to each section of ducts and wireways using a continuous conductor and lay-in type grounding lugs bolted to the housing.
- E. The equipment grounding busses of the normal and essential branch - circuit panelboards serving the same patient care areas, shall be bonded together using a No. 10 insulated (green) copper conductor in accordance with Article 517-14, N.E.C.
- F. In all patient rooms, prep/recovery areas, O.R.'s, or other patient care areas, bond outlet boxes of each switch, receptacle, TV outlet, telecom outlet, telemetry outlet, med gas outlet, nurse call outlet, code blue outlet, etc., together using a #10 AWG (min.) green equipment grounding conductor. Bond to med gas faceplates using a tapped cap-screw or similar connection. This requirement is intended to enhance equipotential grounding in these spaces.

3.2 FIELD QUALITY CONTROL

- A. Measure ground resistance in accord with 26 05 70.

END OF SECTION

SECTION 26 05 29 - SUPPORTING DEVICES

PART 1: GENERAL

1.1 WORK INCLUDED

- A. Conduit and equipment supports.
- B. Fastening hardware.

1.2 COORDINATION

- A. Coordinate size, shape and location of concrete pads with Division 3.

1.3 QUALITY ASSURANCE

- A. Support systems shall be adequate for weight of equipment and conduit, including wiring, which they carry.

PART 2: PRODUCTS

2.1 MATERIAL

- A. Support Channel: Galvanized steel.
- B. Hardware: Corrosion resistant.

PART 3: EXECUTION

3.1 INSTALLATION

- A. Fasten hanger rods, conduit clamps, and outlet and junction boxes to building concrete structure using expansion anchors.
- B. Use toggle bolts or hollow wall fasteners in hollow masonry, plaster, or gypsum board partitions and walls; expansion anchors or preset inserts in solid masonry walls; self-drilling anchors or expansion anchor on concrete surfaces; sheet metal screws in sheet metal studs; and wood screws in wood construction.
- C. Do not fasten supports to piping, ductwork, mechanical equipment, or conduit.
- D. Do not use powder-actuated anchors.
- E. Do not drill structural steel members.
- F. Fabricate supports from structural steel or steel channel, rigidly welded or bolted to present a neat appearance. Use hexagon head bolts with spring lock washers under all nuts.

- G. In wet locations install free-standing electrical equipment on concrete pads.
- H. Install surface-mounted cabinets and panelboards with minimum of four anchors. Provide steel channel supports to stand cabinet 3/4 inch off wall.
- I. Bridge studs top and bottom with channels to support flush-mounted cabinets and panelboards in stud walls.

END OF SECTION

SECTION 26 05 33 - RACEWAYS

PART 1: GENERAL

1.1 SECTION INCLUDES

- A. Metal conduit.
- B. Flexible metal conduit.
- C. Liquidtight flexible metal conduit.
- D. Electrical metallic tubing.
- E. Fittings and conduit bodies.

1.2 REFERENCES

- A. ANSI C80.1 - Rigid Steel Conduit, Zinc Coated.
- B. ANSI C80.3 - Electrical Metallic Tubing, Zinc Coated.
- C. ANSI/NEMA FB 1 - Fittings, Cast Metal Boxes, and Conduit Bodies for Conduit and Cable Assemblies.
- D. ANSI/NFPA 70 - National Electrical Code.
- E. NECA "Standard of Installation."
- F. NEMA RN 1 - Polyvinyl Chloride (PVC) Externally Coated Galvanized Rigid Steel Conduit.

1.3 DESIGN REQUIREMENTS

- A. Conduit Size: ANSI/NFPA 70.

1.4 SUBMITTALS

- A. Submit under provisions of Division One.

1.5 PROJECT RECORD DOCUMENTS

- A. Submit under provisions of Division One.
- B. Accurately record actual routing of empty conduits, exterior underground.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Deliver, store, protect, and handle Products to site under provisions of Division One.

- B. Accept conduit on site. Inspect for damage.
- C. Protect conduit from corrosion and entrance of debris by storing above grade. Provide appropriate covering.

1.7 PROJECT CONDITIONS

- A. Verify that field measurements are as shown on Drawings.
- B. Verify routing and termination locations of conduit prior to rough-in.
- C. Conduit routing is shown on Drawings in approximate locations unless dimensioned. Route as required to complete wiring system.

PART 2: PRODUCTS

2.1 RIGID METAL CONDUIT

- A. Description: Rigid Galvanized Steel Conduit: ANSI C80.1.
- B. Fittings and Conduit Bodies: ANSI/NEMA FB 1; material to match conduit; all steel fittings.

2.2 NON-METALLIC CONDUIT

- A. Description: Schedule 40 PVC.
- B. Fittings and Conduit Bodies: Same manufacturer as conduit.

2.3 FLEXIBLE METAL CONDUIT

- A. Description: Interlocked steel construction.
- B. Fittings: ANSI/NEMA FB 1. Steel or malleable iron type.

2.4 LIQUIDTIGHT FLEXIBLE METAL CONDUIT

- A. Description: Interlocked steel construction with PVC jacket.
- B. Fittings: ANSI/NEMA FB 1. Steel or malleable iron type.

2.5 ELECTRICAL METALLIC TUBING (EMT)

- A. Description: ANSI C80.3; galvanized tubing.
- B. Fittings and Conduit Bodies: ANSI/NEMA FB 1; steel, set screw or compression type with insulated throat.

PART 3: EXECUTION

3.1 CONDUIT REQUIREMENTS

- A. Minimum Size: 3/4 inch unless otherwise specified.
- B. Underground Installations:
 - 1. Use rigid galvanized steel (RGS) conduit or Schedule 40 PVC outside building footprint. Paint all RGS conduit, to be installed underground, with two coats of bitumastic paint.
 - 2. Minimum Size: 3/4 inch.
 - 3. Install conduits a minimum of 30 inches below finished grade, unless inside the building line.
 - 4. Terminate conduits with bell ends or bushings at manholes.
 - 5. Duct seal all outdoor conduit terminations, and underground conduits entering a building.
 - 6. PVC conduit shall not be used in any patient care areas.
- C. Outdoor Locations, Above Grade: Use rigid steel conduit where exposed to possible physical damage. All other areas, use Schedule 40 PVC.
- D. In Slab Above Grade:
 - 1. Use rigid steel conduit or electrical metallic tubing.
 - 2. Maximum Size Conduit in Slab: 3/4 inch.
- E. Wet Locations: Use rigid steel conduit.
- F. Damp Locations: Rigid steel conduit.
- G. Indoor Locations:
 - 1. Concealed: Use rigid steel conduit or use electrical metallic tubing.
 - 2. Exposed: Below 4'-0" AFF, use rigid steel conduit. Above 4'-0" AFF, use electrical metallic tubing.
- H. Subject to Physical Damage: Galvanized rigid steel conduit.
- I. Flexible conduit: 3/8 inch steel (min.), maximum 6 feet long.
- J. Electrical Metallic Tubing: 1/2 inch, not exceeding 10 feet long at the following conditions:
 - 1. Junction box above ceiling to a single box in furred wall.
 - 2. All other locations, use 3/4" EMT minimum.
- K. Steel flexible conduit or liquid tight conduit, 1/2 inch (maximum 3 feet long), to connect equipment where subject to vibration or frequent changing.

3.2 INSTALLATION

- A. Install conduit in accordance with NECA "Standard of Installation."
- B. All wiring shall be in conduit unless specifically noted otherwise.
- C. Arrange supports to prevent misalignment during wiring installation.
- D. Secure and/or support conduit using coated steel or malleable iron straps, lay-in adjustable hangers, clevis hangers, and split hangers.
- E. Multiple parallel runs of suspended conduits shall be supported by steel channel and straps.
- F. Group related conduits; support using conduit rack. Construct rack using steel channel; provide space on each for 25 percent additional conduits.
- G. Fasten conduit supports to building structure and surfaces under provisions of Section 26 05 29.
- H. Do not support and/or secure conduit with perforated pipe straps. Remove wire used for temporary supports.
- I. Do not attach conduit to ceiling support wires. Install additional support wires to support conduits. Conduit must be securely fastened in place.
- J. Arrange conduit to maintain headroom and present neat appearance.
- K. Route exposed conduit parallel and perpendicular to walls. Exposed conduit below 10 ft above floor in occupied areas, shall have 2 hole straps spaced a maximum of 5 ft.
- L. Do not route conduits on floors in areas used for access to any equipment.
- M. Route conduit installed above accessible ceilings parallel and perpendicular to walls.
- N. Route conduit in and under slab from point-to-point.
- O. Do not cross conduits in slab.
- P. Maintain adequate clearance between conduit and piping.
- Q. Maintain 12 inch clearance between conduit and surfaces with temperatures exceeding 104 degrees F.
- R. Cut conduit square using saw or pipe cutter; de-burr cut ends.
- S. Bring conduit to shoulder of fittings; fasten securely.
- T. Use conduit hubs or sealing locknuts to fasten conduit to sheet metal boxes in damp and wet locations and to cast boxes.

- U. Install no more than equivalent of four 90-degree bends between boxes. Use conduit bodies to make sharp changes in direction, as around beams. Use factory elbows for bends in metal conduit larger than 2 inch size.
- V. Avoid moisture traps; provide junction box with drain fitting at low points in conduit system.
- W. Provide suitable fittings to accommodate expansion and deflection where conduit crosses expansion joints.
- X. Provide a 200 lb test pull string in each empty conduit except sleeves and nipples.
- Y. Use suitable caps to protect installed conduit against entrance of dirt and moisture immediately after installation.
- Z. Ground and bond conduit under provisions of Section 16450.
- AA. Identify conduit under provisions of Section 16195.
- BB. New Construction: Conduits run in finished areas shall be concealed.
- CC. No conduits shall be installed on roof surface.
- DD. Do not use threadless connector or couplings on rigid conduit installed above grade.
- EE. Do not use "all-thread" conduit nipples.
- FF. Terminate all empty conduits in approved type boxes.
- GG. Disconnect switches, magnetic starters, contactors, control cabinets and panel boards shall not be used as raceways.
- HH. Flexible metal conduit and liquidtight flexible metal conduit shall not exceed 6 feet in length.
- II. Flexible metal conduit and liquid-tight flexible metal conduit shall not penetrate walls or ceilings.
- JJ. All metallic conduits and fittings below grade or in slabs shall be coated with two (2) coats of bitumastic paint prior to installation.
- KK. All conduit terminations shall have insulated throat or appropriate plastic bushing.
- LL. All raceway systems shall be complete, and each system shall be totally separate.
- MM. Non-metallic conduit shall not be used in patient care areas.

3.2 INTERFACE WITH OTHER PRODUCTS

- A. Install conduit to preserve fire resistance rating of partitions and other elements, using materials and methods under the provisions of Division Seven.
- B. Route conduit through roof openings for piping and ductwork or through suitable roof jack with pitch pocket. Coordinate location with roofing installation.

END OF SECTION

SECTION 26 05 34 - BOXES

PART 1: GENERAL

1.1 SECTION INCLUDES

- A. Wall and ceiling outlet boxes.
- B. Floor boxes.
- C. Pull and junction boxes.

1.2 REFERENCES

- A. ANSI/NEMA FB 1 - Fittings and Supports for Conduit and Cable Assemblies.
- B. ANSI/NEMA OS 1 - Sheet-steel Outlet Boxes, Device Boxes, Covers, and Box Supports.
- C. ANSI/NFPA 70 - National Electrical Code.
- D. NEMA 250 - Enclosures for Electrical Equipment (1000 Volts Maximum).

1.3 PROJECT RECORD DOCUMENTS

- A. Submit under provisions of Division One.
- B. Accurately record actual locations and mounting heights of outlet, pull, and junction boxes.

1.4 REGULATORY REQUIREMENTS

- A. Conform to requirements of ANSI/NFPA 70.
- B. Furnish products listed and classified by Underwriters Laboratories, Inc., as suitable for purpose specified and shown.

1.5 PROJECT CONDITIONS

- A. Verify field measurements are as shown on Drawings.
- B. Electrical boxes are shown on Drawings in approximate locations unless dimensioned. Install at location required for box to serve intended purpose.

PART 2: PRODUCTS

2.1 OUTLET BOXES

- A. Sheet Metal Outlet Boxes: ANSI/NEMA OS 1, galvanized steel one piece construction, 4 inches x 4 inches x 1.5 inches deep, minimum.

- B. Cast Boxes: NEMA FB 1, Type FD cast ferralloy. Provide gasketed cover by box manufacturer. Provide threaded hubs, 4 inches x 4 inches x 1.5 inches deep, minimum.

2.2 PULL AND JUNCTION BOXES

- A. Sheet Metal Boxes: NEMA OS 1, galvanized steel one piece construction.
 - 1. Minimum Size Box: 4 x 4 x 1-1/2 inches deep.
- B. Surface-Mounted Cast Metal Box: NEMA 250, Type 4; flat-flanged, surface-mounted junction box.
 - 1. Material: Galvanized cast iron.
 - 2. Cover: Furnish with ground flange, neoprene gasket, and stainless steel cover screws.

PART 3: EXECUTION

3.1 INSTALLATION

- A. Install electrical boxes as shown on Drawings, and as required for splices, taps, wire pulling, equipment connections and compliance with regulatory requirements.
- B. Install electrical boxes to maintain a 6'-3" headroom and to present neat mechanical appearance.
- C. Install pull boxes and junction boxes above accessible ceilings and in unfinished areas only.
- D. Inaccessible Ceiling Areas: Install outlet and junction boxes no more than 6 inches from ceiling access panel or from removable recessed luminaire.
- E. Accessible Ceiling Areas: Install outlets and junction boxes no more than 3'-0" above removable ceiling.
- F. Install boxes to preserve fire resistance rating of partitions and other elements, using materials and methods under the provisions of Division One.
- G. Align adjacent wall-mounted outlet boxes for switches, thermostats, and similar devices with each other.
- H. Use flush mounting outlet boxes in finished areas.
- I. Do not install flush mounting boxes back-to-back in walls; provide minimum 6 inch separation. Provide minimum 24 inches separation in acoustic rated and fire rated walls.
- J. Secure flush mounting box to interior wall and partition studs. Accurately position to allow for surface finish thickness.
- K. Use stamped steel bridges to fasten flush mounting outlet box between studs.

- L. Install flush mounting box without damaging wall insulation or reducing its effectiveness.
- M. Do not fasten boxes to ceiling support wires.
- N. Support boxes from building structure or structural member.
- O. Use gang box where more than one device is mounted together. Do not use sectional box.
- P. Use 2-gang box with plaster ring for single device outlets.
- Q. Use cast outlet box in exterior locations exposed to the weather and wet locations.
- R. Use cast floor boxes for installations in slab on grade; formed steel boxes are acceptable for other installations.
- S. Set floor boxes level.
- T. Large Pull Boxes: Boxes larger than 100 cubic inches in volume or 12 inches in any dimension.
 - 1. Interior Dry Locations: Use hinged enclosure.
 - 2. Other Locations: Use surface-mounted cast metal box.
- U. Floor boxes shall not be used for feed through wiring except to another floor box.
- V. Cast boxes at the end of a run shall have one additional conduit into slab for support.
- W. Pull boxes shall be added, as necessary, to eliminate conduit runs from exceeding 200 feet in length.
- X. Box mounting height, unless indicated on drawings:
(All mounting heights shall comply with ADA)
 - 1. Refer to Section 26 27 26, Paragraph 3.4.
- Y. A maximum of one extension ring shall be used on a box.
- Z. System pull and junction boxes shall be color-coded as specified in Section 26 05 53.

3.2 INTERFACE WITH OTHER PRODUCTS

- A. Coordinate locations and sizes of required access doors with Division 8.
- B. Locate flush mounting box in masonry wall to require cutting of masonry unit corner only. Coordinate masonry cutting to achieve neat opening.
- C. Coordinate mounting heights and locations of outlets mounted above counters, benches and backsplashes.

- D. Position outlet boxes to locate luminaries as shown on reflected ceiling plan.

3.3 ADJUSTING

- A. Adjust floor box flush with finish flooring material.
- B. Adjust flush-mounting outlets to make front flush with finished wall material.
- C. Install knockout closure in unused box opening.

END OF SECTION

SECTION 26 05 53 – ELECTRICAL SYSTEMS IDENTIFICATION

PART 1: GENERAL

1.1 WORK INCLUDED

- A. Nameplates.
- B. Wire markers.
- C. Box color coding.
- D. Lighting and power junction boxes.
- E. Panel directories.

1.2 SUBMITTALS

- A. Submit shop drawings under provisions of Division One.
- B. Include schedule for nameplates.

PART 2: PRODUCTS

2.1 MATERIALS

- A. Nameplates: Engraved three-layer laminated plastic, white letters on a black background. Equipment and devices on 'critical branch' (emergency) shall have labels with white letters on red background.
- B. Underground-Type Plastic Line Marker: Manufacturer's standard permanent, bright-colored, continuous-printed plastic tape with mylar backing, intended for direct-burial service; not less than 6 inches wide x 4 mils thick. Provide tape with printing which most accurately indicates the type of the buried conduit.
- C. Wire and Cable Markers: Cloth markers, split sleeve or tubing type.

PART 3: EXECUTION

3.1 INSTALLATION

- A. Degrease and clean surfaces to receive nameplates.
- B. Install nameplates parallel to equipment lines.
- C. Secure nameplates to equipment fronts using stainless steel screws. Secure nameplate to outside face of recessed panelboard doors in finished locations.

- D. Embossed tape will not be permitted for any application.
- E. Provide underground-type plastic line marker above exterior underground conduits. Bury 6 to 8 inches below finish grade. Provide line markers on each side of trench if wider than 16 inches.

3.2 WIRE IDENTIFICATION

- A. Phase Color Coding:
 - 1. 120/208 volt system, "A" phase - black, "B" phase - red, "C" phase - blue, neutral - white, and ground green.
 - 2. 277/480 volt system, "A" phase - brown, "B" phase - orange, "C" phase - yellow, neutral - gray, and ground - green.
- B. Maintain A, B, C, phase relation left to right or top to bottom when viewed from front. Maintain color coding throughout entire project.
- C. Phase conductors, size #10 and smaller, and neutral and ground conductors, shall have continuous outer finish color as indicated above. Size #8 and larger conductors shall have black insulation and be color coded with a six inch band of colored tape at all junctions and terminators.

3.3 NAMEPLATE ENGRAVING SCHEDULE

- A. Provide nameplates of minimum letter height as scheduled below.
 - 1. Panelboards: 1/2 inch-identify panelboard name. 1/4 inch-identify voltage rating.
 - 2. Individual Circuit Breakers and Switches: 3/8 inch-identify circuit and load served, including location.
 - 3. Safety Switches and Enclosed Switches: 1/2 inch - identify switch name; 1/4-inch - identify load served.
 - 4. Transformers: 3/8 inch-identify transformer name. 1/4 inch-identify primary and secondary voltages.
 - 5. Electrical Cabinets and Enclosures: 3/8 inch- identify equipment name.
 - 6. System Terminal Cabinets: 3/8 inch-identify equipment or system name.
- B. Headwall: 1/8 inch-identify panel and circuit number serving outlet (ex. 'LINA - 2') located above each outlet on headwall.
- C. Provide panelboard and circuit number on engraved trim plate, on each receptacle and switch. Engraving shall be deep enough to be visible and legible from a distance of 5'-0". Fasten nameplate to switch coverplate.

3.4 BOX COLOR CODING SCHEDULE

- A. Paint junction box and cover, and 6" of all conduits entering/leaving, in the following manner:

Life-Safety - Yellow

Critical - Orange
Equipment - Green
Fire alarm - Red
Nurse Call/Code Blue - blue.
Patient Monitor - purple.
Telephone system - brown.
CATV - white.

3.5 LIGHTING AND POWER JUNCTION BOX IDENTIFICATION

- A. Identify lighting and power junction box covers with circuit and panelboard number on the outside, using permanent marker.

36 PANEL DIRECTORY

- A. Shall be typewritten, indicating specific and clear area of control, regardless of the listing in the panel schedules on the drawings. Indicate by room name, equipment, system, etc.
- B. Seven (7) days prior to the final AHCA survey, provide to the Engineer corrected panel directories so the panel schedules on the record drawings can be updated to match the directories in the panels in the field.

END OF SECTION

SECTION 26 05 70 - TESTING

PART 1 - GENERAL

1.1 WORK INCLUDES

- A. Testing of electrical components and equipment as herein specified.

1.2 SYSTEM DESCRIPTION

- A. Testing includes:
 - 1. Resistance tests.
 - 2. Continuity tests.
 - 3. Phase relationship verification.
 - 4. Voltage tests.
 - 5. Ground fault protection tests.

1.3 QUALITY ASSURANCE

- A. Regulatory Requirement
 - 1. Comply with National Electrical Code, (NEC).
- B. Reference Publications

1.4 SUBMITTALS

- A. Test Reports: All test reports shall be submitted in triplicate, assembled and bound to Architect/Engineer prior to final acceptance.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Furnish all test equipment to perform specified testing.

PART 3 - EXECUTION

3.1 TESTS

- A. Conduct such tests and adjustment of equipment as necessary to verify performance requirements.
- B. Test Reports: Typewritten, listing testing equipment used, person or persons performing the tests, date tested, circuits tested, motor or equipment nameplate data, and results of tests.
- C. Insulation resistance tests general:
 - 1. Perform insulation resistance tests on equipment and cables listed herein.

2. Test equipment: Furnished by Contractor.
3. Resistance measured: line-to-ground.
4. Disconnect, prior to testing, any device that could be damaged by application of voltage.
5. Insulation resistance tests shall be conducted per following schedule:

Item Tested	Voltage of Test	Min. Acceptance Resistance in Megohms
Transformers	500v	5
No. 2 and larger cables (600 V)	1000V	50
Panelboards	1000V	25

D. Ground Resistance

1. Measure and record ground resistance from system neutral connection at separately derived system, to convenient ground reference point using suitable ground testing equipment. Minimum acceptable resistance: 10 ohms. When resistance exceeds 10 ohms, modify ground connection and/or increase grounding electrode conductor size and repeat test.
2. Measure equipotential difference and ground resistance between the metallic raceway, and the equipment grounding conductor at each outlet mounted in the walls, of the Operating and Procedure rooms, and prep and recovery areas. Maximum allowable potential difference is 20 millivolts, (.020 volts), and maximum ground resistance shall be 0.1 ohms.
3. Random testing shall be performed at the time of the AHCA Final Survey. Test equipment shall be provided with current calibration data indicating date of calibration, and length of test leads used during calibration. Calibration shall have been within the last twelve (12) months.

E. Continuity Test

1. Test branch circuits and control circuits to determine continuity of wiring and connection. Submit written statement that this has been performed.

F. Voltage test shall be made and recorded at the following listed points. Tests shall be conducted under normal load conditions.

1. Distribution feeders at panelboards.
2. Outlets in the headrail system.

G. Phase Relationship: Check connections to equipment for proper A-B-C phase relationships.

1. Disconnect, prior to check, any device which could be damaged by application of voltage of reversed phase sequence.

3.2 PRE-AHCA SURVEY

- A. The Contractor shall be required to perform a pre-inspection with the Engineer, 7 days prior to the Final AHCA Survey. Purpose of inspection is to identify and address any deficiencies prior to the actual AHCA survey.

3.3 CORRECTIONS OF DEFECTS

- A. If tests disclose any unsatisfactory workmanship or equipment furnished under this contract, Contractor shall repair or replace such defects.
- B. If any wiring or equipment is damaged by tests, Contractor shall repair or replace such wiring or equipment.

END OF SECTION

SECTION 26 24 16 - CIRCUIT BREAKER PANELBOARDS

PART 1 - GENERAL

1.1 WORK INCLUDES

- A. Panelboards herein specified and shown on the drawings.

1.2 SUBMITTALS

- A. In accord with Division One.
 - 1. Shop Drawings: Panelboards and Dimensional Data
 - 2. Product Data: Circuit breakers.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Panelboards rated 208Y/120 volt shall have copper bus structure braced for 10,000 RMS amps fault current minimum, and panelboards rated 277/480 volt shall have copper bus braced for 25,000 RMS amps fault current minimum, or as indicated on the drawings, whichever is greater. All copper parts shall be plated to prevent corrosion.
 - 1. All panelboards shall be Dead-Front Safety Type, equipped with thermal-magnetic molded case breakers, and solid neutral bus.
 - 2. Bus bar connections to the branch circuit breakers shall be the "Distributed Phase" or "Phase Sequence" type. Bussing shall be such that adjacent single pole breakers will be on different phases or polarities, and that two or three pole breakers can be installed at any location.
 - 3. Panelboard numbering shall be such that starting at the top, odd numbers shall be used in sequence down the left hand side and even numbers shall be used in sequence down the right hand side.
- B. Cabinets shall be fabricated of code gauge galvanized steel with gutters per National Electrical Code. Fronts shall have doors with matching one piece trim, be code gauge and be finished with rust inhibiting primer and baked enamel. Fronts shall have adjustable indicating trim clamps completely concealed when door is closed. Provide a circuit directory frame and card with a clear plastic covering on the inside of the doors. Fronts shall have flush locks and be furnished with two keys per lock.
- C. Provide circuit breakers, quick-make, quick-break, thermal-magnetic, trip indicating, and common trip on all multi-pole breakers. Branch circuit breakers feeding convenience outlets shall have sensitive instantaneous trip settings of not more than 10 times the trip rating of the breaker. Circuit breakers shall have bolt-on connections to the bus. Ratings are shown on the panelboard schedule.

- D. Main circuit breaker: Circuit breaker ampere rating as shown on drawings, voltage as required, 3-pole, single-throw, front connected. Molded case, thermal-magnetic, common trip, quick-make, quick-break, adjustable magnetic trip elements, with RMS interrupting rating as required to meet the panel's integrated rating. Provide where indicated on drawings.
- E. Breakers intended to switch fluorescent lighting loads on a regular basis shall be rated for switching duty.
- F. Provide ground fault circuit interrupter circuit breakers rated to trip at 30 milliamperes for circuits as shown on drawings.
- G. Panelboards shall be furnished with ground bus and separate insulated neutral bus.
- H. Circuit Breaker Panelboards:
 - 1. Acceptable Products:
 - a. Square D (Basis of Design)
 - b. G.E.
 - c. Eaton
 - d. Siemens

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Locate as shown on drawings. Maximum distance from floor to highest breaker: 6 feet - 6 inches.
- B. Provide mounting materials required; make connections specified or shown. Use collars around mounting bolts, or equivalent means to provide 1/4" minimum air space between panel and wall for surface mounted panel.
- C. Provide nameplate for each panel in accord 26 05 53.
- D. Provide typed circuit directory for each panel indicating load served. Leave spare circuit breakers and circuit breaker space blank on directory.
- E. Where double-panels are indicated, provide single common trim or allow for two individual covers when mounting cabinets.

END OF SECTION

SECTION 26 27 16 - CABINETS AND ENCLOSURES

PART 1 GENERAL

1.1 SECTION INCLUDES:

- A. Hinged cover enclosures.
- B. Cabinets.
- C. Terminal blocks and accessories.

1.2 REFERENCES

- A. NEMA 250 - Enclosures for Electrical Equipment (1000 Volts Maximum).
- B. ANSI/NEMA ICS 1 - Industrial Control and Systems.
- C. ANSI/NEMA ICS 4 - Terminal Blocks for Industrial Control Equipment and Systems.
- D. ANSI/NEMA ICS 6 - Enclosures for Industrial Control Equipment and Systems.

1.3 SUBMITTALS

- A. Submit product data under provisions of Section 01300.
- B. Shop Drawings for Equipment Panels: Include wiring schematic diagram, wiring diagram, outline drawing and construction diagram as described in ANSI/NEMA ICS 1.

PART 2 PRODUCTS

2.1 HINGED COVER ENCLOSURES

- A. Construction: NEMA 250; steel; type as required to meet conditions of installation unless indicated on the Drawings. Where installed outdoors, enclosure shall be NEMA-4X stainless steel.
- B. Finish: Manufacturer's standard enamel finish.
- C. Covers: Continuous hinge, held closed by flush latch operable by key.
- D. Panel for Mounting Terminal Blocks or Electrical Components: 14 gage steel, enamel finish.

2.2 CABINETS

- A. Cabinet Boxes: Galvanized steel with removable end walls. Provide 3/4 inch thick plywood backboard (exterior fir, type A/C, 7 ply) painted gray on all sides, for mounting terminal blocks.
- B. Cabinet Fronts: Screw cover front, concealed hinge and flush lock keyed to match branch circuit panelboard; finish in baked enamel.

2.3 TERMINAL BLOCKS AND ACCESSORIES

- A. Terminal Blocks: ANSI/NEMA ICS 4; UL listed.
- B. Power Terminals: Unit construction type, closed-back type, with tubular pressure screw connectors, rated 600 volts.
- C. Signal and Control Terminals: Modular construction type, channel mounted; tubular pressure screw connectors, rated 300 volts.

2.4 FABRICATION

- A. Shop assemble enclosures and cabinets housing terminal blocks or electrical components in accordance with ANSI/NEMA ICS 6.
- B. Provide knockouts on enclosures.
- C. Provide protective pocket inside front cover with schematic diagram, connection diagram, and layout drawing of control wiring and components within enclosure.

PART 3 EXECUTION

3.1 INSTALLATION

- A. Install cabinets and enclosures plumb; anchor securely to wall and structural supports at each corner, minimum.
- B. Provide accessory feet for free-standing equipment enclosures.
- C. Install trim plumb.

END OF SECTION

SECTION 26 27 26 - WIRING DEVICES

PART 1: GENERAL

1.1 SECTION INCLUDES

- A. Wall switches.
- B. Receptacles.
- C. Device plates and decorative box covers.

1.2 REFERENCES

- A. NEMA WD 1 - General Purpose Wiring Devices.
- B. NEMA WD 6 - Wiring Device Configurations.

1.3 SUBMITTALS

- A. Submit under provisions of Division One.
- B. Product Data: Provide manufacturer's catalog information showing dimensions, colors, and configurations.
- C. Manufacturer's Instructions:
 - 1. Indicate application conditions and limitations of use stipulated by product testing agency specified under regulatory requirements.
 - 2. Include instructions for storage, handling, protection, examination, preparation, operation and installation of product.

1.4 QUALIFICATIONS

- A. Manufacturer: Company specializing in manufacturing products specified in this Section with minimum three (3) years experience.

PART 2: PRODUCTS

2.1 WALL SWITCHES - Specification Grade - 20A, 125v/277v, grounding type. Switches on the critical branch and life safety branch shall be red.

- A. Single Pole Switch:
 - 1. Legrand
 - 2. Leviton
 - 3. Arrow-Hart
- B. Three-way Switch:

Martin County School District
Warfield Elementary School
Enhanced Security Project A2

1. Legrand
2. Leviton
3. Arrow-Hart

C. Four-way Switch:

1. Legrand
2. Leviton
3. Arrow-Hart

2.2 RECEPTACLES - Hospital Grade - 20A, 125V, 3W, Grounding type. Receptacles on the critical and life-safety branch shall be red.

A. Single Convenience Receptacle:

1. Legrand
2. Leviton.
3. Arrow-Hart

B. Duplex Convenience Receptacle:

1. Legrand
2. Leviton
3. Arrow-Hart

C. GFCI Receptacle:

1. Legrand
2. Leviton
3. Arrow-Hart

D. Surge Protected Receptacle:

1. Legrand
2. Leviton

2.3 WALL PLATES

A. Decorative Cover Plate: Stainless steel type 302/304 satin finished, non-magnetic.

B. Weatherproof Cover Plate: Gasketed stainless steel with lockable hinged gasketed device cover, equal to Sierra Model WP-26L.

PART 3: EXECUTION

3.1 EXAMINATION

A. Verify existing conditions.

- B. Verify outlet boxes are installed at proper height.
- C. Verify wall openings are neatly cut and will be completely covered by wall plates.
- D. Verify branch circuit wiring installation is completed, tested, and ready for connection to wiring devices.

3.2 PREPARATION

- A. Provide extension rings to bring outlet boxes flush with finished surface.
- B. Clean debris from outlet boxes.

3.3 INSTALLATION

- A. Install products in accordance with manufacturer's instructions.
- B. Install devices plumb and level.
- C. Install switches with OFF position down.
- E. Install receptacles with grounding pole on bottom, or to the left when mounted horizontally.
- F. Connect wiring device grounding terminal to branch circuit equipment grounding conductor.
- G. Install decorative plates on switch, receptacle, and blank outlets in finished areas.
- H. Connect wiring devices by wrapping conductor around screw terminal. Do not "back-wire" any devices.
- I. Install galvanized steel plates on outlet boxes and junction boxes in unfinished areas, above accessible ceilings, and on surface mounted outlets.
- J. Any receptacle within six feet of a sink shall be a GFCI type.
- K. Devices on 'emergency' circuits shall be red in color. Devices on normal power circuits shall be the color as specified by the Architect.
- L. When GFCI is specified, use only GFCI receptacles. Do not protect "down stream" receptacles with GFCI receptacles.
- M. Do not use push-in connections on any device.
- N. All devices, receptacles, and switches shall have separate grounding terminal.
- O. Identify each outlet and switch in accordance with Section 26 05 53.

3.4 MOUNTING HEIGHTS

- A. Coordinate locations of outlet boxes provided under Section 26 05 34 to obtain mounting heights specified herein or indicated on Drawings.
- B. Install wall switch 42-inches, to center, above finished floor, or as dimensioned on the drawings.
- C. Install convenience receptacle 18-inches, to center, above finished floor.
- D. Install convenience receptacle 6-inches to center, above backsplash of counter.
- E. Install telecommunications outlet 18-inches, to center, above finished floor, or as dimensioned on the drawings.

3.5 FIELD QUALITY CONTROL

- A. Inspect each wiring device for defects.
- B. Operate each wall switch with circuit energized and verify proper operation.
- C. Verify that each receptacle device is energized.
- D. Test each receptacle device for proper polarity.
- E. Test each GFCI receptacle device for proper operation.

3.6 ADJUSTING

- A. Adjust devices and wall plates to be flush, plumb, and level.

END OF SECTION

SECTION 26 28 13 - FUSES (600 VOLT & BELOW)

PART 1 GENERAL

- 1.1 Furnish and install fuses of the types and sizes as indicated on the drawings and/or as specified herein. All fuses furnished and installed under this specification shall be as specified; shall be new, unused fuses; shall be delivered to the job site in manufacturer's original boxes or cartons whether furnished by the Contractor or by the manufacturer of equipment. All fuses shall have a minimum interrupting rating of 200,000 amperes. Should utilization, conversion, or distribution equipment provided under any division of these specifications require fuse classes offering a higher degree of protection or different ampere ratings than fuses specified, such fuse classes and ampere ratings may be used.
- 1.2 Mounting bolts or nuts shall be evenly torqued to ASTM recommendations for type and diameter of mounting bolts or studs provided. The inside of each fuse enclosure shall contain a durable, readily visible label which shall clearly indicate the correct type and size of replacement fuse. Label shall not cover or interfere with equipment manufacturer's instructions.
- 1.3 FUSES SHALL BE MADE BY ONE OF THE FOLLOWING MANUFACTURERS
- A. Reliance Fuses
 - B. Gould Shawmut
 - C. Littlefuse
 - D. Bussmann
 - E. Substitutions: Should the Contractor propose to provide fuses other than those specified, at least six weeks prior to the installation of the fuses, he shall furnish the Engineer complete technical data sufficient for the Engineer to determine whether system function will be adversely affected, whether proposed fuses meet this specification and whether they are equal in quality. Proposal for substitution shall state the dollar cost savings to the Owner and reason for proposed substitution.
- 1.4 To assure selective coordination of protective devices, all fuses shall be of the same manufacturer.

PART 2 PRODUCTS

- 2.1 FUSES FOR SERVICE, SWITCHBOARD MAINS, FEEDERS AND BRANCH CIRCUITS
- A. 0 to 600 amperes. Except as specified fuses 0 to 600 amperes shall be UL listed RK1 dual-element, time-delay fuses with ampere ratings indicated on the drawings except as may be modified by these specifications.

- B. Fuses for motor branch circuits 600 amperes and below, whether individual or grouped (MCC), shall be class RK1 fuses. Fuse ratings for motor branch circuits shall be determined by actual full-load currents of motors provided, not by NEC Table of Standard Motor Full Load Ampere. EXCEPTION: Fuses in motor control centers may be time-delay Class CC fuses if MCC manufacturer's standard designs are for these fuses. Fuse manufacturer's recommendations shall be followed for Class CC fuses.
- C. Fuses for motor branch circuits requiring fuses over 601 amps, whether individual or grouped (MCC), shall be Class L fuses.

2.2 FUSING OF CONTROL CIRCUITS

- A. General: Fuses shall be RK1 or time-delay Class CC fuses installed in Class CC fuse blocks.
- B. Control Power Transformers: Primary circuit of all control power transformers shall be fused. Fuse ratings shall be in accordance with NEC requirements. Fuses shall be RK1 or time-delay UL Class CC fuses installed in Class CC fuse blocks.

2.3 FUSING FOR FLUORESCENT AND H.I.D. LIGHTING FIXTURE BALLASTS

- A. 300 volt and below fluorescent fixture ballasts, where required, shall be individually fused. Fuseholders and fuses shall be GLR fuses or equal.
- B. H.I.D. lighting fixture ballasts shall be individually fused, where required, with fuses rated in accordance with fixture manufacturer's recommendation. Fuseholders shall be UL Class CC fuses.

2.4 FUSES FOR METERING CENTERS, LOAD CENTERS AND FOR BACK-UP PRODUCTION OF CIRCUIT BREAKERS

- A. Fuses for above purposes shall be RK1 or Class L fuses. Fuse ampere ratings shall not exceed maximum recommended by equipment manufacturer.

2.5 INITIAL START-UP

- A. Contractor shall replace all fuses opened during start-up and testing. At contract completion, all fuseholders shall contain serviceable fuses as specified.

PART 3 EXECUTION

3.1 INSTALLATION

- A. All circuits shall be completely de-energized prior to installing any fuses.

END OF SECTION

SECTION 26 28 16 - CIRCUIT AND MOTOR DISCONNECTS

PART 1 - GENERAL

1.1 WORK INCLUDES

- A. All disconnect switches for each piece of electrically operated equipment shown on the Drawings or herein specified.

1.2 SUBMITTALS

- A. In accord Division One.
 - 1. Product Data: All disconnect switches.
 - 2. Shop Drawings: Dimensional Data

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Provide switches fusible or non-fusible as indicated, heavy duty, and incorporate a quick-make, quick-break operating mechanism. Cover shall be interlocked with handle and be suitable for padlocking in "OFF" position using up to three padlocks.
- B. Switches shall be furnished in NEMA 1 general purpose enclosures. If located outdoors, they shall be in NEMA 3R Stainless Steel (SS) enclosures. Covers on NEMA 1 enclosures shall be attached with pin type hinges. NEMA 3RSS covers shall be securable in the open position. NEMA 3RSS enclosures for switches thru 200 amperes shall have provisions for interchangeable bolt-on hubs. NEMA 3RSS enclosures shall be manufactured from stainless steel. Enclosures shall have a gray baked enamel finish, electro-deposited on cleaned, phosphatized steel.
- C. Switches shall be horsepower rated for ac and/or dc as indicated by the plans. All fusible switches rated 100 thru 600 amperes at 240 volts and 30 thru 600 amperes at 600 volts shall have a UL approved method of field conversion from standard Class H fuse spacing to Class J fuse spacing. The switch also must accept Class R fuses and have provisions for field installation of a UL listed rejection feature to reject all fuses except Class R. The UL listed short circuit rating of the switches shall be 200,000 rms symmetrical amperes when Class R or Class J fuses are used with the appropriate rejection scheme. The UL listed short circuit rating of the switch, when equipped with Class H fuses, shall be 10,000 rms symmetrical amperes. 800 and 1200 ampere switches shall have provisions for Class L fuses and shall have a UL listed short circuit range of 200,000 rms symmetrical amperes.

2.2 ACCEPTABLE MANUFACTURERS

- A. Square D
- B. General Electric
- C. Eaton

D. Siemens

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Mount switches 5 feet - 0 inch to top. Provide anchoring point at each mounting hole provided in enclosure.
- B. Provide nameplate in accord with 26 05 00 to indicate equipment served or function of switch.
- C. Mounting Method:
 - 1. Wall Mounting: Use expansion anchors and bolts. Install collars around mounting bolts or mount on channel, to provide air space between wall and device enclosure.
 - 2. Do not mount unit onto air handling units.
 - 3. Floor Mounting: Install on 4" high concrete equipment pad, in plumb and level attitude. Use expansion anchors and bolts as required.
 - 4. Where wall or floor-mounting is not possible, erect framework using steel channel or angle-iron to adequately support unit. Provide bracing to prevent sway.

END OF SECTION

SECTION 26 28 17 - OVERCURRENT PROTECTIVE DEVICES

PART 1 - GENERAL

1.1 WORK INCLUDES

- A. Fuses for all fusible equipment installed on the project regardless of which contractor has provided the equipment.
- B. Enclosed circuit breakers as indicated on the drawings and herein specified.
- C. Circuit breakers for existing panelboards for new branch circuit overcurrent protection.

1.2 SUBMITTALS

- A. In accord with Division One.
 - 1. Shop Drawings: All enclosed circuit breakers with dimensional data.
 - 2. Product Data
 - a. Fuses
 - b. Enclosed circuit breakers
 - c. Circuit breakers for installation into existing panelboards.

1.3 COORDINATION STUDY

- A. The Engineer has performed the coordination study of the overcurrent protection system based on "Square-D" type devices, for the purpose of AHCA design approval. At the time the Contractor procures the electrical distribution equipment and Overcurrent protective devices, the Contractor shall also procure a coordination study of said devices from the respective equipment manufacturer. The study shall be signed and sealed by a Florida Licensed Engineer, and shall be submitted to the Project Engineer (JLRD) prior to the 80% AHCA survey. The Contractor shall also obtain the assistance of the manufacturer's field service technician as may be required to properly set the adjustable trip devices in the field, prior to the final AHCA survey. The coordination study shall be based on the exact devices installed in the field.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Fuses rated 15 to 600 ampere (except for motor branch circuit protection), 600 volt and below, U.L. listed Class RK-1 current limiting type, 200,000 amperes RMS interrupting.
 - 1. Acceptable Products
 - a. Bussman Limitron - Type KTS-R
 - b. Little Fuse - Type KLSR
 - c. Gould Shawmut - Type A2K (250 vac)/A6K (600 vac)
- B. Fuses for motor branch circuit and transformer protection U.L. listed Class RK-5 dual element type, 200,000 amperes RMS interrupting.

1. Acceptable Products

- a. Bussman Fusetron - Type FRS-R
- b. Little Fuse - Slo-Blo, Type FLS-R
- c. Gould Shawmut - Type TR (250 vac)/TRS (600 vac)

- C. Furnish and install individually enclosed circuit breakers as indicated on the plans. All circuit breakers shall meet Federal Specification W-C-375B, and both the circuit breaker and the enclosure shall be UL listed.

Circuit breakers shall have overcenter toggle type mechanisms, providing quick-make, quick-break action. Breakers shall have current and interrupting rating as indicated on the plans. Each circuit breaker shall have trip indication by handle position and shall be trip-free. Two and three pole breakers shall be common trip. Each breaker shall have a permanent trip unit containing individual thermal and magnetic trip elements in each pole.

Enclosures shall be of the NEMA type indicated on the plans.

NEMA 1 enclosures shall be furnished with knockouts where practical and shall be fabricated from sheet steel which conforms to UL 50. The enclosure shall be given an electrodeposited, gray baked enamel finish. Padlocking provisions shall be provided to allow locking the circuit breaker in the "OFF" position. Enclosures shall be UL listed.

NEMA 3RSS enclosures for circuit breakers rated thru the 225 ampere frame size shall be furnished with provisions for interchangeable, bolt-on hubs. Enclosures shall be fabricated from stainless steel and shall be given an electrodeposited, gray baked enamel finish. Enclosure covers shall be securable in the open position. Padlocking provisions shall be provided to allow locking the enclosure cover closed. Enclosures shall be UL listed.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Distribution system is designed to provide selectivity, coordination, and component protection. To guarantee this system, all fuses or circuit breakers shall be from the same manufacturer. Substitution provisions are specified in Division One.
- B. Place a fuse identification label showing size and type of fuses installed inside the cover of each switch.
- C. Furnish Owner at completion of project, one spare set (3) of each size of fuse rated over 100 amperes. Obtain a written receipt for same from the Owner.
- D. Provide a nameplate for each enclosed circuit breaker in accordance with Section 26 05 53.

END OF SECTION

SECTION 26 29 10 - ELECTRIC CONTROLS AND RELAYS

PART 1 GENERAL

1.1 SECTION INCLUDES:

- A. Pushbutton and selector switches.
- B. Control stations.
- C. Relays.
- D. Time-delay relays.
- E. Control power transformers.
- F. Control panels.

1.2 REFERENCES

- A. NEMA ICS 1 - General Standards for Industrial Control Systems.
- B. NEMA ICS 2 - Standards for Industrial Control Devices, Controllers and Assemblies.
- C. NEMA ICS 6 - Enclosures for Industrial Controls and Systems.
- D. NEMA ST 1 - Standard for Specialty Transformers (Except General Purpose Type).

1.3 SUBMITTALS

- A. Submit shop drawings under provisions of Section 01300.
- B. Submit shop drawings to NEMA ICS 1 indicating control panel layouts, wiring connections and diagrams, dimensions, support points.
- C. Submit product data under provisions of Section 01300.
- D. Submit product data for each component specified.

1.4 PROJECT RECORD DOCUMENTS

- A. Submit record documents under provisions of Section 01700.
- B. Accurately record actual locations of control equipment. Revise diagrams included in Drawings to reflect actual control device connections.

1.5 OPERATION AND MAINTENANCE DATA

- A. Submit operation data under provisions of Section 01700.

- B. Include instructions for adjusting and resetting time-delay relays, timers and counters.
- C. Submit maintenance data under provisions of Section 01700.
- D. Include recommended preventive maintenance procedures and materials.

1.6 QUALIFICATIONS

- A. Manufacturer: Company specializing in manufacturing the products specified in this Section with minimum three years documented experience.

PART 2 PRODUCTS

2.1 CONTROL SWITCHES AND STATIONS

- A. Contacts: NEMA ICS 2; Form C.
- B. Contact Ratings: NEMA ICS 2; as scheduled.
- C. Pushbutton Operator: NEMA ICS 2; as scheduled.
- D. Control Stations: NEMA ICS 2; as scheduled.

2.2 CONTROL RELAYS

- A. Contacts: NEMA ICS 2; Form C.
- B. Contact Ratings: NEMA ICS 2; as scheduled.
- C. Coil Voltage: as scheduled.

2.3 TIME-DELAY RELAYS

- A. Contacts: NEMA ICS 2; as scheduled.
- B. Contact Ratings: NEMA ICS 2; Class A150.
- C. Coil Voltage: as scheduled.
- D. Time-Delay Relays: NEMA ICS 2; as scheduled.

2.4 CONTROL POWER TRANSFORMERS

- A. Transformer: NEMA ST 1; machine tool transformer with isolated secondary winding.
- B. Power Rating: 500 va.
- C. Voltage Rating: as required.

2.5 ENCLOSURES

- A. Control Station Enclosure: NEMA ICS 6; Type as required to meet conditions of installation unless indicated on the Drawings.
- B. Relay Enclosure: NEMA ICS 6; Type as required to meet conditions of installation unless indicated on the Drawings.

2.6 FABRICATION

- A. Control Panels: Shop fabricate control panels to NEMA ICS 1, using cabinets and terminal blocks furnished under the provisions of Section 16160.

PART 3 EXECUTION

3.1 INSTALLATION

- A. Install devices and equipment in accordance with manufacturer's instructions.
- B. Install individual relays and time delay relays in enclosures.
- C. Install cabinets under the provisions of Section 16160.
- D. Make electrical wiring interconnections as shown on Drawings.

3.2 COMMISSIONING SUPPORT

- A. Perform all required commissioning sub tasks as specified in the Commissioning specifications noted in Division 1, General Requirements and 23 08 00, "Commissioning". The contractor shall designate an individual to serve on the commissioning team and shall cooperate as required concerning all commissioning related activities, meetings, documentation, field tests, etc. The contractor shall provide all technically qualified personnel, equipment, instrumentation, and materials on a continuous basis in order to perform their required tasks at the required time period and provide all required or requested assistance by the commissioning provider to complete the commissioning process. The contractor is required per referenced specifications to complete all applicable Pre-Functional Test Report forms on the systems being commissioned. This may include as well, start-up check list forms.

END OF SECTION

SECTION 26 51 00 - LIGHTING FIXTURES

PART 1: GENERAL

1.1 WORK INCLUDED

- A. Interior luminaires and accessories.
- B. Exterior luminaires and accessories.
- C. Lamps.
- D. Ballasts.

1.2 REFERENCES

- A. ANSI C82.1 - Specification for Fluorescent Lamp Ballasts.
- B. ANSI C82.4 - Specifications for High-Intensity-Discharge Lamp Ballasts (Multiple Supply Type.)
- C. FS W-F-414 - Fixture, Lighting (Fluorescent, Alternating-Current, Pendant Mounting.)
- D. NEMA LE 2 - H-I-D Lighting System Noise Criterion (LS-NC) Ratings.

1.3 SUBMITTALS

- A. Submit product data under provisions of Division One.
- B. Include outline drawings, lamp and ballast data, support points, weights, and accessory information for each luminaire type.
- C. Submit manufacturer's installation instructions under provisions of Division One.
- D. Submit index listing all fixtures types and complete model number with submittal. Incomplete submittals will be returned without review.

1.4 SUBSTITUTIONS

- A. The lighting fixtures listed in the first line of each type of fixture in the Lighting Fixture Schedule, are the "basis of design" for the lighting systems. Alternate fixtures from manufacturers listed on the second and third lines of each type of fixture in the fixture schedule, will be considered, if proposed fixtures are equivalent in all respects as to performance, quality of construction, suitability for the application, and appearance, including aesthetic considerations for compatibility with the architecture. The Engineer shall have sole discretion in determining equivalency of fixtures.

- B. Requests for consideration of substitutes (fixtures from manufacturers that are not listed), must be made in advance of bidding. Complete data on each proposed substitute fixture, including catalog cuts and photometric data for both the specified and proposed substitute fixtures, together with an item by item comparison highlighting differences from the specified fixture, must be submitted to and received by the Architect and Engineer ten (10) business days prior to opening of bids.
- C. The Engineer will evaluate the submittal and advise the Proposer within five (5) business days after receipt thereof of the Architect's and Engineer's decision as to the acceptability of the proposed substitute.
- D. The Contractor shall be responsible for all changes and modifications to the work required to accommodate the substitute fixtures if accepted, including costs of additional design engineering work if any.
- E. Final review for fixtures will be when shop drawings are submitted. The Architect and Engineer reserve the right to reject any fixtures which, in their opinion, do not meet the intent of the overall lighting system design. Upon request, the fixture supplier shall submit sample fixtures.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Deliver products to site under provisions of Division One.
- B. Store and protect products under provision of Division One.
- C. There shall be no payment for products billed as stored material or work in place until respective data is approved by the Engineer. Include delivery slips and invoice with pay requisition for review.

PART 2: PRODUCTS

2.1 INTERIOR LUMINAIRES AND ACCESSORIES

- A. Recessed Fluorescent Luminaires: Provide trim type and accessories required for installation in ceiling system installed. Maximum depth of luminaire, 6 inch, including yokes and bridges.
- B. Exit Signs: LED type source. Stencil face; 6 inch high red letters on white background, directional arrows as indicated, mounting type as indicated.
- C. Provide in-line fuses in all fluorescent fixtures on emergency power.
- D. Recessed fixture housings shall be die-formed of cold rolled steel of not less than 22 gauge. Construction shall provide an approved method of locking lens or shielding in place. Enamel finish for light reflectance shall have a hardness between H and 3H. The metal shall be cleaned and prepared by "Bonderizing" or an equivalent process. All paint shall be applied after fabrication and have a minimum reflectivity of 88%.

- E. Plastic lenses for fluorescent fixtures shall be 100% virgin acrylic, not less than 3/16" nominal thickness, type K-19.
- F. Temperature in fixture housing shall not exceed 90-degrees C with ambient room temperature of 27-degrees C.
- G. All luminaires required to meet National Appliance Energy Conservation Amendments.
- H. All fixtures shall be equipped with a ground screw or lug to ensure mechanical bond.
- I. Recessed fixtures in plaster ceilings shall be furnished with plaster frames.
- J. Prior to placing orders for recessed fixtures, Contractor shall verify the types of ceilings and suspension systems that have been approved for the project and shall order fixtures with flanges as required to fit in the approved ceilings.
- K. All fixtures shall be provided complete with lamps.
- L. All fluorescent ballasts shall be electronic type with less than 10% total harmonic distortion (THD).
- M. Acceptable Manufacturers - Fluorescent Ballasts
 - 1. General Electric.
 - 2. Universal.
 - 3. Advance.

2.2 EXTERIOR POLE MOUNTED FIXTURES

- A. Fixture shall be approved for pole mounting.
- B. Fixture, pole, and base assembly shall be rated to withstand maximum winds in zone of the project location. Provide wind load calculations for the fixture, pole, base assembly (including embedment), performed and signed and sealed by a Florida Licensed Engineer.

PART 3: EXECUTION

3.1 INSTALLATION

- A. Install all lighting fixtures. Install lamps in luminaires and lampholders.
- B. Support surface-mounted luminaires directly from building structure. Fasten to T using screws, or approved ceiling framing member clips. Install fluorescent luminaires independent of ceiling framing.
- C. Install recessed luminaires to permit removal from below. Use plaster frames in drywall ceilings. All lay-in type recessed fixtures shall be fastened to acoustical ceiling main T-bars by screws or approved seismic clips. T-bars shall be supported at all four corners of fixture by #12 gauge tie wire.

3.2 RELAMPING

- A. Relamp luminaires which have failed lamps at completion of work. Obtain lamps from the Owner.

3.3 ADJUSTING AND CLEANING

- A. Align luminaires and clean lenses and diffusers at completion of Work. Clean paint splatters, dirt, and debris from installed luminaires.
- B. Touch up luminaires as necessary at completion of work to provide a clean, fully operational unit.
- C. All cracked or damaged lenses shall be replaced with new undamaged unit.

END OF SECTION

SECTION 26 52 00 - EMERGENCY LIGHTING EQUIPMENT

PART 1 GENERAL

1.1 WORK INCLUDED:

- A. Emergency lighting units.
- B. Emergency LED exit signs.
- C. Emergency fluorescent lamp power supplies.

1.2 REFERENCES

- A. FS W-L-305 - Light Set, General Illumination (Emergency or Auxiliary)
- B. NFPA 101 - Code for Safety to Life from Fire in Buildings and Structures
- C. NEMA WD1 - General-Purpose Wiring Devices.

1.3 SUBMITTALS

- A. Submit product data under provisions of Section 01300.
- B. Provide product data on emergency lighting units, exit signs, and emergency fluorescent lamp power supply units.

PART 2 PRODUCTS

2.1 INCANDESCENT EMERGENCY LIGHTING UNITS

- A. Emergency Lighting Unit: Self-contained unit with rechargeable storage batteries, charger, and lamps.
- B. Battery: 6-volt, nickel-cadmium type, with 1.5 hour capacity to supply the connected lamp load.
- C. Charger: Dual-rate charger, capable of maintaining the battery in a full-charge state during normal conditions and capable of recharging discharged battery to full charged within 12 hours.
- D. Lamps: 8 Watt minimum, sealed beam type PAR 36.
- E. Remote Lamps: Match lamps on unit.
- F. Unit Housing: Steel with bronze hammer tone finish.
- G. Indicators: Provide lamps to indicate AC ON and RECHARGING.

H. Provide switch to transfer unit from normal supply to battery supply.

I. Electrical Connection: Knockout for conduit connection.

2.2 SELF-CONTAINED EMERGENCY POWER LED EXIT SIGNS

A. Type: Exit signs shall utilize LED's for light source and be provided with integral battery-operated emergency power supply, including power failure relay, test switch, AC ON pilot light, battery, and fully-automatic two-rate charger.

B. Battery: Sealed lead acid or lead calcium cell, requiring no maintenance or replacement for 10 years under normal conditions.

PART 3 EXECUTION

3.1 INSTALLATION

A. Install units plumb and level.

B. Aim directional lampheads as directed.

END OF SECTION

SECTION 26 52 01 - WIRING FOR EQUIPMENT FURNISHED BY OTHERS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. The other Contract Documents complement the requirements of this Section. The General Requirements apply to the work of this Section.
- B. Drawings and/or information provided by medical equipment vendor.

1.2 SCOPE

- A. Provide materials, labor and supervision necessary to install electric services for equipment furnished by Mechanical Contractor, Equipment Contractor and Owner.
- B. In general, the equipment to be wired shall include but not be limited to the following:
 - 1. Mechanical Equipment.
 - 2. Medical Equipment.
- C. Provide equipment connections in accordance with the information provided on the drawings. Provide all conduit, conductors, boxes, outlets, devices, switches, etc. for a complete connection to make equipment operable.

PART 2 - PRODUCTS

NOT USED

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Provide services and make final connections for motors and equipment. Make final connections except where notes on drawings state "rough-in only" or "final connections by others." Where final connections are to be made by others, install outlet box, pull in conductors and leave 8" pigtail for each conductor.

Conductors shall be dead-ended and taped, and appropriate cover plate installed over box.

- B. Furnish safety disconnects unless indicated to be supplied by Division 23 for motors and equipment, so as to make service complete to each item of equipment.
- C. Specific attention is made to the miscellaneous medical equipment to be installed throughout the space. The Contractor shall consult the equipment drawings and product information, and coordinate with the local representative, to ensure a complete understanding of the scope of work. All systems shall be provided complete and operational, in their entirety under this contract.

- D. Prior to roughing-in conduit, the Electrical Contractor shall consult with Mechanical Contractors, Equipment Contractors and Owner, and shall verify with them the exact locations for rough-ins, and the exact size and characteristics of the services required, and shall obtain from the Mechanical and Equipment Contractors and Owner a schedule of electrical loads for the equipment furnished by them. These schedules shall be used for verifying services, motor starters, disconnects, fuses, and overload protection.
- E. The Owner reserves the right to relocate connection point of their equipment, 10'-0" in any direction from the location shown, at no additional cost. Final location must be established prior to conduit rough-in.
- F. Changes required in the work, due to the Contractor's failure to comply with these requirements, shall be made by the Electrical Contractor at no additional cost to the Owner.

END OF SECTION

28

DIVISION

ELECTRONIC SAFETY AND SECURITY

SECTION 28 05 28 - SECURITY RACEWAY SYSTEM

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract, including, but not limited to, General, Special and Supplementary Conditions and other Division-1 Specification Sections, apply to the work of this section.

1.2 SCOPE

- A. Provide materials, equipment, labor, and supervision necessary to install conduit system only, for installation of complete security system to be provided by Owner. Raceway system is intended to accommodate intrusion detection and video surveillance system (CCTV), as would be provided by the Owner's vendors. Conduit system shall accommodate all wiring, devices, control panel, and interconnections to other systems.

1.3 QUALITY ASSURANCE

- A. Regulatory Requirements:
 - 1. National Electrical Code, (NEC).

1.4 SUBMITTALS

- A. Product Data: N/A
- B. Shop Drawings: N/A

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Raceways:
 - 1. J-Hooks: Static load limit of 75 lbs. galvanized steel construction. Caddy "Cablecat" or equal.
 - 2. Provide #6 AWG insulated copper grounding conductor from each system control panel enclosure/rack, to ground bus in room.
 - 3. Interior conduits concealed in partitions and exposed above 4'-0" aff shall be EMT, ¾-inch minimum. Conduits in or under slab or exposed below 4'-0" aff shall be RGS, ¾-inch minimum, painted with two (2) coats of bitumastic paint.
- B. Outlet Boxes:
 - 1. Outlet boxes concealed in partitions shall be 4-11/16" x 2-1/8" DP, galvanized sheet metal. Provide with single-gang drywall ring mounted vertically. Stub ¾-inch conduit from box, up into ceiling space.
 - 2. Provide single-gang blank plate on each unused outlet opening. Color shall match all other device plates.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Provide 200 pound test line in all empty conduits.
- B. Ensure a complete pathway for cabling is possible from each outlet device, back to the respective security system control panel. Provide sleeves through firewalls/partitions as necessary to provide for future cabling.

END OF SECTION

SECTION 28 13 10
ACCESS CONTROL SYSTEM

PART 1 GENERAL

1.1 RELATED DOCUMENTS

- A. The provisions of the General Conditions, Supplementary Conditions, and the Sections included under Division 01, General Requirements, are included as a part of this Section as though bound herein.

1.2 PERFORMANCE REQUIREMENTS

- A. Purpose:
1. Provide electronic card access control system for all new construction and renovation projects.
 2. Electronic card access shall be located at designated perimeter doors leading to each of the program areas with electric re-strike rim exit device, controlled by card access system.
 3. Electronic card access control system shall include all necessary components, wiring for power and control to sensors, card access controls, door hardware devices, uninterruptible power supply system (UPS) and capable of interfacing with existing AMAG software for a complete operable and fully integrated system that is capable of control through the internet.
 4. Raceway system shall consist of conduit, J-hooks, sleeves, boxes and wiring for an automatic card access system.
 5. Electronic card access system shall be independent from Section Intrusion Detection System and shall be an internet-based control system, connected to SJCS D main security control center.
 6. The system shall shunt the alarm system to allow passage through the doors when access card is swiped then rearm the alarm system when the door closes. On egress a passive infrared sensor shall shunt the alarm and unlock the door allowing for passage out of the building then resetting the alarm when the door closes.
- B. The System shall include but not be limited to:
1. Main Cabinet shall be surface mounted steel construction, AMAG Panel Model # 2100 installed on a plywood backboard. Main cabinet shall be installed in the MDF Room, including all required power supplies, batteries, integral charger and the software for a complete fully operational system.
 - a. Backboard: Plywood, 1/2 inch thick, AC Grade, covered with two coats of UL Classified, fire retardant intumescent paint, light gray color, painted front, rear, and all four sides.
 - b. Backboard shall be clearly labeled with the name of the backboard manufacturer, UL classification of the Fire Retardant Coating with the NFPA 255 Coating Flame Index and the APA Grade of the plywood. Backboard shall be securely fastened to the wall in order to support any and all attached equipment.
 2. Each cabinet shall feed a minimum of eight controlled devices (readers).
 3. Surge suppression for the 120 VAC power supply.
 4. Card readers.
 5. The distribution cabinet must be within 300 feet of the controlled devices.

6. Raceway shall not exceed 400 feet without a pull box.
 7. Grounding.
 8. Raceway, fittings, wire and wire fittings.
 9. A 2 inch raceway from the main cabinet to the next building and floor distribution cabinet.
 10. Wire and cable labeling.
 11. Programming Software that is capable of interfacing with AMAG system.
 12. Electrical power required to comply with all functions and operations required for the system.
- C. Access Card Locations: Provide a card reader/controlled device at the following locations:
1. All designated perimeter doors at the discretion of SJCSO Site Security and/or Electrical Engineer.
 2. Other doors may be installed to include;
 - a. Principal's Office
 - b. Bookkeeper's Office
 - c. AV Storage
 - d. CCTV Studio Area
 - e. Custodial Receiving
 - f. MDF Room
 - g. Other areas as defined in the plans specific review process

1.3 QUALITY ASSURANCE

- A. Installer Qualifications:
1. The Contractor shall use personnel who are manufacturer-certified, thoroughly trained and experienced with the specified requirements and methods needed for the proper performance of the work.
- B. Manufacturer Qualifications:
1. Manufacturer shall have completed a minimum of five projects of equal scope to systems described herein and shall have been in the business of supplying and installing specified type of systems for a minimum of five years.
- C. Fabricator Qualifications Mockups:
1. Fabricator shall have completed a minimum of five projects of equal scope to systems described herein and shall have been in the business of supplying and installing specified type of systems for a minimum of five years.

1.4 SUBMITTALS

- A. Shop Drawings:
1. Shop Drawings shall be prepared in latest version of AutoCAD 2006 or later format with electronic copies submitted along with full sized Shop Drawings.
 2. Shop Drawings shall indicate typical wire connections and cable types, keypad locations, and all main and remote panels. Provide wiring schematics including point-to-point, terminal strips, connections to batteries, and power supplies, including the estimated anticipated wiring lengths required for all connection points (i.e., zone and system communications bus runs) within the system. Indicate interfaces to equipment furnished by others.

3. Submit dimensioned Shop Drawings indicating mechanical layout of all card access equipment, including cabinets and interconnecting conduit for the main panel, typical remote panel, keypad and indicator locations, identifying all parts by manufacturer and part number.
 4. Shop Drawings shall be accompanied by engineering documentation including:
 - a. Floor Plans indicating all components, raceways, and terminal boxes and cabling.
 - b. Riser diagram indicating all connections in a manner following the floor plan layout.
 - c. Cabling diagram indicating the Contractor's designed routing and number of cables in specific raceways or conduits, from the main panel connecting to other sub-panels, modules or devices. Diagram shall include length, in wire feet, and capacitance calculation charts for all cables.
- B. Warranty Requirements:
1. Contractor shall warranty that all materials furnished shall be free from defects of material for a period of one year excluding specific items of work that require a warranty of a greater period that may be set forth in this Specification. Contractor shall warranty that workmanship for a period of one year from date of Final Completion, excluding specific items of work that require a warranty of a greater period that may be set forth in this Specification. Immediately upon receipt of written notice from the Owner, the Contractor shall repair or replace at no expense to the Owner, any defective material or work that may be discovered before final acceptance of work or within the warranty period; any material or work damaged thereby; and adjacent material or work that may be displaced in repair or replacement. Examination of or failure to examine work by the Owner shall not relieve Contractor from these obligations.

PART 2 PRODUCTS

2.1 MATERIALS, PRODUCTS, EQUIPMENT, MANUFACTURED UNITS

- A. Raceways
1. General:
 - a. Provide raceways (conduits, wireways, pull boxes, J-hooks, outlet boxes, etc.) in compliance with the requirements of the card access manufacturer, Section Conduit for Electrical Systems, and Section Outlet Boxes.
 2. Conduit:
 - a. Provide conduit sized and based on fill in accordance with the NEC. Minimum size of conduit is to be 1 inch.
 - b. Provide pull cords in all raceway installed without cable.
 3. J-Hooks:
 - a. Provide J-hooks in accordance with the NEC, EIA/TIA requirements for structured cabling systems. All cable supports shall be UL listed.
 - i. Design Selection: Enrico Caddy or J-Hook
 4. Boxes:
 - a. Provide boxes sized as required by the system manufacturer and the NEC for cables and/or devices installed.
- B. Conduit and Boxes
1. Provide and install the building and floor distribution cabinets for each building according to the following criteria:
 - a. There must be one of these main cabinets within 300 feet of a door access reader.

- b. Each cabinet shall feed a minimum of eight controlled devices (access readers) and the cabinet can be located on any floor in an MDF or IDF room. It does not have to be located on the same floor as the controlled devices.
 - c. The main cabinet can serve as the distribution cabinet for its area of eight door access readers.
 - d. Minimum conduit size shall be 1 inch. No conduit shall be installed more than 150 feet without a pull box.
 2. Provide 1 inch conduits if needed from the distribution cabinets and distribute to feed the junction and mounting boxes for each device.
 - a. If a separate 120V feed is needed at any device, a separate conduit will be needed.
 - b. Each separate 1 inch feed will supply no more than one Controlled Device/Card Reader Feed locations however if multiple devices are being installed in the same area, conduit sizes will need to be increased.
 3. Provide and extend conduit to feed 2 inch x 4 inch x 2 1/8 inch flush mounted boxes with single gang mud ring and weatherproof covers; mounted with the opening vertical, at all designated card reader locations.
 - a. Locate to the strike side of single doors, and as designated for double doors, and gates.
 - b. Center 42 inches above finished floor/grade.
 - c. Exact location to be determined during plan review.
 4. Provide a 2 inch x 4 inch x 2 1/8 inch card access feed junction box with cover at the interior side of all designated card access door locations.
 - a. If the area location has removable ceiling tiles, the box shall be located above the tile.
 - b. If the location has a structure of fixed ceiling material, then flush-mount the box with a square to round mud ring and cover
 - c. Both boxes from a) and b) above shall be connected. Also if door is a double door an additional single gang box will be installed, connected and centered on the top of the door frame.
 5. Provide a 1 inch conduit from the AMAG control box to the closet network switch if conduit is determined to be needed.
 6. Cable:
 - a. Provide at each card reader location, a single home run cable to the locations to be identified in the drawings. The cable for the Card Access System shall be Belden # 658AFS or manufacturer recommended equivalent.
 - b. Provide between Access Control Panel and Access Control Terminal Cabinet one (1) Belden # 9502 cable or manufacturer recommended equivalent.
 - c. Card Access system cables installed in interior, exterior and/or underground raceways shall comply with the applicable section of the NEC.
 7. Power Feeds:
 - a. Provide a double duplex, dedicated 120-volt clean power receptacle adjacent to the lower portion of the main terminal cabinet and each distribution cabinet.
 8. Surge Suppression:
 - a. Provide surge suppression equipment listed by Underwriters' Laboratories, bearing the UL seal and marked accordingly. Surge suppression equipment is to be UL listed and labeled for the intended use.

PART 3 EXECUTION

3.1 FIELD QUALITY CONTROL

- A. Training of the School's administrative and maintenance personnel is required in cooperation with the District's Representative.
 - 1. Engage a factory-authorized service representative to inspect, test, and adjust components, assemblies, and equipment installations, including connections, and to assist in field testing.
 - 2. Report results in writing.
- B. Startup Service:
 - 1. Engage a factory-authorized service representative to perform startup service in accordance with the manufacturer's requirements.
 - a. Complete installation and startup checks according to manufacturer's written instructions.
 - b. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.
 - c. Report results in writing.
- C. Adjusting
 - 1. When requested within 12 months of date of Substantial Completion, provide on-site assistance in adjusting system to suit actual occupied conditions. Provide up to three visits to site during other-than-normal occupancy hours for this purpose. These visits are not be considered as "warranty calls."

3.2 ERECTION TOLERANCES

- A. Install system in accordance with NECA "Standard of Installation" and Divisions 26, 27, and 28.
- B. Permanently label all conduits as to plan room number destination, at all terminal cabinets.
- C. Install 200 lb strength pull string throughout the conduit system.
- D. The Card Access System shall be independent and shall not interconnect with or be used by any other system.
- E. Mount all junction boxes located above the ceiling with the opening facing down unless mounted to the wall above the ceiling, and with a reasonable immediate access pathway provided.
 - 1. Note: The requiring of removing of a light fixture or other similar ceiling equipment is not a reasonable access pathway.
- F. All conduit runs shall be as direct as possible in order to save on wiring costs and to reduce poor performance due to cable loss.
- G. Refer to Section Door Hardware for Card Access Door preparation.
- H. The Contractor shall be advised that the circuit routing for the card access system may not be shown on the project drawings and that he is responsible to install all raceways, wiring and cabling for a complete and fully functional system.
- I. General:
 - 1. The Contractor shall provide and install the card access system (including raceways, pull and back boxes, and wire) in accordance with the Card Access System manufacturer's requirements.

2. The Contractor shall size and route raceways to accommodate the proper installation of the system cabling. T-tapped cabling is not acceptable.
3. Where raceway and/or conduit is not accessible after completion of the project, conduit shall be routed from device to device or fire rated access panels shall be installed to provide access to junction and pull boxes.
4. Device to device wiring is only to be acceptable where the wiring scheme of the system, as recommended by the manufacturer, requires cable to pass from device to device.
5. Termination of devices is to be in accordance with manufacturer's requirements.
6. Install Card Access System wiring with at least 12 inches of separation from line voltage power wiring on parallel runs. Wiring crossing power circuits shall be at right angles. For metal enclosed electric light or power or Class 1 circuits, separation may be reduced as described in the National Electrical Code. Increase separation if so required to comply with EIA/TIA referenced standards.
7. Each Card Access System outlet shall have splice-free cables homerun to the respective control panel in the associated Main/Intermediate Distribution Frame (MDF/IDF) at the communication equipment room (CER), communication closet (CC), or communication panel (CP) as indicated on the drawings. Each cable shall be tagged at each end.
8. Provide a minimum of three-hundred (300) access cards in addition to the original compliment required by the owner.

3.3 DEMONSTRATION

- A. Training of the School's Administrative and Maintenance Personnel is required in cooperation with the District's Representative:
- B. Engage a factory-authorized service representative to train school administrative and maintenance personnel to adjust, operate, and maintain Card Access System. Refer to Division 01 Section Closeout Procedures for information regarding Demonstration and Training.

END OF SECTION

SECTION 28 31 00 - FIRE ALARM AND SMOKE DETECTION SYSTEMS

PART 1: GENERAL

1.1 SCOPE

- A. The work covered under this section of the specification includes the provision of all labor, materials, and supervision necessary to install and test a Fire Alarm System, associated devices, and components in the project. This shall include, but not be limited to provision of the following:

- Control Panel
- Voice Alarm Panel
- Terminal Cabinet
- Pull Stations
- Heat Detectors
- Area Smoke Sensors
- Strobe Lights
- Audible/Strobe Combinations
- Programming
- System Start-up, Test
- Supervisory Switches
- Remote Annunciators
- Duct Smoke Detectors and Test Switches
- Water Flow Switches
- Magnetic Door Holders

1.2 DESCRIPTION

- A. The system installed under this contract shall be able to communicate with and report to the existing 'Siemens' fire alarm system serving the entire building. Provide all zone modules, power supplies, programming, etc. as required for an approved, fully functional system. All components of the system must be listed by Underwriters Laboratories (U.L.).
- B. All duct detectors shall be equipped with test switches and annunciator light.
- C. Conduit fill shall not exceed 40%.
- D. All fire alarm devices shall be white. All conduit junction boxes and couplings will be painted RED and marked "FA" in white.
- E. All wiring entering and leaving the panel and junction boxes will be permanently labeled in such a manner as to indicate the type of device and its location.
- F. All wires that leave or enter the panel from outside the building must have surge and transient protection at the panel with devices that will limit the voltage to no more than 10% above the peak operating voltage of the devices connected to the wires.

- G. The system shall provide a three-pulse temporal signal to the horns or voice evacuation system. A switch shall be provided on the control panel for silencing the alarm devices. Any additional incoming alarm shall operate normally. Each alarm shall be represented on the control panel by an audio and visual indication.
- H. See attached list of acceptable and pre-approved equipment.

1.3 QUALITY ASSURANCE AND WARRANTY

- A. Perform all work in accord with the following codes and standards:
 - 1. Federal, state and local codes, regulations and ordinances.
 - 2. National Electrical Code (NEC), latest edition.
 - 3. Occupational Safety and Health Act (OSHA).
 - 4. All authorities having jurisdiction.
 - 5. Factory Mutual system (FM) requirements.
 - 6. EIA, Electronics Institute of America.
 - 7. UL, Underwriters Laboratories.
 - 8. American Disability Act (ADA).
 - 9. National Fire Alarm Code NFPA 72
 - 10. Life Safety Code (NFPA 101).
- B. System Warranty: All components, parts, assemblies and software shall be guaranteed against defects in material and workmanship for a period of at least 12 months, beginning on the date of acceptance by the local Fire Marshall and the Owner's designated representative. Warranty service shall be provided by a manufacturer's authorized representative 24 hours per day, 7 days per week. The representative shall be based in a fully staffed branch office located within one (1) hour travel time of the installation site and respond within this time. All repairs performed during the warranty period must be non-chargeable for labor, material, and travel time. All repairs performed during the warranty period shall be completed within the time limitations imposed by NFPA rules. The initial fire alarm call will be handled by the Owner who will assess the problem, and notify the vendor of corrective actions required.

1.4 SUBMITTALS

- A. At completion of project, prior to final payment provide to Owner copies of the following:
 - 1. Manufacturer's installation diagrams, written product specifications, and instructions for installation, operation and maintenance.
 - 2. Manufacturer's published product warranties and warranty instructions.
 - 3. Point to point wiring diagrams for devices/circuits added under this contract. (2 sets)
 - 4. Data sheets on each item of equipment.
 - 5. List of device location indicating specific zone designation. (2 sets)
 - 6. List of all programming and access codes associated with the panel. (2 sets)
 - 7. Supply all software required to program/re-program fire alarm panel/components, dialers and any other device required for operation of the system.

B. At the Fire Alarm Panel(s), install the following:

1. Plan drawings (1/16" = 1'-0" or larger as required for clarity), modified to include new equipment, showing location of automatic detectors and manual pull stations. Drawings shall be professionally drawn on suitable drafting medium 8.5" x 11" and shall reflect the system as installed. Devices shall be numbered in a manner that reflects the ZONE/DEVICE location.
2. A Certificate of Completion as required by NFPA.
3. A Certificate of Inspection, showing a completed 100% test, as required by NFPA.

1.5 SYSTEM OPERATION

A. System Supervision:

1. Initiation Circuits: The occurrence of an open circuit in the initiation circuit shall cause a trouble indication. The occurrence of a ground condition in the initiation circuit shall cause a trouble and a panel ground fault indication. A single open circuit or a single ground condition, or both at the same time on the same initiation circuit, shall not inhibit the panel from recognizing an alarm condition from any other initiation device on that same circuit or any other circuit.
2. Signal Circuits: The occurrence of an open circuit in a signal circuit cause a signal zone trouble indication. The occurrence of a ground condition in a signal circuit shall cause a signal zone trouble indication and a panel ground fault indication. A single ground in a signal circuit shall not inhibit the signals from working properly.
3. Remote Annunciator: Shall be supervised as required for signal circuits, and be of LCD design, with alpha-numeric display.
4. The system shall detect the following conditions:
 - a. Loss of primary and/or secondary operating power.
 - b. A single ground, open, or short on any installation wiring to supervisory or alarm initiating devices.
 - c. A single ground, open or short on any installation wiring to the system speakers, remote supervised annunciator and remote telephone station.
 - d. Failure of a tone generator, pre-amplifier, or power amplifier in the audio subsystem.
5. If any of the above faults develop, the system shall produce both an audible and visual trouble signal at the Fire Alarm Control Panel (FACP) and/or the remote annunciator.
6. If the switch of a supervisory device is operated, the system shall product audible and visible supervisory signals at the Fire Alarm Control Panel and Remote Annunciator.

B. Alarm Initiating Devices: If an alarm initiating device is activated, the following responses shall automatically occur:

1. Visual indications shall identify the specific device in alarm, and common audible and visual alarm signals shall be generated by the Fire Alarm Control Panel.
2. An audio indication shall produce a message to the speakers sufficient to product an audio signal 15db over ambient noise.

3. Auxiliary relays shall be installed to accommodate accessories such as: air-handler shutdown, vent fans (etcetera), to match the design of the system, as required by NFPA standards and rules.
4. Each device shall be a measured device having the capability to send measured and intelligent signals back to the panel stating the condition of the device (e.g. measured level of obscuration, measure particles of dirt/dust and measured temperature levels).

C. Alarm/Trouble Silencing:

1. The general alarm devices may be silenced only by entering a locked control cabinet and operating the proper silencing switch. However, a subsequent alarm shall reactive the signals. Operation of the silencing switch shall be indicated by a trouble light and an audible signal.
2. Power failure, opens, grounds, or an interruption of the system wiring or components, shall be indicated by a visual and audible trouble signal. The audible trouble signal may be silenced, however, the visual trouble indications shall remain illuminated until the system has been returned to a normal operating condition.

1.6 OPERATION AND MAINTENANCE DATA

- A. Submit data under provision of Division One.
- B. Include operating instructions, and maintenance and repair procedures.
- C. Include manufacturer representative's letter stating that system is operational.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Deliver products to site under provisions of Division One.
- B. Store and protect products under provisions of Division One.

PART 2 PRODUCTS

2.1 FIRE ALARM AND SMOKE DETECTION CONTROL PANEL

- A. Control Panel: The control panel shall provide power, annunciation, supervision, and control for the detection and alarm system and shall be modular in construction and contain all modules necessary to operate according with this section.
 1. The detection system shall remain 100% operational and capable of responding to an alarm condition while in the routine maintenance mode.
 - a. The system shall be capable of having the entire total number of detection devices in alarm at the same time, without any loss of function.
 - b. The control panel shall be capable of supporting non-addressable as well as addressable detection devices.
 - c. The panel annunciator shall be a minimum, 32-character alphanumeric display, providing an optional user definable message associated with each detection device or zone.

2. The control system shall provide the supervision of system electronics, wiring, devices, and software.
 - a. Monitor for the failure of system hardware or wiring with an independent hardware watchdog, which will indicate their failure.
 - b. The system shall provide failsafe operation, i.e. incoming alarms shall automatically override all other modes of operation, and the panel shall automatically return to normal operating mode from any operator initiated mode.
 - c. Provide ground fault detection for all initiating and audible circuits.
3. Provide lamp test capability to test all visual panel indicators and associated software.
 - a. Make provisions for remote trouble and remote alarm silencing switches.
 - b. The control panel shall be equipped with a silence before reset feature, designed to prevent accidental system reset during an alarm condition.
4. The system alarm lamp shall flash upon receipt of any alarm condition.
 - a. Acknowledgement of the alarm by operation of the silence switch shall silence the audible alarm and cause the alarm lamp to light steadily.
 - b. Receipt of subsequent alarms shall cause the audible devices to resound and the alarm lamp to flash.
5. The system trouble lamp shall flash and an integral trouble buzzer shall sound upon the occurrence of any trouble condition.
 - a. Acknowledgement of the trouble condition by operation of the silence switch shall silence the audible alarm and cause the trouble lamp to light steadily.
 - b. Receipt of subsequent troubles shall cause the trouble buzzer to resound and the trouble lamp to flash.
6. Use the same pair of wires to perform the individual input and output device addressability.
 - a. The system shall be capable of having all addressable devices in alarm simultaneously.
7. The service mode shall permit the arming and disarming of individual input or output devices as well as manually operating output devices.
 - a. Provide one-step function switches to allow the disarming & arming of groups of inputs or outputs.
 - b. The control panel shall display the status of these devices upon command.
 - c. The panel shall automatically return to normal mode in the event the panel remains unattended in the service mode for more than 4-hours.
 - d. The panel shall be capable of receiving and processing alarms even when in the service mode.
8. The control shall operate from a three-wire 120 VA supply and internal 24V back-up battery.
 - a. Separately fuse all power connections whether AC or DC within the control unit.
 - b. Include light emitting diodes (LED's) to indicate (green) system power, (yellow) trouble, and (red) alarm; with trouble and alarm annunciated on an alphanumeric display, giving device number and location plus diagnosis of trouble.
 - c. Momentary contact switches shall provide for Locate, Next Alarm, Next Trouble, Acknowledge/Silence, and Reset.
 - d. An audible device shall sound within the control for alarm or trouble.

- e. This device shall have two distinct sounds, and shall be silenceable by the acknowledge/silence switch.
 - f. Alarms shall override any trouble condition.
9. The control CPU and power supply shall be capable of powering up to 960 addressable early warning detectors and up to 960 addressable auxiliary relays.
- a. All system expansion modules shall interconnect through a card edge connector and shall require no inter-module wiring.
 - b. The control shall be capable of measuring and adjusting the sensitivity of detectors.
 - c. Provide an alphanumeric display, to display custom messages and give readings of detector sensitivity, detector by detector.
 - d. The system shall check each device on an addressable initiating circuit continuously for the following: sensitivity, response, open shorts, ground faults, functionality, and status.
 - e. The control CPU shall report the failure of a device's transmitting component(s) for open or shorts on an addressable initiating circuit.
 - f. Recognize and identify the device by location with the circuit to the specific device, and all other devices shall continue to function properly.
10. The control shall report, by specific device number, any device removed from an addressable initiating circuit and all other devices shall continue to function.
11. The control shall allow changing the status of configured circuits (arming or disarming and changing status of relays).
- a. If any change in status degrades system operation as configured, a trouble condition shall be reported and remain until system operation again meets configured status.
12. FACP shall include the necessary hardware to provide remote access via an Internet/Intranet Interface.
- a. The Internet Interface shall provide an alternative access to system information using the familiar interface of a standard Internet browser.
 - b. Remotely located authorized personnel can use this access to analyze control panel status during non-alarm conditions and to assist responder during alarm conditions.
 - c. The Internet Interface shall provide single user access for multi-user accounts each with separate password.
 - i) Provide programmable lockout to prevent excessive login attempts by unauthorized users.
 - ii) Provide a built-in email feature that will automatically notify user accounts of individually selected status changes
 - iii) (i.e.: Alarm, Trouble, Supervisory, Sensor Sensitivity Status, and Historical Logs, for the same, on demand or via a selectable schedule-weekly, bi-weekly, or monthly).
13. The control panel shall allow for expansion and shall be configurable without system inter-wiring.
- a. Leave 20% of points or addresses on each mapnet loop available for future additions on fire alarm system.
14. The manufacturer shall provide all system software, configuration software, licensing and required certification that is necessary.
15. The system shall have capability to provide a level III access to view all past trouble and alarm events on site.

16. The system shall be capable of providing a hardcopy written record of all alarms, troubles, and system activity by means of full carriage width terminal to print detection device designations and location messages on a single line of up to 128 characters wherein 32 are reserved for device or zone custom identification. Printer is not required.
 17. New unacknowledged alarms and troubles shall be distinctively displayed on the visual display and differentiated from previous alarm and troubles.
 18. The system shall automatically indicate the total quantity of alarms and of troubles, which have occurred prior to reset at the control unit.
 19. No alarm or trouble indication shall be re-settable until acknowledged.
 20. It shall not be possible to reset the system without acknowledging all alarms. It shall be possible to display up to 250 alarms and up to 250 trouble indications, one at a time, on the digital annunciator, which shall be capable of listing, upon request:
 - a. Alarms with time, date, and location
 - b. Troubles with time, date, and location
 - c. Status of output functions, "on" or "off"
 - d. Sensitivity of addressable smoke detectors
 - e. Device number, type and location
 - f. Status of remote relays, "on" or "off"
 21. The fire alarm system's programmed database of initiation devices shall be "hard burned" (stored in permanent memory) not reliant on a power source of any form.
- B. Voice Alarm Panel: Provide and install a new voice alarm panel. System shall be capable of distributing voice messages throughout the building via an audio amplifier and fire alarm speakers. Provide the following features:
1. Multiplexed audio wiring.
 2. Distributed audio.
 3. Pre-recorded evacuation message using solid-state electronics. May provide different message or tones based on events.
 4. Remote All-Call page option.
 5. Medium system capacity.
 6. Multiple channel capability for up to 4 audio channels.
 7. Style Y or Style Z speaker circuit operation.
 8. Speaker and telephone on/off manual switches with custom labels.
 9. 30 watt and 120 watt audio amplifiers with switch-mode power supplies.
 10. All-call switch and indicator.
 11. Field configurable and programmable.
 12. Field recorded message option.
 13. Zone-coded voice options.
- C. Audio Amplifier: Provides up to 120 watts of 25 VRMS audio power, low-power standby mode for low battery drain, high-efficiency switched regulation, plug-in terminal strips and cable connectors, and 10-position level adjust and indicator LED's, and includes a built-in automatic tone generator (slow whoop on high/low).
- D. Include a digital communicator in the control panel capable of automatically transmitting alarm and trouble information, annunciated by device, via a Cat 6 cable, to the dispatcher located in PBX room.

- E. Power Supply: Adequate to serve control panel modules, remote detectors, remote annunciator(s), door holders, smoke dampers, relays, and alarm signaling devices and 20% spare capacity.
- F. Connect the system to the life safety branch of emergency generator.
 - 1. The system shall have battery back up.
 - 2. Size the batteries to provide 24-hours of standby operation followed by five-minutes of alarm.
 - 3. Provide a dual rate battery charger, which is capable of recharging the batteries to 80% capacity in 12-hours.
 - 4. Loss of commercial power shall annunciate as a system trouble.
 - 5. System trouble shall indicate for over or under voltage conditions, blown fuse or disconnected batteries.
 - 6. The system shall indicate visually and audibly when operating from standby power.
 - 7. The system shall automatically restart upon the return of power.
- G. Detection Circuits:
 - 1. Addressable device input supervisory modules capable of Class A or Class B supervision, Class B is allowed with the following conditions:
 - a. No more than 25 devices on one circuit
 - b. The end line resistors shall be located in the fire alarm terminal cabinets.
 - c. Any construction on an active campus requires hand excavation in locations within 10' of any known or suspected location of utility or wiring.
 - 2. Addressable devices shall be monitored, each device uniquely identifiable.
 - 3. Capable of supporting non-addressable initiating devices through installation of additional modules.
 - 4. Sized and programmed, suitable for all initiating devices connected to the system and an additional 100 possible future expansion devices.
- H. Signal Circuits:
 - 1. Supervised march time signal modules, sufficient for signal devices connected to system and two additional unused circuits, tested, installed and programmed for future expansion.
- I. Remote Station Outputs: Provide a self-restoring relay to output common trouble conditions and a re-settable relay to output common alarm conditions to the Owner's security interface equipment.
- J. Auxiliary Relays: Provide sufficient SPDT auxiliary relay contacts to provide accessory functions specified.
- K. Supervised booster panels, or remote power supplies may be used to power and supervise the notification appliance circuits.
 - 1. Install Manufacturer recommended transient absorption devices at booster panels.
 - 2. Install remote booster panels or remote power supplies in electrical or mechanical rooms.
 - 3. Do not install fire alarm system equipment in locations that are not readily accessible.
 - 4. Connect booster panels and remote power supplies to the life safety branch of generator.

2.2 INITIATING DEVICES

- A. Manual Station: Semi-flush mounted, double action manual station equipped with an addressable interface module that interfaces the manual station and the addressable initiating circuit. It shall be field programmable. The double action product shall be self restoring and not a disposable component.
- B. Heat Detectors: NFPA 72; Combination rate-of-rise and fixed temperature, rated 135 degrees F and temperature rate of rise of 15 degrees F or (fixed only) 190 degree F as specified. Addressable and controlled by the system control panel. Each detector to be uniquely identifiable and be field programmed. Calibration and device identification monitored by the system control panel.
- C. Ceiling Mounted Smoke Detector: NFPA 72; Addressable detector that is controlled by the system control panel. Photoelectric type with adjustable sensitivity, plug-in base, auxiliary relay contact, integral thermal element rated 135 degrees F, and visual indication of detector actuation, suitable for mounting on 4 inch (100 mm) outlet box. Each detector shall be uniquely identifiable and can be field programmed. Calibration, device identification and sensitivity shall be monitored by the system control panel. The sensitivity controlled by the system control panel.
- D. Duct Mounted Smoke Detector: NFPA 72; photoelectric type with auxiliary SPDT relay contact, duct sampling tubes extending width of duct, and visual indication of detector actuation, in duct-mounted housing.

2.3 SIGNALING DEVICES

- A. Alarm Lights: NFPA 72; strobe lamp and flasher with red lettered FIRE on white lens. 2-3 (flash rate) per second. Strobes shall comply with ADA requirements and NFPA 72 placement requirements. If any one room or area contains more than 3 visual devices, flashing shall be synchronized.
- B. Alarm Speaker: NFPA 72; flush type with wall or ceiling trim plate (interior), surface type (exterior), fire alarm speaker. Sound Rating: 87 dB at 10 feet (3 m). As designated, provide additional integral strobe lamp and flasher with red lettered FIRE on white lens. (Strobes cannot be mounted on ceiling.)
- C. Remote Annunciator: Remote annunciator shall be 32 character LCD display type, similar to the annunciator in the FACP.
- D. Duct detector remote test switch: flush mounted with red L.E.D. to indicate remote (above ceiling or obscured from normal view) duct detectors alarm status. Normal - off, Alarm - on. Provide with magnetic test switch.

2.4 AUXILIARY DEVICES

- A. Waterflow Detector: Shall be suitable for installation into Schedule 10 and Schedule 40 Steel or Black Iron Pipe. Unit shall be sealed in metal enclosure, be provided with two SPDT switches, each with N.O. and N.C. contracts, have aluminum saddles, and steel U-bolts.

- B. Supervisory (tamper) Switch: Shall be suitable for installation on OSY, butterfly, and post-indicating valves with rising or falling flags. Unit shall be sealed in metal, weatherproof enclosure, be provided with two SPDT switches each with N.O. and N.C. contacts, and be suitable for use on 1" through 12" valves.
- C. Magnetic Door Hold Devices: Devices shall be suitable for flush mounting on walls, have 25 pounds holding force, and have an adjustable swivel contact plate.

2.5 SYSTEM RACEWAY

- A. Install all raceway necessary to provide specified equipment function and per print sheets as under the provisions of Sections 26 05 33, 26 05 34, and 26 05 53.
- B. All raceway for fire alarm system shall be rigid galvanized steel underground, painted with two (2) coats of bitumsatic paint RGS exposed below 4'-0" AFF, and EMT exposed above 4'-0" AFF. Flexible liquidtight conduit to duct detectors.
- C. Install ground rod and provide grounding bar and bond to the ground rod with solid #8 minimum wire. Grounding bar buss is to be used as earth potential for the installed transient protection devices.
- D. All fire alarm terminal boxes, panels and relay enclosures shall be permanently labeled in accordance with Section 26 05 53. (Fire Alarm)

2.6 FIRE ALARM WIRE AND CABLE

Note: Approved cabling not installed in conduit, may be used for fire alarm wiring as long as it complies with NEC Article 760, AHCA, and the local building authority.

- A. Fire Alarm Power Branch Circuits: Building wire as specified in Section 26 05 13.
- B. Initiating Circuits and Auxiliary Control: Building wire as specified in Section 26 05 13. Non-power limited fire-protective signaling cable, copper conductor, Class 1 600 volt insulation and Article 760 of NEC Power limited circuits, Constructed in accordance with articles 318, 340, 500 & 501 of NEC. Passing VW-1 Vertical Flame Test. If stranded, (maximum of seven strands).
- C. Signal Circuits, and Annunciator point wiring: Building wire as specified in Section 26 05 13. 600 volt insulation, Type THWN stranded (maximum of 19 strands), and in accordance with NEC 310.
- D. Each separate circuit, initiation, signal and auxiliary shall have a specific number. Label each conductor by this circuit number at the control connections and at each terminal connection in the terminal boxes.
- E. A grounding conductor shall be installed through the entire conduit system and bonded to each device, junction box, terminal box, and control panel.

2.7 APPROVED EQUIPMENT

Manufacturers listed below are acceptable under this contract, contingent upon their compatibility with the main fire alarm control panel. It shall be the Contractor's responsibility to coordinate and verify this compatibility.

1. Simplex
2. Notifier
3. EST

PART 3 EXECUTION

3.1 INSTALLATION

- A. Install system in accordance with manufacturer's instructions.
- B. Install manual station with operating handle 48 inches above finished floor. Install audible and visual signal devices 90 inches above finished floor.
- C. Waterflow switches and tamper switches shall be provided by the Division 26 Contractor, installed by the Division 23 Contractor, and wired by the Division 26 Contractor. Contractors shall coordinate as required.
- D. Make conduit and wiring connections to door release devices, sprinkler flow switches, sprinkler valve tamper switches, fire suppression system control panels, duct smoke detectors, and all other specified peripherals.
- E. Automatic Detector Installation shall be in compliance with NFPA-72.
- F. Fire Alarm equipment mounting boxes shall house only the wiring pertinent to the equipment mounted on the box and are not to be used as junction points or run through pathways.
- G. All exterior equipment, mounting boxes and junction boxes shall be installed with all precautions necessary to insure the wiring and equipment being "weatherproof".
- H. Install Manufacturer recommended transient absorption MOV's from field wiring to ground plane for all circuit conductors, (NOT just those circuits that exit the building).
- I. All wiring shall be in conduit (see note in paragraph 2.6).
- J. There shall be no splices made in any wiring.
- K. All terminations, other than at devices, shall be made in terminal cabinets, wall mounted in electrical rooms or equipment spaces. (No terminations shall be made in boxes above the ceiling.)

- L. All visual indicating circuits shall be wired on a separate circuit independent of horn/speaker circuits. All strobe circuits, during an alarm condition, shall have the option of remaining active after a signal silence and only turn off on a panel reset or turning off after the signal silence is activated.
- M. All fire alarm junction/pull/device boxes shall be red.

3.2 FIELD QUALITY CONTROL

- A. Field inspection and testing will be performed under provisions of Division One.
- B. Test in accordance with NFPA 72 and additional owner requirements.

3.3 MANUFACTURER'S FIELD SERVICES

- A. Provide manufacturer's field services under provisions of Division One.
- B. Include services of certified technician to supervise installation, adjustments, final connections, and system testing and field service certification per NFPA 72A. Services shall also include on-site presence of a trained factory technician during the final inspection.

3.4 SYSTEM TESTING & ACCEPTANCE

- A. It is the responsibility of the vendor to meet with the appropriate Owner's representative to compare the placement and installation of proper devices with the drawings and specifications (as-built prints must be furnished to the Owner). A 100% device by device test shall be conducted by the vendor under the supervision of the Owner. Punch lists will be developed at this time by Owner's representative and furnished to the vendor. All punch list items must be corrected and verified as such by the Owner, prior to acceptance of the system.
- B. Vendor shall have manufacturer's trained technician present for final AHCA survey. Coordinate time and date with Contractor. At the survey, provide sensitivity test reports with the required range for all smoke and duct detectors installed in the project area. Also provide an approved 'Record of Completion' for the fire alarm system at the final AHCA survey.

3.5 TRAINING

- A. The Contractor and/or manufacturer's representative shall instruct the Owner's representative in the operation, maintenance, and repair of the system to the sub-assembly level, including familiarization with the operation, maintenance, and parts manual.

3.6 SPARE PARTS

- A. A spare parts inventory equal to ten (10) percent of the total number of each of the smoke detectors, heat detectors, speakers, pull stations, and strobes shall be supplied to the Owner, prior to acceptance.

END OF SECTION

WARFIELD ELEMENTARY SCHOOL ENHANCED SECURITY PROJECT A2

MARTIN COUNTY SCHOOL DISTRICT PERMIT DOCUMENTS SUBMITTAL

ARCHITECTURAL DESIGN CONSULTANT:

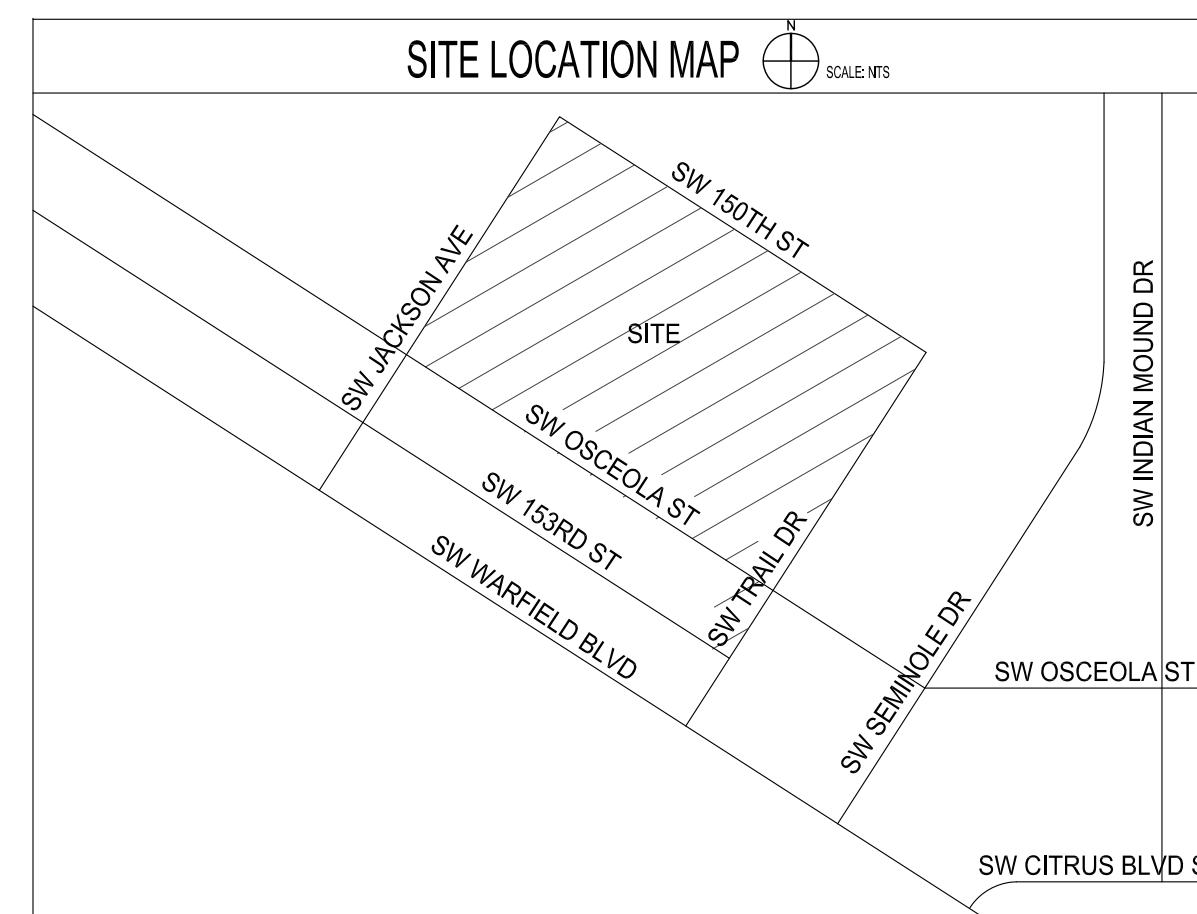
HARVARD JOLLY ARCHITECTURE

2047 VISTA PARKWAY, SUITE 100
WEST PALM BEACH, FL 33411
PHONE: 561-478-4457

MECHANICAL, PLUMBING & ELECTRICAL ENGINEER:

JLRD INC. ENGINEERS

1450 CENTREPARK BLVD - SUITE 350
WEST PALM BEACH, FLORIDA 33401
PHONE: 561- 689-2303



BOARD MEMBERS:

**CHRISTIA LI ROBERTS
MICHAEL DITERLIZZI
MARSHA POWERS
VICTORIA DEFENTHALER
TONY ANDERSON**

LAURIE J GAYLORD

**CHAIR
VICE CHAIR
MEMBER
MEMBER
MEMBER**

SUPERINTENDENT

PROJECT NARRATIVE

THE SCOPE OF WORK FOR THE SECURITY ENHANCEMENT PROJECT FOR THE RECEPTION/ADMINISTRATION AREA AT WARFIELD ELEMENTARY SCHOOL, LOCATED WITHIN THE MARTIN COUNTY SCHOOL DISTRICT, INCLUDES THE FOLLOWING: INTERIOR SELECTIVE DEMOLITION OF EXISTING FINISHES, ACOUSTICAL CEILING TILES, LIGHT FIXTURES, MECHANICAL DIFFUSERS, DOORS, WINDOWS, WALLS AND MILLWORK. NEW WORK IS COMPOSED OF THE INSTALLATION OF NEW IMPACT RESISTANT STORE FRONTS WITH CARD READERS AND ELECTRONIC RELEASE HARDWARE, NEW FLOOR FINISHES, WALL BASE, ACOUSTICAL CEILING TILES, LIGHT FIXTURES, MECHANICAL DIFFUSERS, METAL STUD AND GYPSUM WALL BOARD WALLS, WALL PAINT AND NEW MILLWORK.

THE INSTALLATION OF THE PROPOSED WORK SHALL BE IN ACCORDANCE WITH DRAWINGS AND SPECIFICATIONS SET FORTH IN THESE DOCUMENTS, FROM DIRECTION GIVEN FROM THE MARTIN COUNTY SCHOOL DISTRICT AND PER MANUFACTURERS RECOMMENDED INSTALLATION REQUIREMENTS. ALL AREAS, REGARDLESS OF LOCATION, WILL BE REQUIRED TO BE REPAIRED IF DISTURBED BY THE INSTALLATION OF THE SCOPE OF WORK. CONTRACTOR TO REVIEW ALL AS-BUILT DOCUMENTS BEFORE COMMENCING CONSTRUCTION AND VISIT THE SITE TO RECOGNIZE THE AREAS WITHIN THE SCOPE OF WORK.

ALL NEW CONSTRUCTION SHALL BE IN CONFORMANCE WITH THE MARTIN COUNTY SCHOOL DISTRICT STANDARDS, APPLICABLE CODES AND AUTHORITY HAVING JURISDICTION. THIS INCLUDES THE REQUIREMENTS OF SREF, THE 2017 FLORIDA BUILDING CODE SIXTH EDITION WITH AMENDMENTS AND THE FLORIDA FIRE PREVENTION CODE.

ARCHITECT'S STATEMENT OF COMPLIANCE:
TO THE BEST OF OUR KNOWLEDGE, THESE DRAWINGS AND THE PROJECT MANUAL ARE COMPLETE AND COMPLY WITH THE MINIMUM REQUIREMENTS OF THE 2017 FLORIDA BUILDING CODE SIXTH EDITION.

SHEET NO.	TITLE	ORIGINAL DATE	REVISION NO.	LATEST REVISION DATE
ARCHITECTURAL				
G-001	COVER SHEET & INDEX	07/30/2020		
LS-101	LIFE SAFETY PLAN	07/30/2020		
A-101	OVERALL SITE PLAN	07/30/2020		
A-102	DEMOLITION PLANS: FLOOR PLAN & REFLECTED CEILING PLAN	07/30/2020		
A-103	PROPOSED PLANS: FLOOR PLAN & REFLECTED CEILING PLAN	07/30/2020		
A-104	ELEVATIONS, SECTIONS & DETAILS	07/30/2020		
A-105	CASEWORK DETAILS & SCHEDULES	07/30/2020		
ELECTRICAL				
E0.1	ELECTRICAL NOTES & LEGEND	07/30/2020		
E1.1	ELECTRICAL PLAN - OVERALL	07/30/2020		
E2.1	LIGHTING PLAN - DEMOLITION	07/30/2020		
E2.2	LIGHTING PLAN - NEW WORK	07/30/2020		
E3.1	POWER AND SYSTEMS - DEMOLITION	07/30/2020		
E3.2	POWER AND SYSTEMS - NEW WORK	07/30/2020		
E4.1	ELECTRICAL RISER AND SCHEDULES	07/30/2020		
E5.1	ELECTRICAL DETAILS	07/30/2020		
MECHANICAL				
M0.1	MECHANICAL LEGEND AND GENERAL NOTES	07/30/2020		
M1.1	FIRST FLOOR HVAC - DEMOLITION	07/30/2020		
M1.2	FIRST FLOOR HVAC - NEW WORK	07/30/2020		
M2.1	MECHANICAL DETAILS	07/30/2020		

Revisions		
No.	Date	Note

TO THE BEST OF MY KNOWLEDGE, THE PLANS AND SPECIFICATIONS COMPLY WITH THE MINIMUM BUILDING CODES.

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COVER SHEET

G-001

BUILDING CODE/ LIFE SAFETY CODE ANALYSIS

REVIEW QUALIFICATION:

THIS REVIEW IS BASED ON CODES INTERPRETATIONS BY THE AUTHOR AND INCLUDES ARCHITECTURAL ISSUES ASSOCIATED WITH THE BUILDING AND LIFE SAFETY CODES. NOTE THAT NO CONFIRMATION OF THE INFORMATION HEREIN HAS BEEN OBTAINED BY THE REVIEW AGENCIES, WHICH, AS STATED IN THE CODES, HAVE THE AUTHORITY TO DIRECT MORE STRINGENT REQUIREMENTS. THE ARCHITECT OF RECORD RESERVES THE RIGHT TO IMPLEMENT MORE STRINGENT REQUIREMENTS.

PROJECT LOCATION/ GOVERNMENT AGENCY JURISDCITION

INDIANTOWN, FLORIDA/ MARTIN COUNTY SCHOOL DISTRICT

APPLICABLE CODES

- A. FLORIDA BUILDING CODE - BUILDING (FBC - B) 6TH EDITION, 2017
- B. FLORIDA BUILDING CODE - ACCESSIBILITY (FBC - A) 6TH EDITION, 2017
- C. STATE REQUIREMENTS FOR EDUCATIONAL FACILITIES (SREF), 2017
- D. PUBLIC LAW 101-338: AMERICAN WITH DISABILITIES ACT OF 1993 (ADA)
- E. NATIONAL ELECTRIC CODE
- F. FLORIDA FIRE PREVENTION CODE, 2017 (FFPC) INCLUDING NFPA 10, 13 AND 11
- G. FLORIDA BUILDING CODE - MECHANICAL (FBC-M) 6TH EDITION, 2017

OCCUPANCY CLASSIFICATION

EXISTING BUILDING IS CLASSIFIED AS FOLLOWS:

SECTION 305 - EDUCATIONAL (GROUP E OCCUPANCY)
 -NO CHANGE IN OCCUPANCY, OCCUPANT LOAD OR SQUARE FOOTAGE.
 -BUILDING IS NON-SPRINKLERED.

BUILDING DATA:

THE EXISTING BUILDING IS A SINGLE STORY, ADMINISTRATIVE USE BUILDING ON THE WARFIELD ELEMENTARY SCHOOL CAMPUS WITHIN THE MARTIN COUNTY SCHOOL DISTRICT. THE ENHANCED SECURITY PROJECT INVOLVES CREATING A NEW VESTIBULE AT THE MAIN ENTRY WITH AN IMPACT RESISTANT STOREFRONT SYSTEM. THERE WILL ALSO BE NEW IMPACT RESISTANT DOORS AND GLAZING INSTALLED AT THE ENTRY TO THE PRINCIPALS SUITE AND AT THE ENTRY TO THE CLASSROOM AREAS. AN EXISTING CONFERENCE ROOM WILL BE DIVIDED INTO TWO (2) OFFICE SPACES AND THE ORIGINAL CONFERENCE ROOM WILL BE RELOCATED TO AN EXISTING OFFICE SPACE IMMEDIATELY ADJACENT TO THE RECEPTION AREA. A NEW RECEPTION DESK WILL BE PROVIDED.

TRAVEL DISTANCE TO AN EXIT:

FBC-B TABLE 1017.2: EDUCATIONAL OCCUPANCY, 200' MAXIMUM (WITHOUT SPRINKLER SYSTEM)

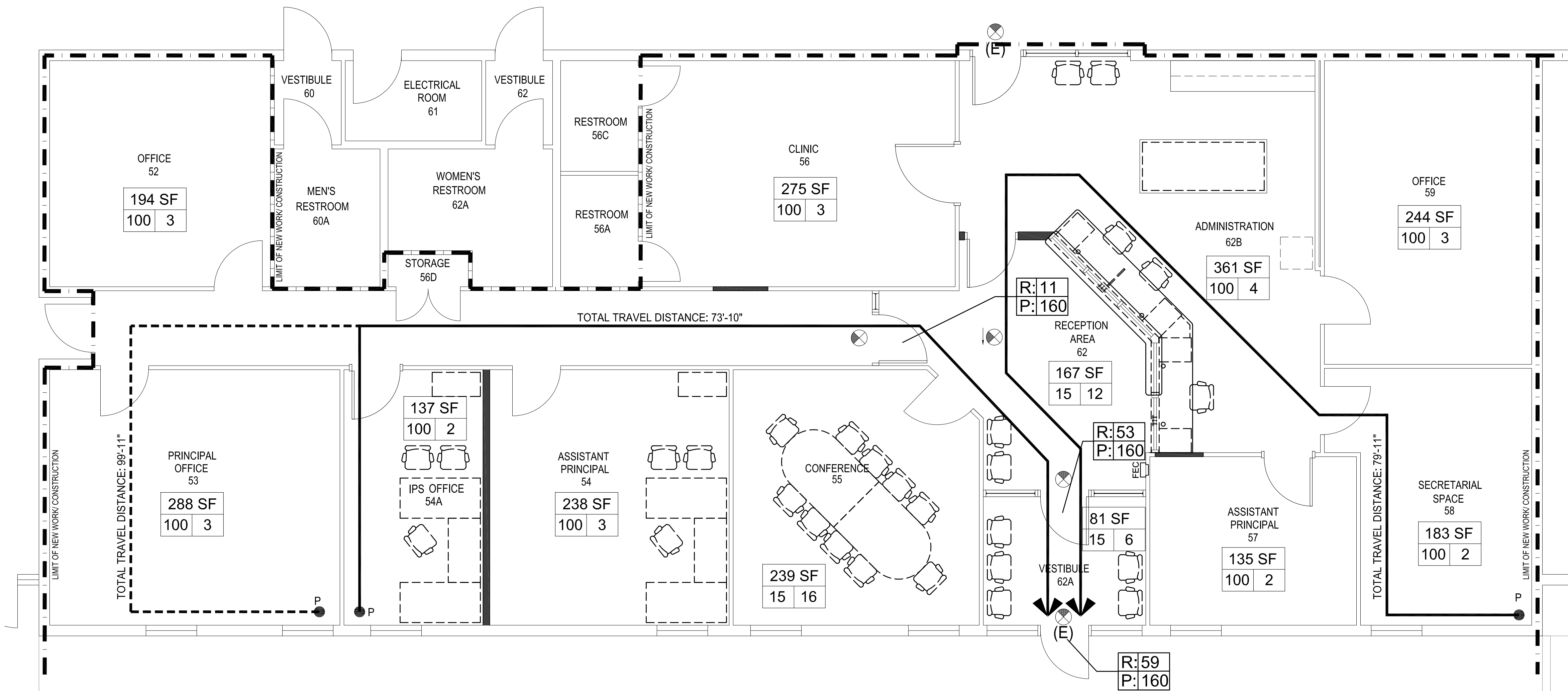
WORST CASE: 99'-11" IS LESS THAN 200' THEREFORE COMPLIANT.

LIFE SAFETY LEGEND

- ROOM AREA
- OCCUPANT LOAD (LIFE SAFETY ONLY)
- OCCUPANT LOAD FACTOR (LIFE SAFETY ONLY)
- REQUIRED EGRESS CAPACITY OF DOORS & EXITS (# OF OCCUPANTS)
- PROVIDED EGRESS CAPACITY OF DOORS & EXITS (# OF OCCUPANTS)
- FIRE EXTINGUISHER & CABINET
- ILLUMINATED EXIT SIGN, DOUBLE FACE W/ DIRECTION ARROWS (IF INDICATED) (SEE ELECTRICAL DRAWINGS)
- ILLUMINATED EXIT SIGN, SINGLE FACE W/ DIRECTION ARROWS (IF INDICATED) (SEE ELECTRICAL DRAWINGS)
- TRAVEL DISTANCE AND ROUTE TO EXIT FROM MOST REMOTE POINT

SHEET GENERAL NOTES

1. EXTEND ALL RATED PARTITIONS TO DECK ABOVE U.N.O.
2. ALL EXIT SIGNS WILL BE THE ILLUMINATED TYPE. SEE ELECTRICAL DRAWINGS & SPECIFICATIONS.
3. THESE DRAWINGS ARE DIAGRAMMATIC IN NATURE. REFER TO PLANS FOR ACTUAL LOCATIONS OF CEILING DEVICES.
4. IT IS THE DESIGN INTENT OF THESE DOCUMENTS THAT ALL CEILING DEVICES BE LOCATED IN THE CENTER OF CEILING TILES. (AS APPLICABLE)

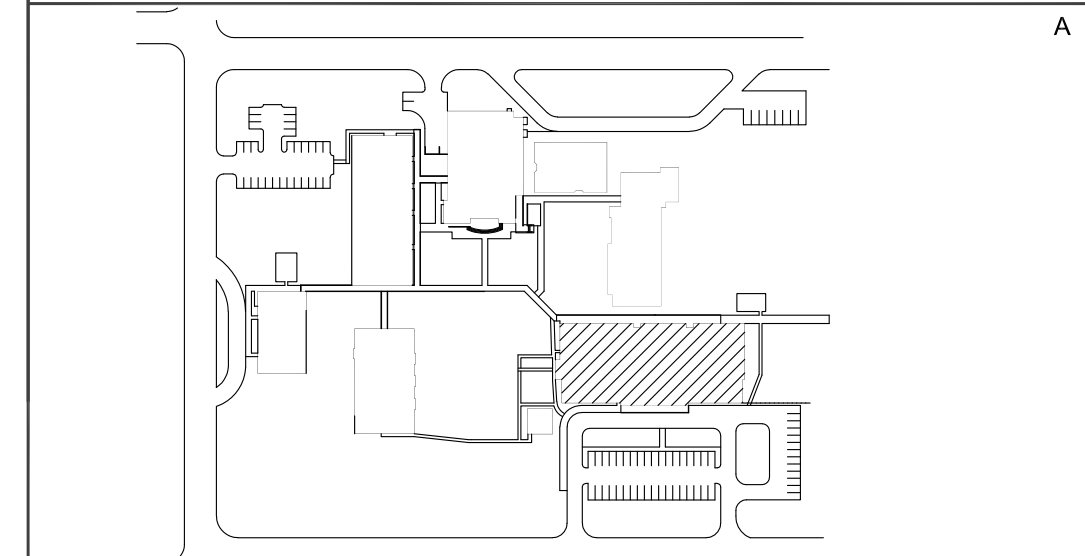


01

LIFE SAFETY PLAN

SCALE: 1/4" = 1'-0"

KEY PLAN



Comm. No: 16025.21
 Date: 07/30/2020
 Drawn: ER

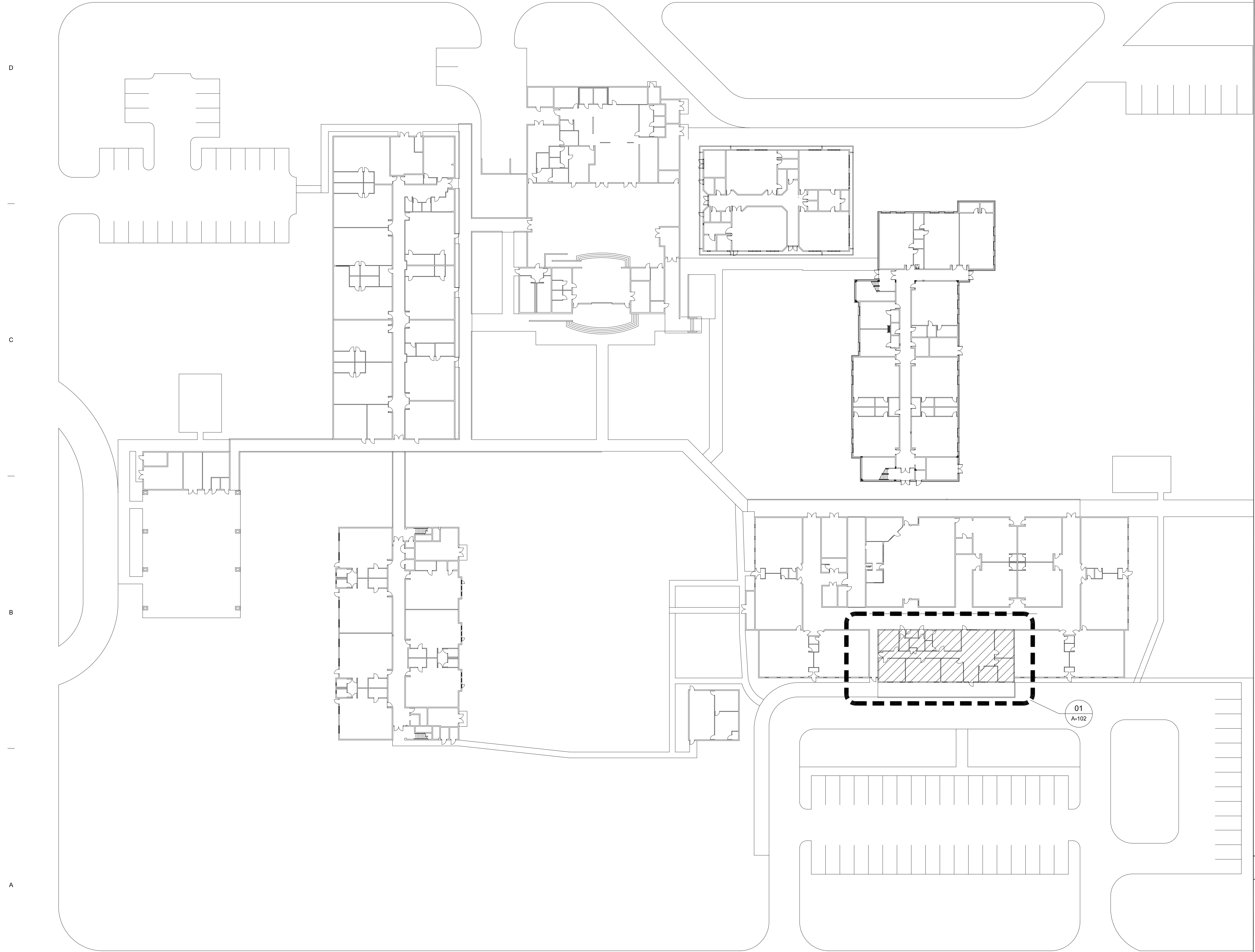
Revisions		
No.	Date	Note

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LIFE SAFETY PLAN

LS-101

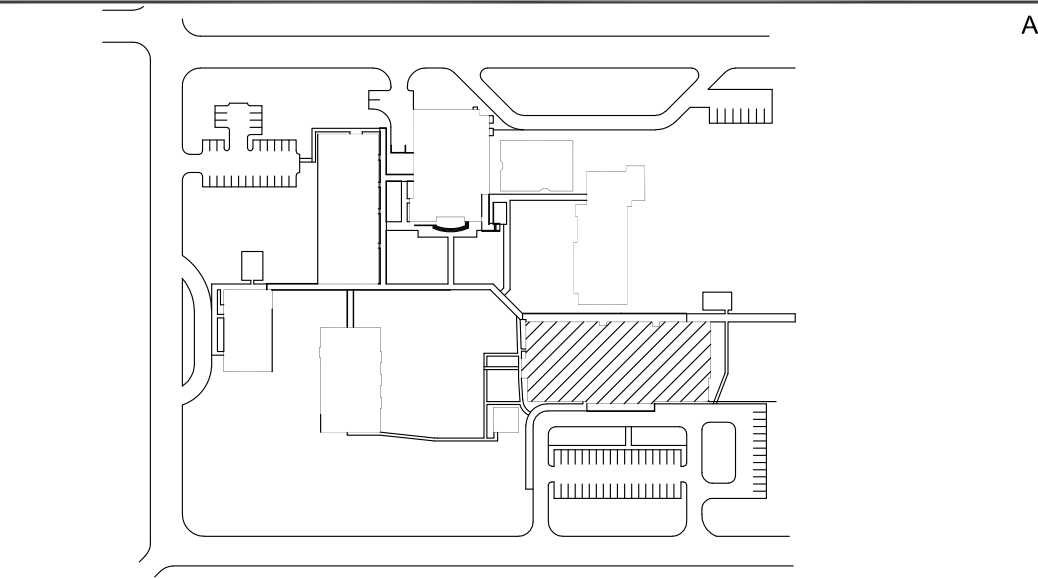


01 OVERALL SITE PLAN
SCALE: 1/32" = 1'-0"

GENERAL NOTES

- A. CONTRACTOR(S) ARE RESPONSIBLE FOR FIELD VERIFYING THE EXTENT OF NEW WORK PRIOR TO BIDDING, AND FOR COORDINATING THE EXTENT OF DEMOLITION ASSOCIATED WITH THE INSTALLATION OF NEW SYSTEMS AND FINISHES INDICATED IN THE CONTRACT DOCUMENTS.
- B. ALL WORK, MATERIALS AND EQUIPMENT UTILIZED IN THIS PROJECT SHALL BE NEW AND INSTALLED IN STRICT ACCORDANCE WITH THE MANUFACTURERS RECOMMENDATIONS AND SPECIFICATIONS.
- C. CONTRACTOR SHALL SUBMIT SHOP DRAWINGS FOR APPROVAL BEFORE COMMENCING FABRICATION AND/OR INSTALLATION OF ALL APPLICABLE ITEMS IN CONSTRUCTION. ALL SHOP DRAWINGS SHALL BE FIELD VERIFIED, REVIEWED AND APPROVED BY THE CONTRACTOR BEFORE SUBMITTAL.
- D. PATCH, REPAIR AND RESTORE FINISHES TO MATCH EXISTING TO ALL BUILDING CONSTRUCTION REQUIRING DEMOLITION IN ORDER TO INSTALL ALL NEW ITEMS OF THE SCOPE OF WORK.
- E. NEW ELECTRICAL ITEMS SHALL BE LOCATED BEHIND FINAL FINISH SYSTEMS. EXPOSED/ SURFACE MOUNTED CONDUITS ARE NOT ACCEPTABLE.
- F. AFTER THE INSTALLATION OF NEW WORK, THE RESULTING EXPOSED SURFACE SHALL BE SMOOTH AND FLUSH WITH EXISTING CONDITIONS.
- G. IN ALL AREAS OF NEW WORK, EXISTING FLOORS, WALLS, CEILINGS AND FINISHES SHALL BE PROTECTED FROM DAMAGE. ANY DAMAGES THAT OCCUR SHALL BE RESTORED TO LIKE NEW CONDITION BY THE CONTRACTOR AT NO ADDITIONAL COST TO THE OWNER.
- H. CONTRACTOR SHALL MAINTAIN ALL CONSTRUCTION AREAS AS WELL AS, SURROUNDING AREAS, FREE OF DEBRIS OR HAZARDOUS EQUIPMENT AT ALL TIMES.
- I. MAINTAIN THE EGRESS REQUIRED IN ALL AREAS PER ALL APPLICABLE CODES AND STANDARDS DURING CONSTRUCTION.
- J. TO THE BEST OF OWNER'S KNOWLEDGE THERE ARE NO HAZARDOUS CONTAINING MATERIALS IN THE LIMITS OF CONSTRUCTION. THE CONTRACTOR SHALL NOTIFY THE OWNER IMMEDIATELY IF ANY HAZARDOUS CONTAINING MATERIALS ARE ENCOUNTERED.
- K. GENERAL CONTRACTOR SHALL REMOVE OR RELOCATE ANY EXISTING CEILING COMPONENTS SUCH AS CEILING TILES AND GRID, DIFFUSERS, LIGHT FIXTURES AND CEILING DEVICES AS REQUIRED FOR THE INSTALLATION OF NEW EQUIPMENT. CONTRACTOR SHALL REINSTALL CEILING COMPONENTS UPON COMPLETION OF NEW EQUIPMENT INSTALLATION LOCATING COMPONENTS BACK TO THEIR ORIGINAL LOCATION. CONTRACTOR SHALL REPLACE ANY BROKEN CEILING TILES OR GRID AS REQUIRED FOR COMPLETE INSTALLATION.
- L. CONTRACTOR SHALL FILL VOIDS AROUND PENETRATIONS WITH FIRE RATED CAULK IN FIRE RATED DRYWALL DECKING AND FIRE RATED PARTITIONS. FIRE RATING MUST BE MAINTAINED.
- M. CAMERA MOUNTING DETAILS SHALL VARY BASED ON FIELD CONDITIONS. THE CONTRACTOR SHALL SUBMIT SHOP DRAWINGS INDICATING THE VARIOUS TYPES OF CAMERA MOUNTING METHODS INCLUSIVE FOR THE COMPLETE SYSTEM.
- N. THE SCOPE OF WORK IS TO TAKE PLACE ON AN OCCUPIED AND ACTIVE CAMPUS. ALL PERSONNEL WORKING ON-SITE WITH THIS PROJECT MUST HAVE, WEAR AND DISPLAY A MARTIN COUNTY SCHOOL DISTRICT BADGE. CONTRACTOR/ VENDOR MUST APPLY AT THE MCSD AND PAY FOR ALL BADGE ASSOCIATED COSTS.
- O. CONSTRUCTION PERSONNEL SHALL BE CONFINED TO THE LIMITS OF THE CONSTRUCTION AREA.
- P. CONTRACTOR SHALL BE RESPONSIBLE FOR PROPERLY CLEANING ALL AREAS PRIOR TO FINAL ACCEPTANCE BY THE OWNER INCLUDING BUT NOT LIMITED TO FLOORS, WALLS, WINDOWS, DOORS, EQUIPMENT, ETC.

KEY PLAN



Comm. No: 16025.21
Date: 07/30/2020
Drawn: ER

Revisions		
No.	Date	Note

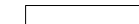






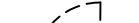
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OVERALL SITE PLAN

A-101

LEGEND

-  EXISTING WALL TO REMAIN
-  EXISTING TO BE DEMOLISHED
-  NEW STUD AND GWB PARTITION
-  LIMIT OF NEW WORK/ CONSTRUCTION
-  SMOKE DETECTOR
-  EXISTING TO REMAIN
-  REMOVE EXISTING
-  FIRE EXTINGUISHER CABINET

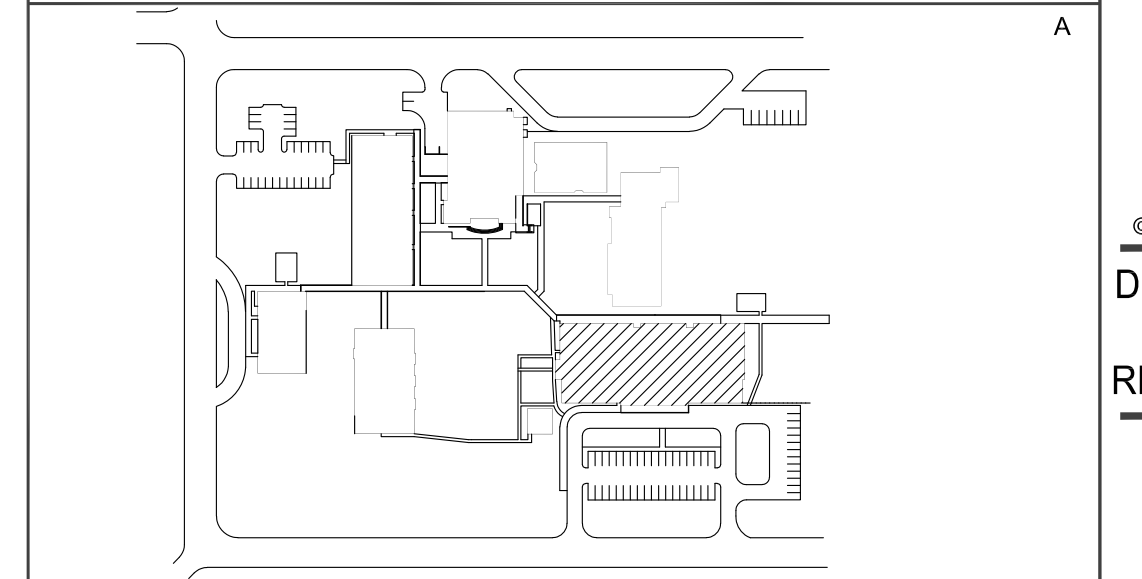
DEMOLITION GENERAL NOTES

- A. CONTRACTOR(S) ARE RESPONSIBLE FOR FIELD VERIFYING THE EXTENT OF DEMOLITION WORK PRIOR TO BIDDING, AND FOR COORDINATING THE EXTENT OF DEMOLITION WITH THE INSTALLATION OF NEW SYSTEMS AND FINISHES INDICATED IN THE CONTRACT DOCUMENTS. REFER TO THE NEW CONSTRUCTION DRAWINGS FOR DEMOLITION REQUIRED, BUT NOT SHOWN ON DEMOLITION PLANS.
- B. REFER TO THE MECHANICAL, PLUMBING AND ELECTRICAL DOCUMENTS FOR ADDITIONAL DEMOLITION ITEMS. PATCH, REPAIR AND RESTORE FINISHES TO MATCH EXISTING TO ALL BUILDING CONSTRUCTION REQUIRING DEMOLITION IN ORDER TO INSTALL ALL NEW ITEMS OF MECHANICAL, ELECTRICAL & PLUMBING WORK.
- C. MECHANICAL, PLUMBING AND ELECTRICAL ITEMS REMOVED SHOULD BE CAPPED AND ABANDONED; THEY SHALL BE LOCATED BEHIND FINAL FINISH SYSTEMS.
- D. "FLOORING" DENOTES FLOOR COVERING MATERIALS, INCLUDING BACKINGS, ADHESIVES, DOWN TO, BUT EXCLUSIVE OF FLOOR SLABS, STRUCTURAL SLABS AND STRUCTURAL SYSTEMS, UNLESS NOTED OTHERWISE.
- E. WALLS TO BE REMOVED SHALL BE REMOVED TO A POINT 2" MINIMUM BELOW THE EXISTING FLOOR SLAB UNLESS SETTING ON THE SLAB OR AS SPECIFICALLY NOTED. PATCH WITH NEW CONCRETE TO BE FLUSH WITH THE EXISTING FLOOR SLAB.
- F. WHEN OPENINGS ARE CUT INTO AN EXISTING WALL, THE OPENING SHALL BE A MINIMUM OF 1'-4" LONGER THAN THE FINISHED OPENING REQUIRED TO ALLOW FOR 8" MINIMUM OF NEW CMU TOOTHED IN AT EDGES.
- G. "CEILING" DENOTES CEILING MATERIALS INCLUDING SUSPENSION SYSTEMS, ADHESIVE RESIDUES, MOLDINGS, UP TO BUT EXCLUSIVE OF STRUCTURAL SYSTEMS.
- H. REMOVE EACH ITEM SHOWN WITH DASHED LINES ON THIS DRAWING WHETHER OR NOT EACH ITEM IS SPECIFICALLY NOTED TO BE REMOVED.
- I. AFTER THE DEMOLITION OF MATERIALS, THE RESULTING EXPOSED SURFACE SHALL BE SMOOTH AND FLUSH WITH EXISTING CONDITIONS.
- J. MATERIALS OF DEMOLITION SHALL BE DISPOSED OF OFF SITE UNLESS DIRECTED OTHERWISE BY OWNER.
- K. OWNER SHALL HAVE "FIRST RIGHTS OF REFUSAL" PRIOR TO DEMOLITION OPERATIONS AND SHALL SALVAGE ALL EXISTING EQUIPMENT PRIOR TO START OF CONSTRUCTION. ANY REMAINING EQUIPMENT SHALL BE DISPOSED OF OR SALVAGED BY THE CONTRACTOR.
- L. WHERE WALLS ARE SHOWN TO BE REMOVED, REMOVE ALL ITEMS IN THE WALLS: ELECTRICAL, PLUMBING, ETC. PER ALL APPLICABLE CODES AND STANDARDS.
- M. IN ALL AREAS OF DEMOLITION, ALL DUCTWORK, DOORS AND WALLS NOT TO BE DEMOLISHED SHOULD BE PROTECTED SO THAT NO DEBRIS/ DUST CAN FILTER THRU TO OTHER PARTS OF THE BUILDING.
- N. MAINTAIN THE EGRESS REQUIRED IN ALL AREAS PER ALL APPLICABLE CODES AND STANDARDS DURING CONSTRUCTION.
- O. TO THE BEST OF OWNER'S KNOWLEDGE THERE ARE NO HAZARDOUS CONTAINING MATERIALS IN THE LIMITS OF CONSTRUCTION. THE CONTRACTOR SHALL NOTIFY THE OWNER IMMEDIATELY IF ANY HAZARDOUS CONTAINING MATERIALS ARE ENCOUNTERED.
- P. GENERAL CONTRACTOR SHALL REMOVE OR RELOCATE ANY EXISTING CEILING COMPONENTS SUCH AS CEILING TILES AND GRID, DIFFUSERS, LIGHT FIXTURES AND CEILING DEVICES AS REQUIRED FOR DEMOLITION OF EXISTING AND INSTALLATION OF NEW MECHANICAL SYSTEM. CONTRACTOR SHALL REINSTALL CEILING COMPONENTS UPON COMPLETION OF MECHANICAL INSTALLATION LOCATING COMPONENTS BACK TO THEIR ORIGINAL LOCATION. CONTRACTOR SHALL REPLACE ANY BROKEN CEILING TILES OR GRID AS REQUIRED FOR COMPLETE INSTALLATION. SEE MECHANICAL DRAWINGS FOR ADDITIONAL INFORMATION.
- Q. GENERAL CONTRACTOR SHALL SALVAGE ALL EXISTING CEILING TILES IN AREAS IDENTIFIED FOR REMOVAL AND SHALL BE USED TO REPLACE DAMAGED TILE OR MISSING TILE IN AREAS OF RENOVATION.
- R. GENERAL CONTRACTOR SHALL CONFIRM WITH OWNER PRIOR TO DISPOSAL OF EXTRA TILE NOT USED IF THE OWNER DOES NOT WANT IT AS SURPLUS INVENTORY.
- S. CONTRACTOR SHALL FILL VOIDS AROUND PENETRATIONS WITH FIRE RATED CAULK IN FIRE RATED DRYWALL DECKING AND FIRE RATED PARTITIONS.

DEMOLITION KEY NOTES

1. REMOVE EXISTING FLOOR FINISH TO CONCRETE SLAB; PATCH, REPAIR AND PROVIDE A LEVEL CONCRETE SLAB AS REQUIRED.
2. REMOVE EXISTING WALL BASE.
3. REMOVE SECTION OF WALL AND PREPARE FOR THE INSTALLATION OF A NEW DOOR.
4. REMOVE EXISTING MILLWORK.
5. REMOVE EXISTING WINDOW & SECTION OF WALL ABOVE/ BELOW FOR INSTALLATION OF NEW DOOR.
6. REMOVE EXISTING DOOR INCLUDING FRAME AND ALL ACCESSORIES.
7. REMOVE EXISTING STOREFRONT SYSTEM.
8. REMOVE EXISTING MILLWORK ISLAND/WORKSTATION. PROTECT & STORE FOR REINSTALLATION - SEE FLOOR PLAN FOR NEW CONFIGURATION.
9. REMOVE EXISTING ACOUSTICAL CEILING TILE, GRID & ALL RELATED ACCESSORIES.
10. REMOVE EXISTING LIGHT FIXTURES; SEE ELECTRICAL DRAWINGS.
11. REMOVE EXISTING MECHANICAL DIFFUSERS & GRILLES; SEE MECHANICAL DRAWINGS.
12. RELOCATE COPIER DURING CONSTRUCTION AND REINSTALL IN SAME LOCATION WHEN CONSTRUCTION IS COMPLETE.
13. REMOVE EXISTING REFRIGERATOR, COUNTERTOP SINK & CABINETS. CAP EXISTING UTILITIES INSIDE WALL.
14. FLOOR SAFE TO BE REMOVED. PATCH CONCRETE SLAB AS REQUIRED.
15. REMOVE EXISTING WALL MOUNTED WHITE BOARD. STORE & PROTECT FOR FUTURE INSTALLATION AS DIRECTED BY THE OWNER.

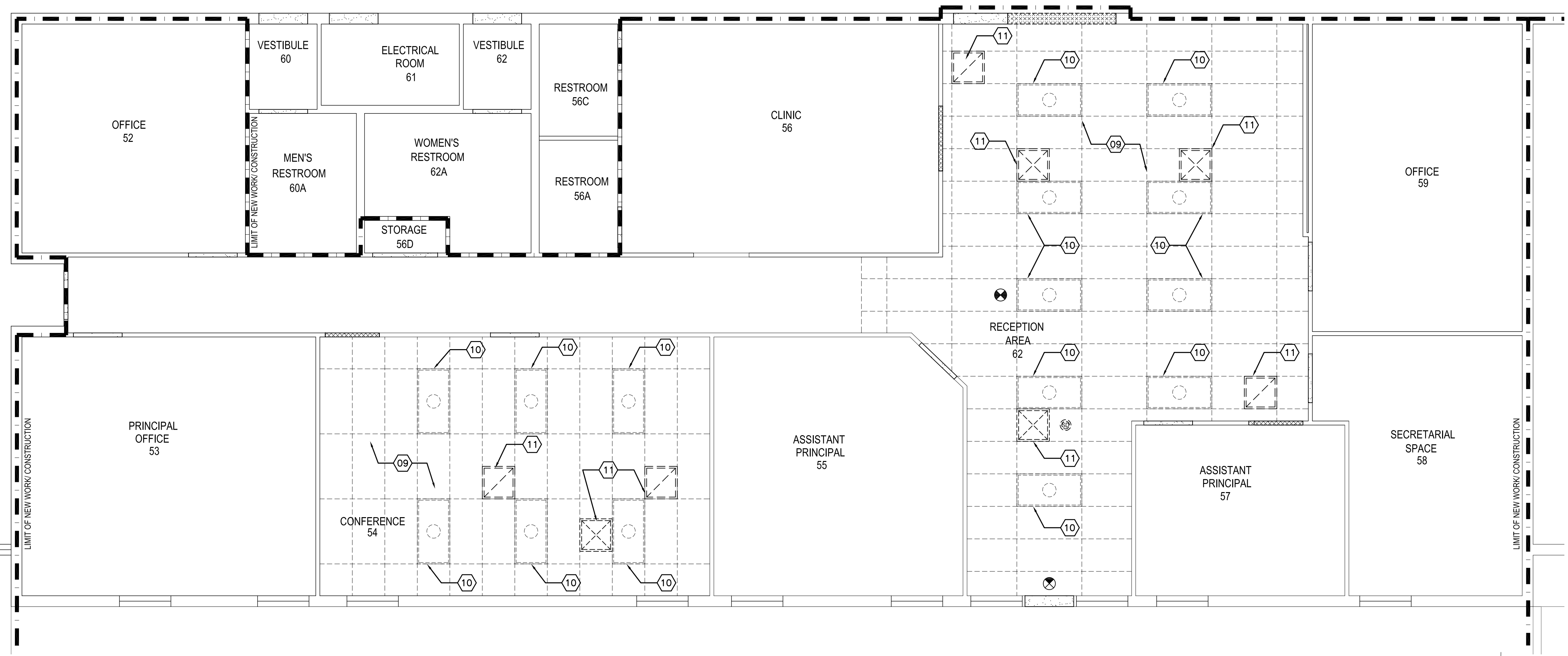
KEY PLAN



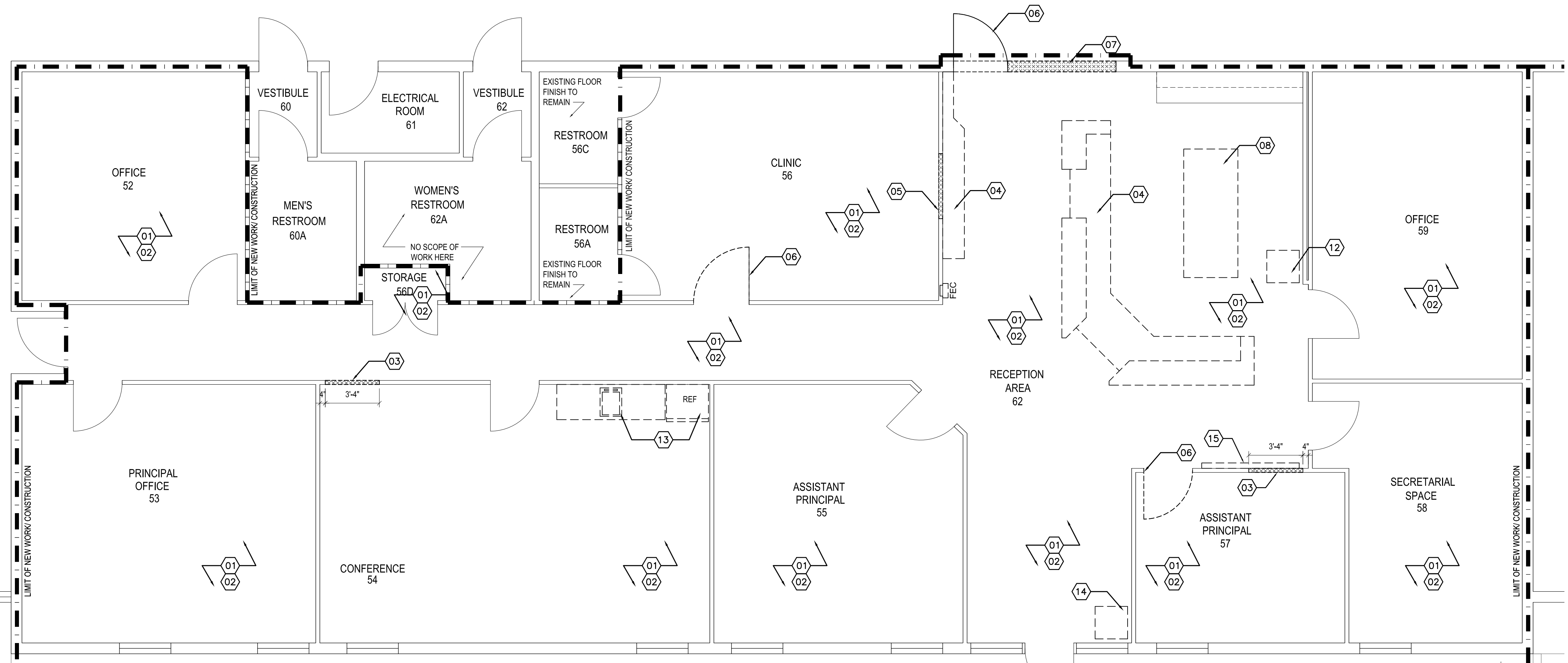
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 Drawn: ER

Revisions		
No.	Date	Note

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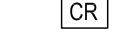

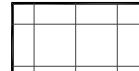
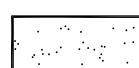
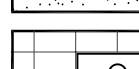
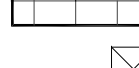


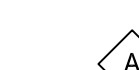




02 DEMOLITION REFLECTED CEILING PLAN
 SCALE: 1/4" = 1'-0"



01 DEMOLITION FLOOR PLAN
 SCALE: 1/4" = 1'-0"

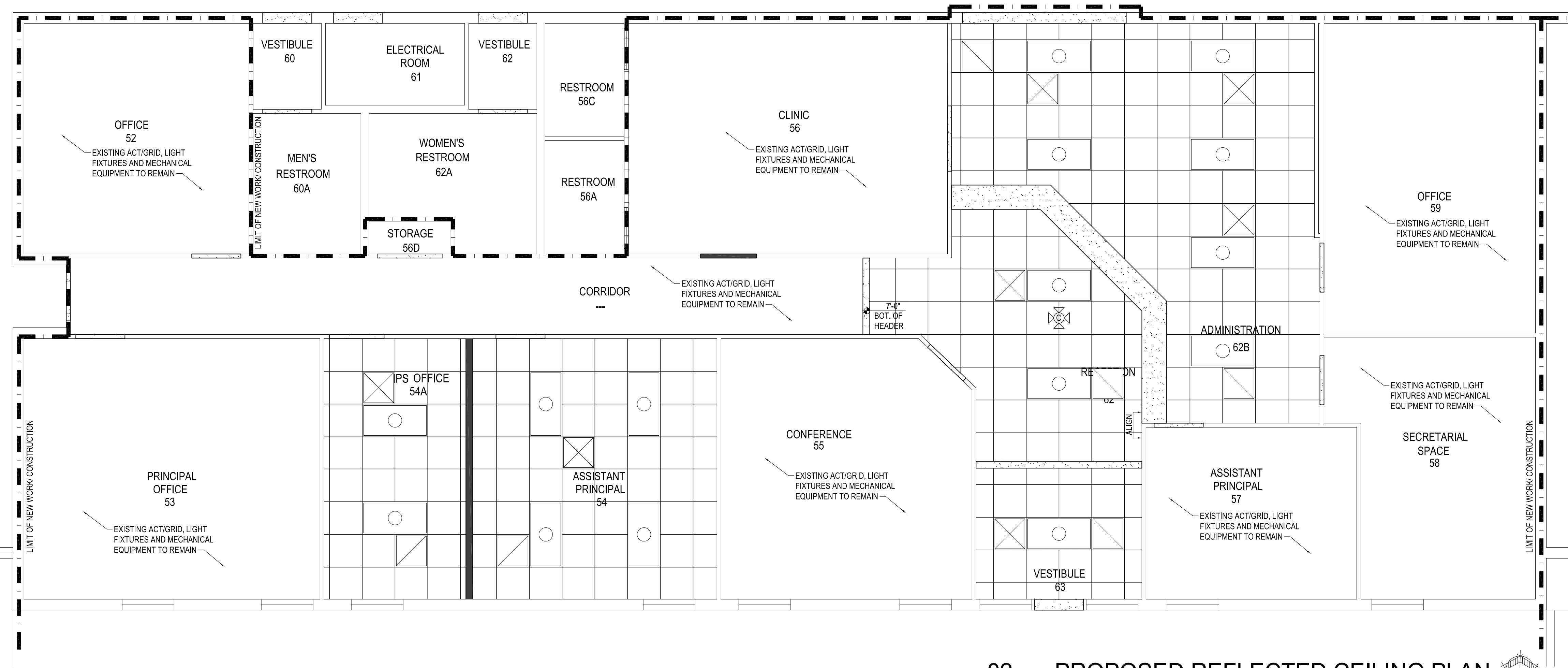
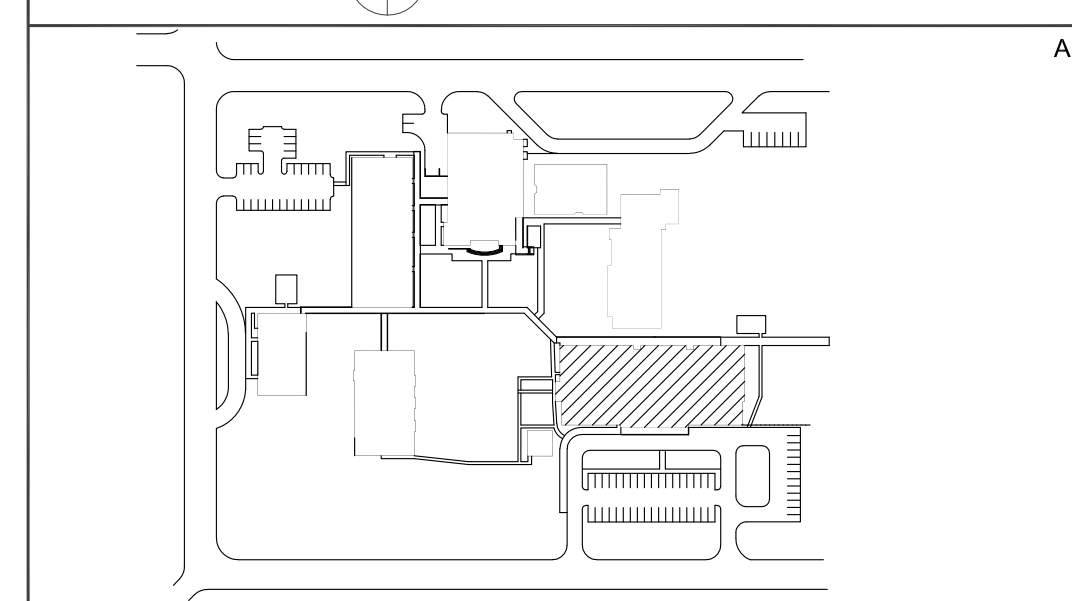
LEGEND

-  EXISTING WALL TO REMAIN
-  NEW STUD AND GWB PARTITION - BRACE AS REQUIRED
-  CARD READER - SEE ELECTRICAL DRAWINGS
-  CAMERA W/ FOUR HEAD VIEW - SEE ELECTRICAL DRAWINGS
-  2'X2' LAY-IN ACOUSTICAL CEILING ON GRID
-  DRYWALL SOFFIT, PAINTED
-  2'X4' RECESSED LED LIGHT FIXTURE - REFER TO ELECTRICAL DRAWINGS
-  DIFFUSER GRILLE REFER TO MECHANICAL DRAWINGS
-  RETURN AIR GRILLE REFER TO MECHANICAL DRAWINGS
-  EXISTING TO REMAIN
-  NEW SCHEDULED DOOR
-  PAINT. REFER TO FINISH SCHEDULE
-  FURNITURE N.I.C

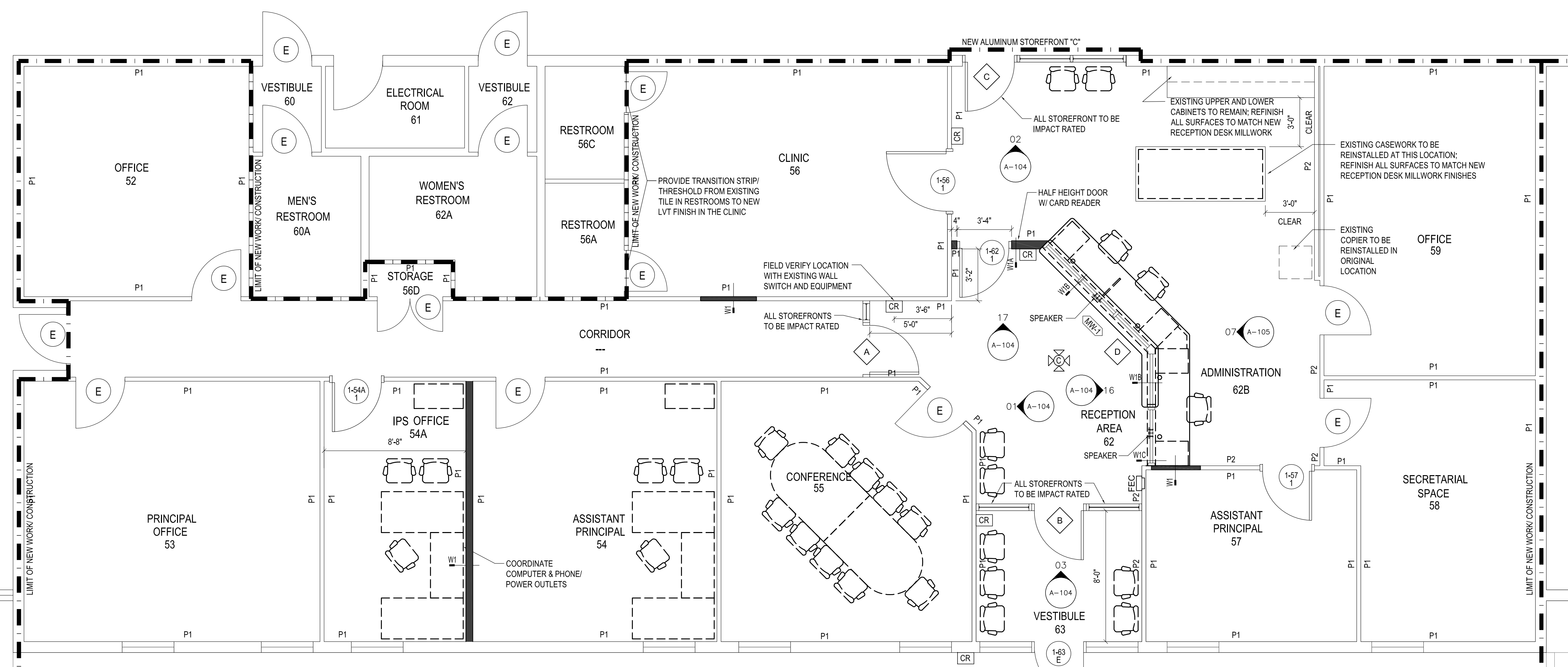
GENERAL NOTES

1. CONTRACTOR SHALL COMPLY WITH FLORIDA BUILDING CODE SIXTH EDITION (2017) WITH ALL APPLICABLE REVISIONS, FLORIDA FIRE PREVENTION CODE SIXTH EDITION, ALL STATE AND LOCAL ZONING CODES AND THE DISTRICT SCHOOL BOARD OF MARTIN COUNTY CRITERIA. PERMITS SHALL BE POSTED IN A VISIBLE PLACE AT ALL TIMES. ALL PERMITS, UTILITY AND METER CONNECTIONS FEES SHALL BE OBTAINED AND PAID FOR BY THE CONTRACTOR.
2. ALL WORK, MATERIALS AND EQUIPMENT UTILIZED IN THIS PROJECT SHALL BE NEW AND INSTALLED IN STRICT ACCORDANCE WITH THE MANUFACTURERS RECOMMENDATIONS AND SPECIFICATIONS.
3. ALL WORK FOR THIS PROJECT SHALL CONFORM TO STANDARDS PUBLISHED BY RECOGNIZED PROFESSIONAL AND INDUSTRY ORGANIZATIONS.
4. CONTRACTOR SHALL BE RESPONSIBLE FOR VISITING THE SITE PRIOR TO BIDDING AND FAMILIARIZING HIMSELF WITH ALL EXISTING CONDITIONS AFFECTING THE WORK INCLUDING BUT NOT LIMITED TO PUBLIC UTILITIES, ON AND OFF SITE ACCESS ROADS AND OTHER SUPPORT FACILITIES.
5. CONTRACTOR SHALL REMOVE, RELOCATE OR RE-ROUTE, AS NECESSARY, ELECTRICAL, TELEPHONE, WATER, SEWER, GAS OR ANY OTHER UTILITY LINES ENCOUNTERED AND SHALL COORDINATE THIS WORK WITH ALL LOCAL UTILITY COMPANIES.
6. CONTRACTOR SHALL IMMEDIATELY NOTIFY THE ARCHITECT OF ANY UNEXPECTED OR UNKNOWN FIELD CONDITIONS, ERRORS, OMISSIONS, OR DISCREPANCIES IN THE DRAWINGS, PROJECT MANUAL OR CONTRACT DOCUMENTS PRIOR TO PROCEEDING WITH THE WORK OR SHOP FABRICATIONS.
7. CONTRACTOR SHALL PREPARE AND MAINTAIN ALL CONSTRUCTION AREAS, AS WELL AS SURROUNDING AREAS FREE OF DEBRIS OR HAZARDOUS EQUIPMENT AT ALL TIMES.
8. CONTRACTOR SHALL BE RESPONSIBLE FOR THE REPAIR AND/OR THE REPLACEMENT OF ANY ITEMS DAMAGED DURING CONSTRUCTION OR CLEAN-UP. CONSTRUCTION PERSONNEL SHALL BE CONFINED TO THE LIMITS OF THE CONSTRUCTION AREA. ALL OSHA REGULATIONS FOR CONSTRUCTION AREAS SHALL BE STRICTLY FOLLOWED.
9. DRAWINGS ARE NOT TO BE SCALED. WRITTEN DIMENSIONS SHALL BE FOLLOWED.
10. ALL DIMENSIONS ARE BASED ON NOMINAL SIZES OF MEMBERS AND ARE GIVEN TO THE OUTER FACE OF SUCH MEMBERS, NOT TO FACE OF FINISH MATERIALS UNLESS OTHERWISE NOTED ON DRAWINGS. WHERE A DIMENSION IS LABELED "CLEAR" IT IS TAKEN FROM THE FACE OF FINISH MATERIALS TO FACE OF FINISH MATERIALS.
11. CONTRACTOR SHALL SUBMIT SHOP DRAWINGS FOR APPROVAL BEFORE COMMENCING FABRICATION AND/OR INSTALLATION OF ALL APPLICABLE ITEMS FOR CONSTRUCTION. ALL SHOP DRAWINGS DIMENSIONS SHALL BE FIELD VERIFIED, REVIEWED AND APPROVED BY CONTRACTOR BEFORE SUBMITTAL.
12. CONTRACTOR SHALL BE RESPONSIBLE FOR REMOVING ALL DEBRIS AND CONSTRUCTION MATERIAL FROM THE SITE. CONTRACTOR SHALL ALSO BE RESPONSIBLE FOR PROPERLY CLEANING ALL AREAS PRIOR TO FINAL ACCEPTANCE BY THE OWNER INCLUDING BUT NOT LIMITED TO WINDOWS, FLOORS, CARPETS, WALLS, DOORS, EQUIPMENT, ETC.
13. UPON COMPLETION OF THIS PROJECT, THE CONTRACTOR SHALL GIVE TO THE OWNER A COMPLETE SET OF AS-BUILT ARCHITECTURAL, MECHANICAL AND ELECTRICAL DRAWINGS IN CAD FORMAT ALONG WITH THE WRITTEN GUARANTEES, OPERATION AND MAINTENANCE MANUALS OF ALL EQUIPMENT AND FINISHES INSTALLED. THE CONTRACTOR SHALL MAINTAIN A CURRENT SET OF AS-BUILT DRAWINGS AND SPECIFICATIONS. INFORMATION SHALL BE RECORDED BY CONTRACTOR AS CONSTRUCTION PROGRESSES AND REVIEWED FOR COMPLETENESS AT EACH REQUISITION REQUEST. REFER TO PROJECT MANUAL.
14. CONTRACTOR SHALL INSTALL BARRIERS AS NECESSARY AND REQUIRED AROUND PERIMETER OF CONSTRUCTION LIMITS TO PROTECT THE PUBLIC. EGRESS FROM THE EXISTING BUILDINGS SHALL NOT BE REDUCED OR LIMITED.
15. CONTRACTOR SHALL FURNISH AND INSTALL ALL METAL AND/OR WOOD BLOCKING REQUIRED FOR WALL MOUNTED OR BRACED FIXTURES, COUNTERTOPS, SHELVES, AND ACCESSORIES OR BY OTHERS ITEMS DESCRIBED IN INTERIOR DESIGN AND ARCHITECTURAL DRAWINGS. BLOCKING SHALL BE CONSTRUCTED TO SUPPORT THE IMPOSED LOAD AND SHALL COMPLY WITH SCHOOL DISTRICT REQUIREMENTS.
16. CONTRACTOR SHALL PROVIDE A SAFETY AND STAGING PLAN PRIOR TO START OF CONSTRUCTION TO CLEARLY DELINEATE AREAS FOR CONSTRUCTION, SAFETY BARRIERS, EXITS, CONSTRUCTION TRAFFIC DURING THE VARIOUS PHASES AND WHEN CONDITIONS CHANGE.
17. CONTRACTOR SHALL SUBMIT SHOP DRAWINGS FOR REVIEW AND APPROVAL BY THE AUTHORITY HAVING JURISDICTION (AHJ) FOR THE FOLLOWING BUT NOT LIMITED TO ALL FINISHES, STOREFRONT ASSEMBLIES, LIGHT FIXTURES, MECHANICAL EQMT, ETC. SPECIFICATIONS.
18. ALL INTERIOR NON-LOAD BEARING WALLS SHALL EXTEND TO UNDERSIDE OF DECK ABOVE U.O.
19. ALL FIRE-RATED AND SMOKE-RATED NON-LOAD BEARING WALLS SHALL EXTEND TO UNDERSIDE OF DECK ABOVE U.O.
20. ALL STUD WALLS TO HAVE HIGH IMPACT 5/8" G.W.B. TO 4'-0" A.F.F. PROVIDE STANDARD G.W.B. ABOVE 4'-0".
21. ALL WALL FRAMING STUDS TO BE MIN. 20 GAUGE U.N.O. ON DRAWINGS OR IN SPECIFICATIONS.
22. PROVIDE NEW THRESHOLD AT EXISTING RESTROOM DOORS FROM EXISTING TILE TO LVT FINISH INSIDE THE CLINIC.
23. GENERAL CONTRACTOR IS RESPONSIBLE FOR MOVING ALL FFE FROM SPACES IN SCOPE OF WORK. GC SHALL PLACE FFE BACK IN SPACES AFTER NEW WORK IS COMPLETED.

KEY PLAN



02 PROPOSED REFLECTED CEILING PLAN
SCALE: 1/4" = 1'-0"



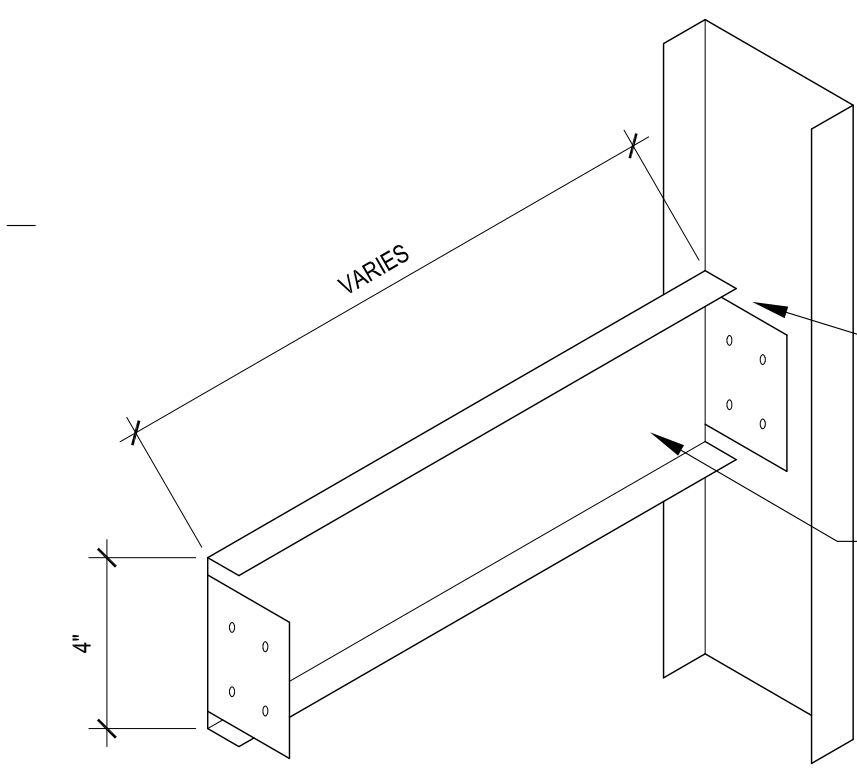
01 PROPOSED FLOOR PLAN
SCALE: 1/4" = 1'-0"

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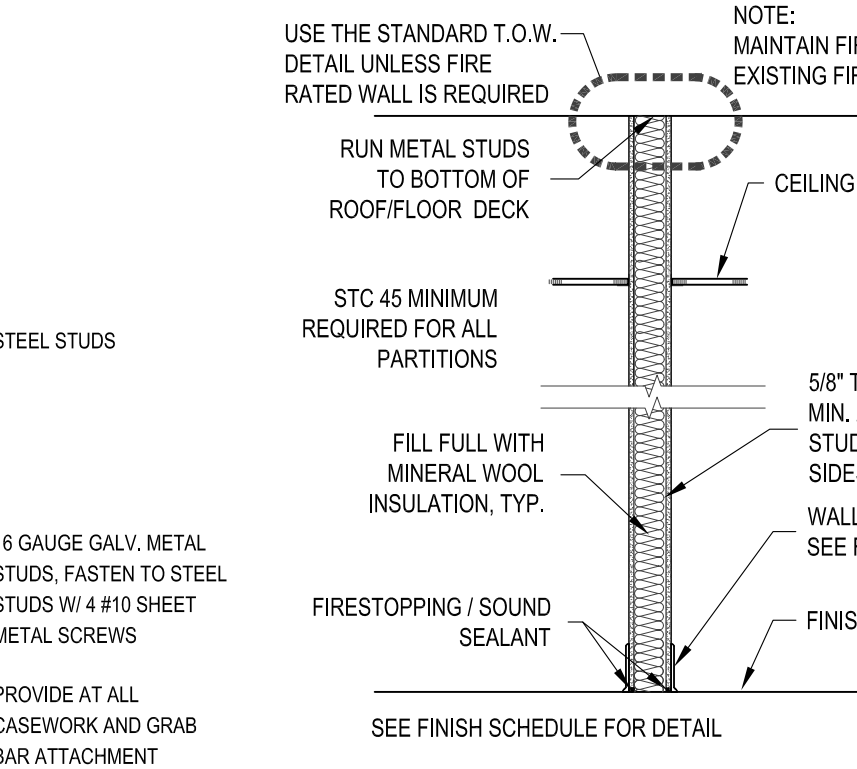
Revisions		
No.	Date	Note

TO THE BEST OF MY KNOWLEDGE, THE PLANS AND SPECIFICATIONS COMPLY WITH THE MINIMUM BUILDING CODES.

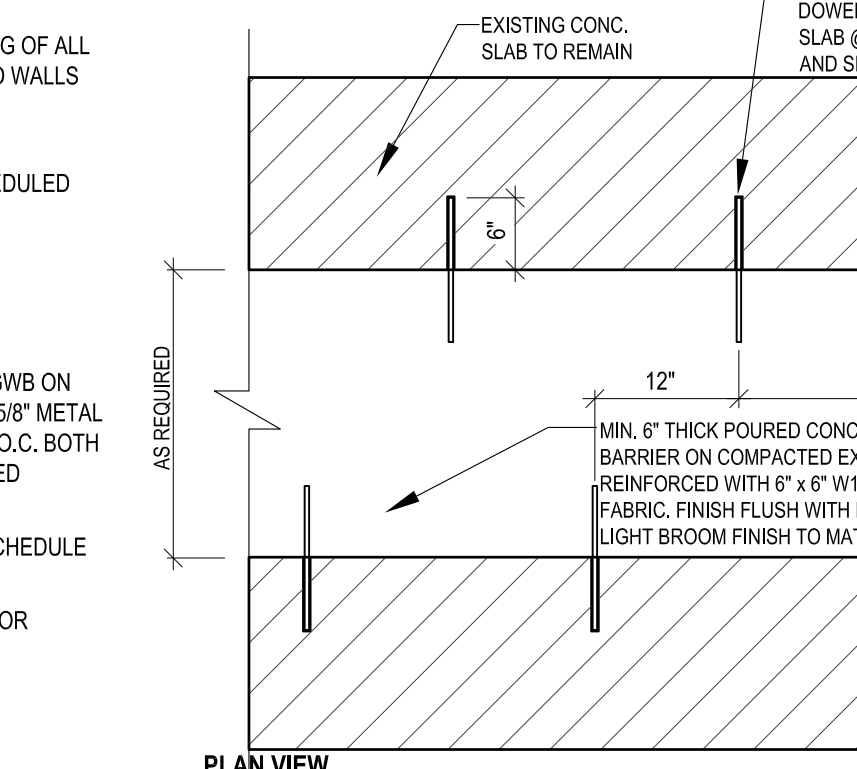
17 INTERIOR ELEVATION
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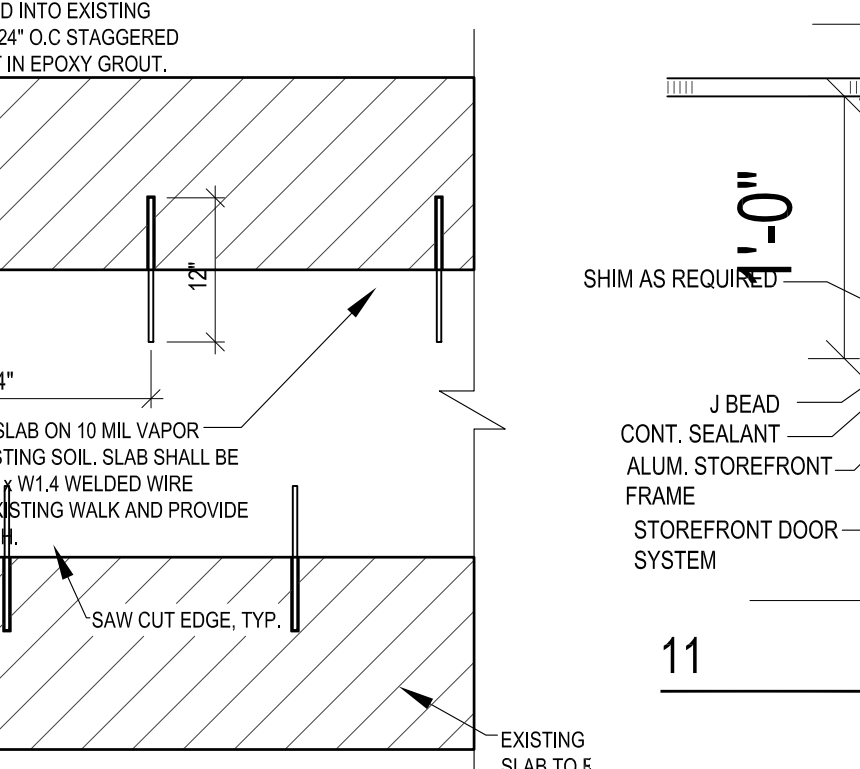
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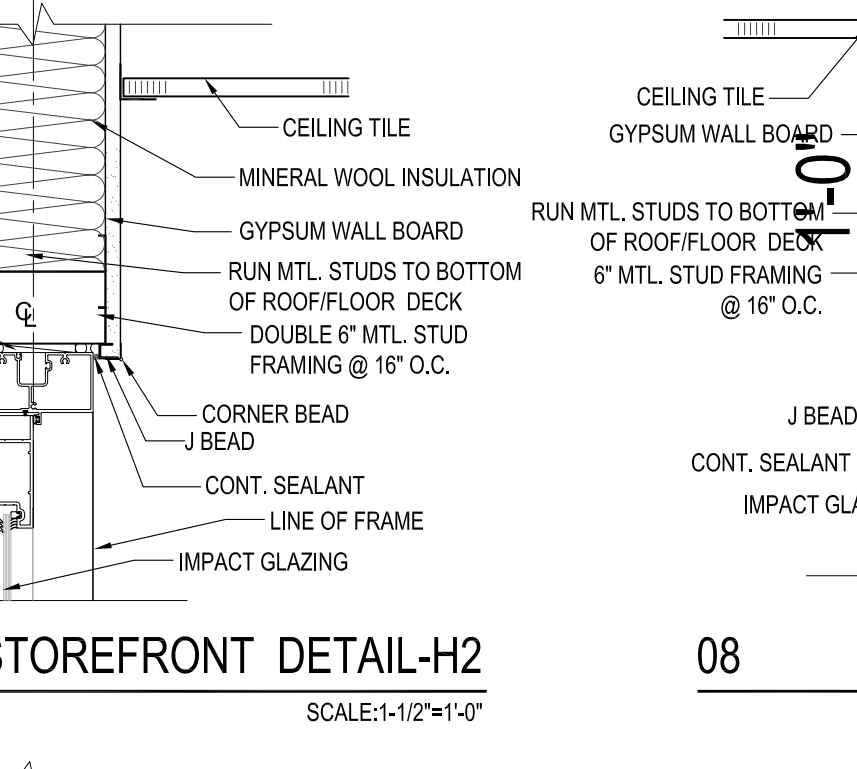
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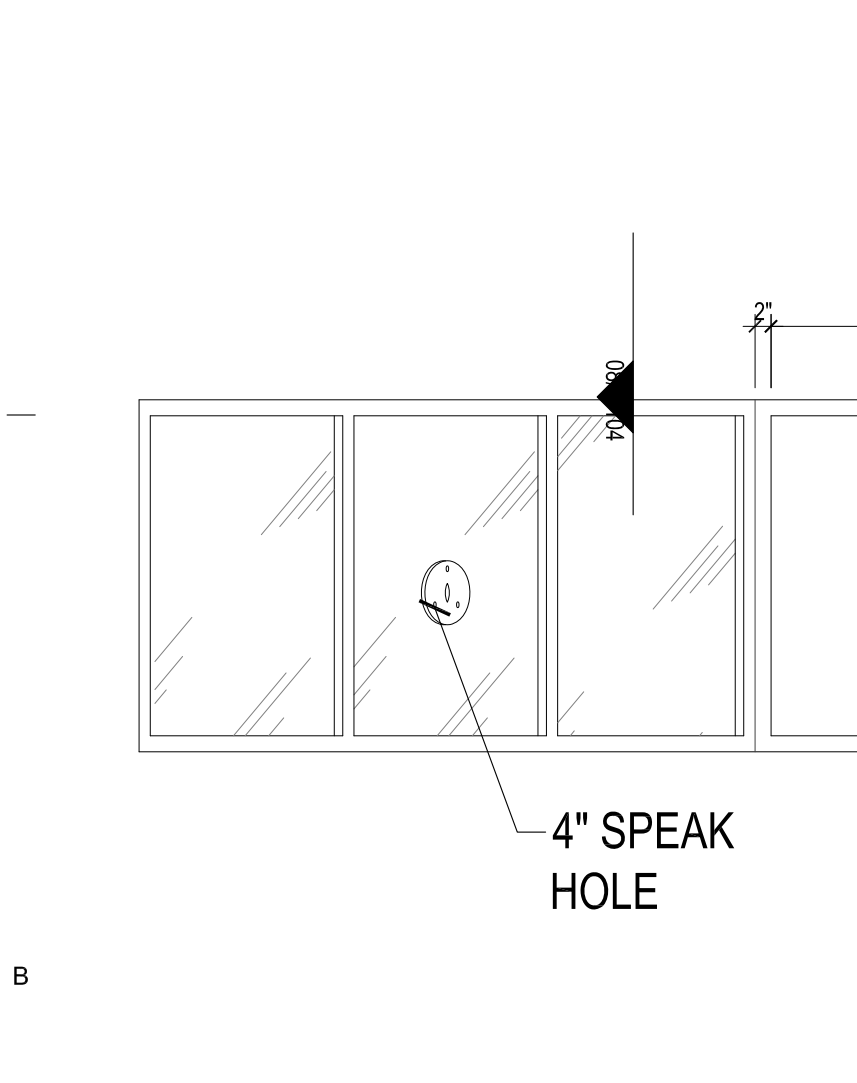
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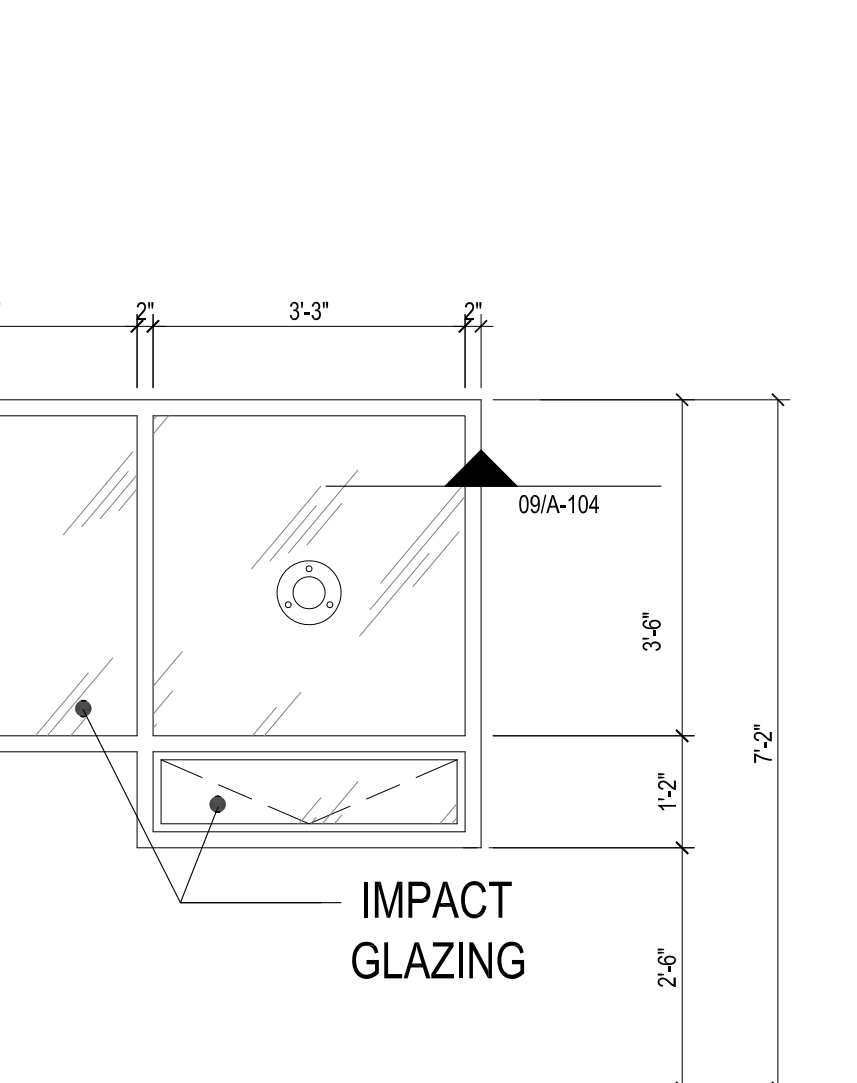
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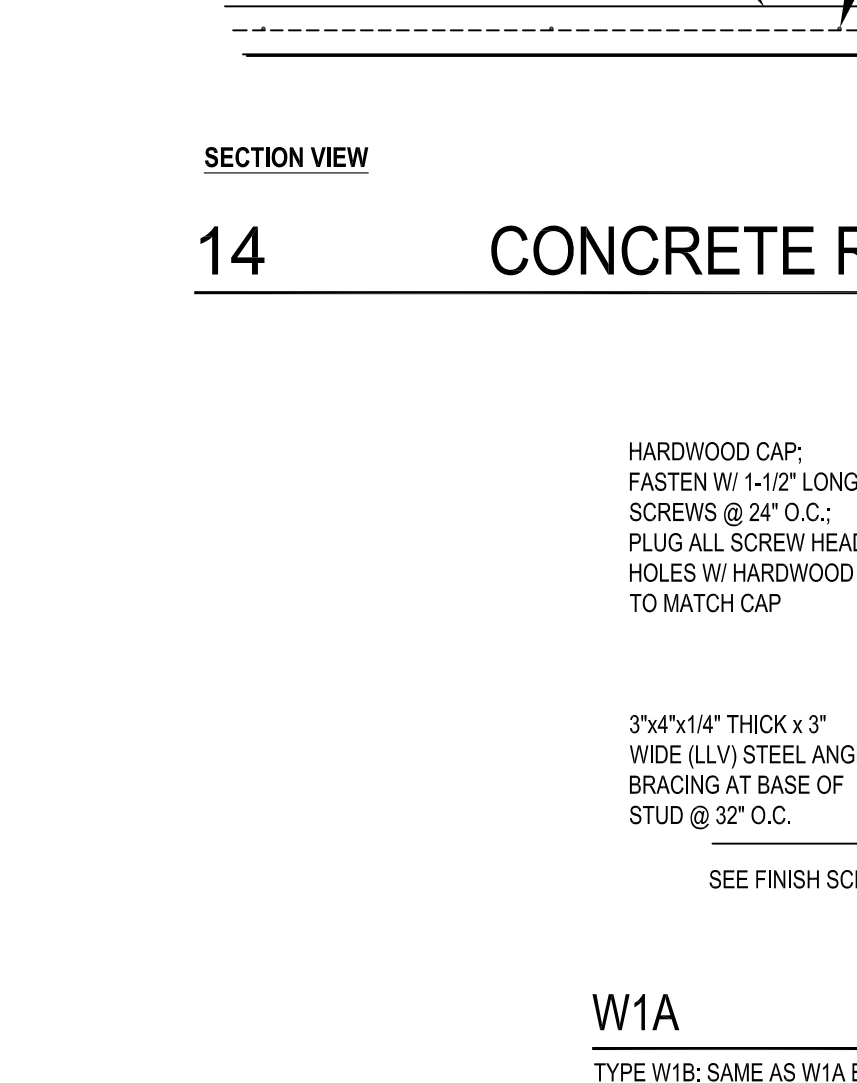
15 WALL BACKING DETAIL
SCALE: 3/4" = 1'-0"



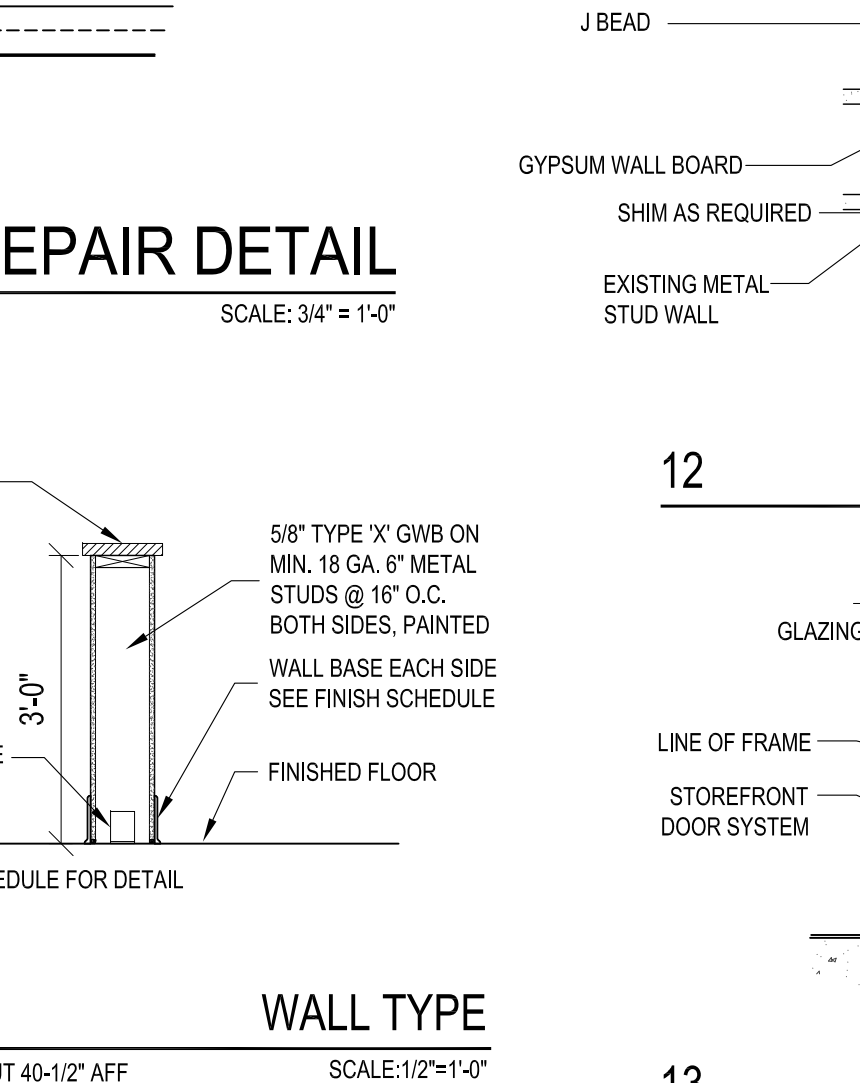
W1 WALL TYPE
SCALE: 1/2" = 1'-0"



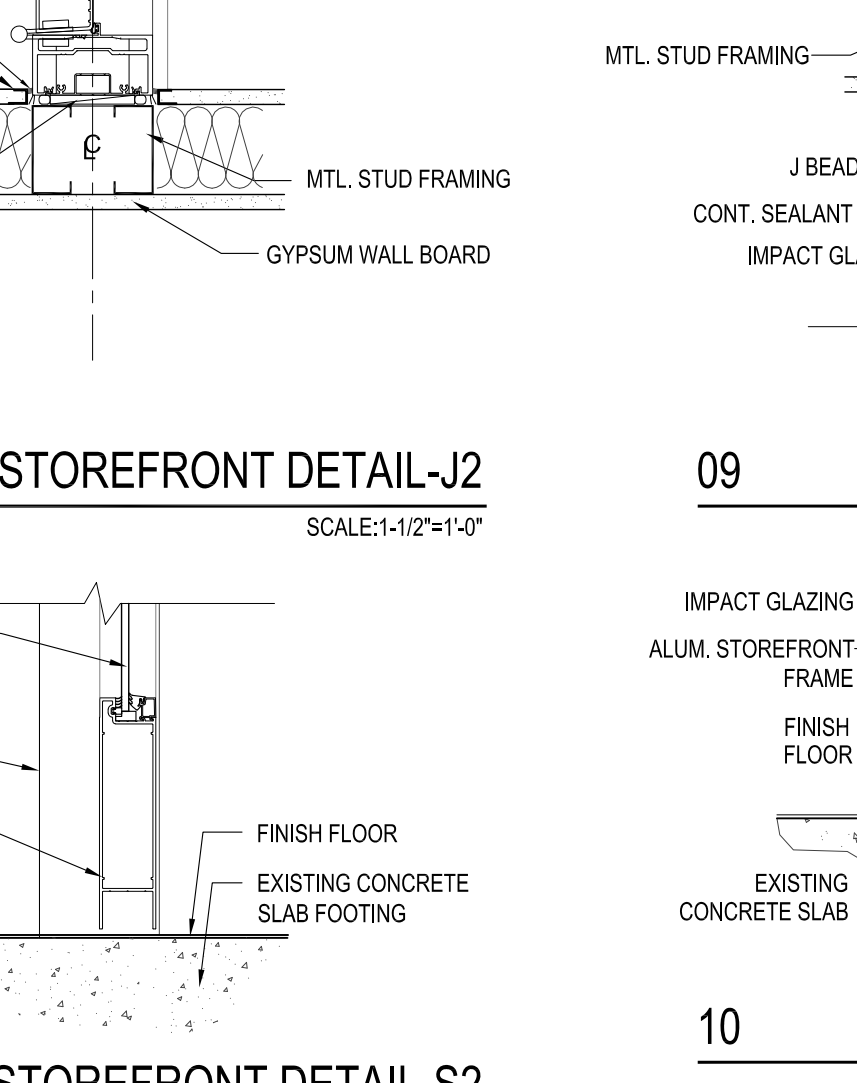
14 CONCRETE REPAIR DETAIL
SCALE: 3/4" = 1'-0"



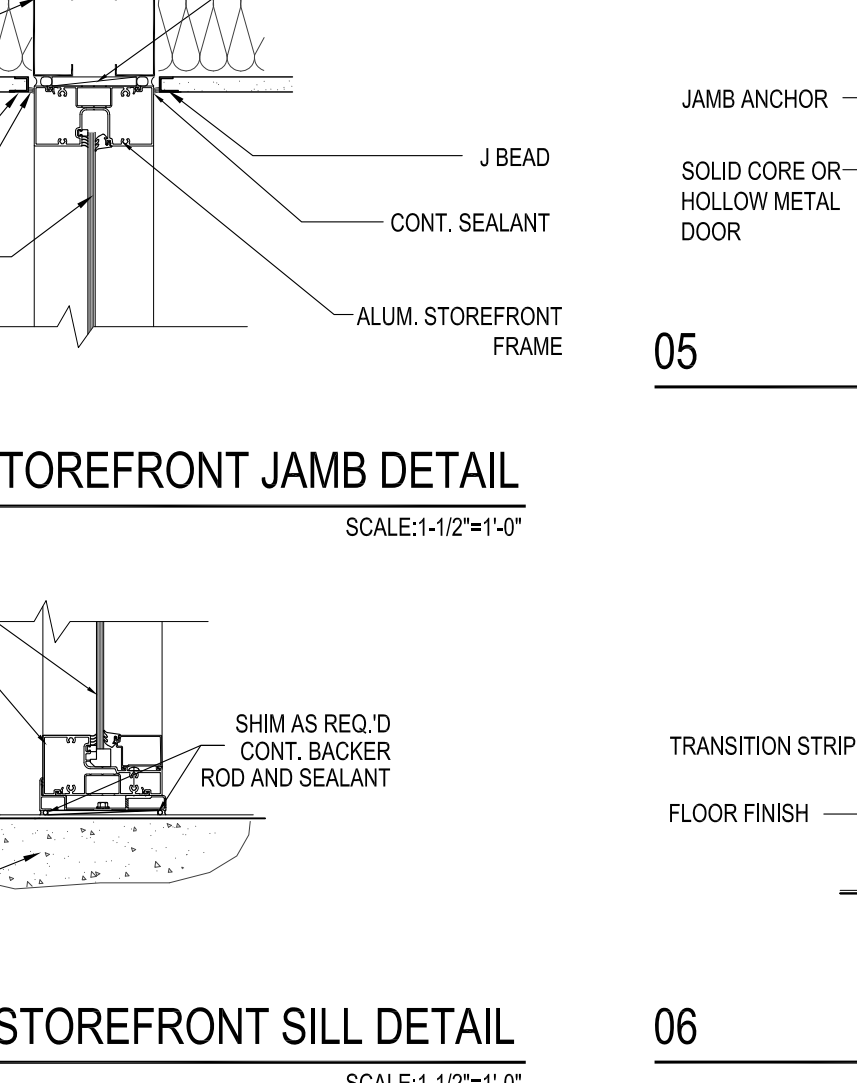
W1A WALL TYPE
SCALE: 1/2" = 1'-0"



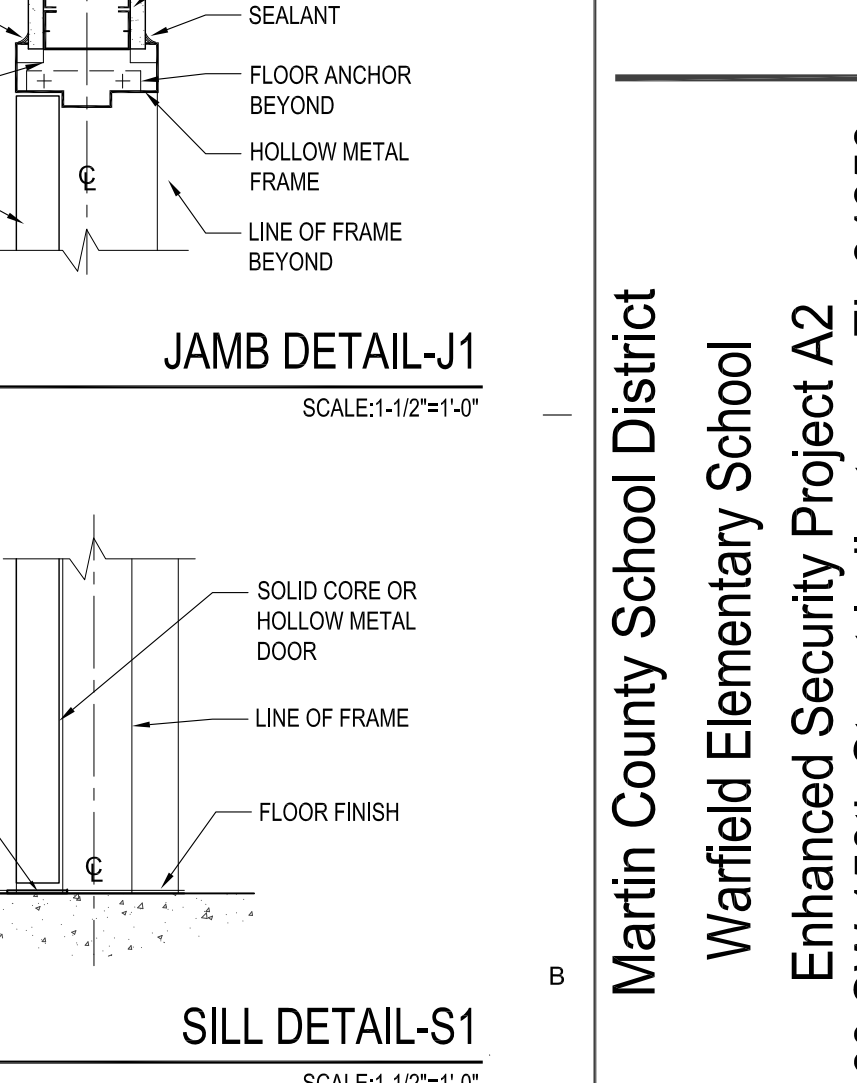
11 STOREFRONT DETAIL-H2
SCALE: 1-1/2" = 1'-0"



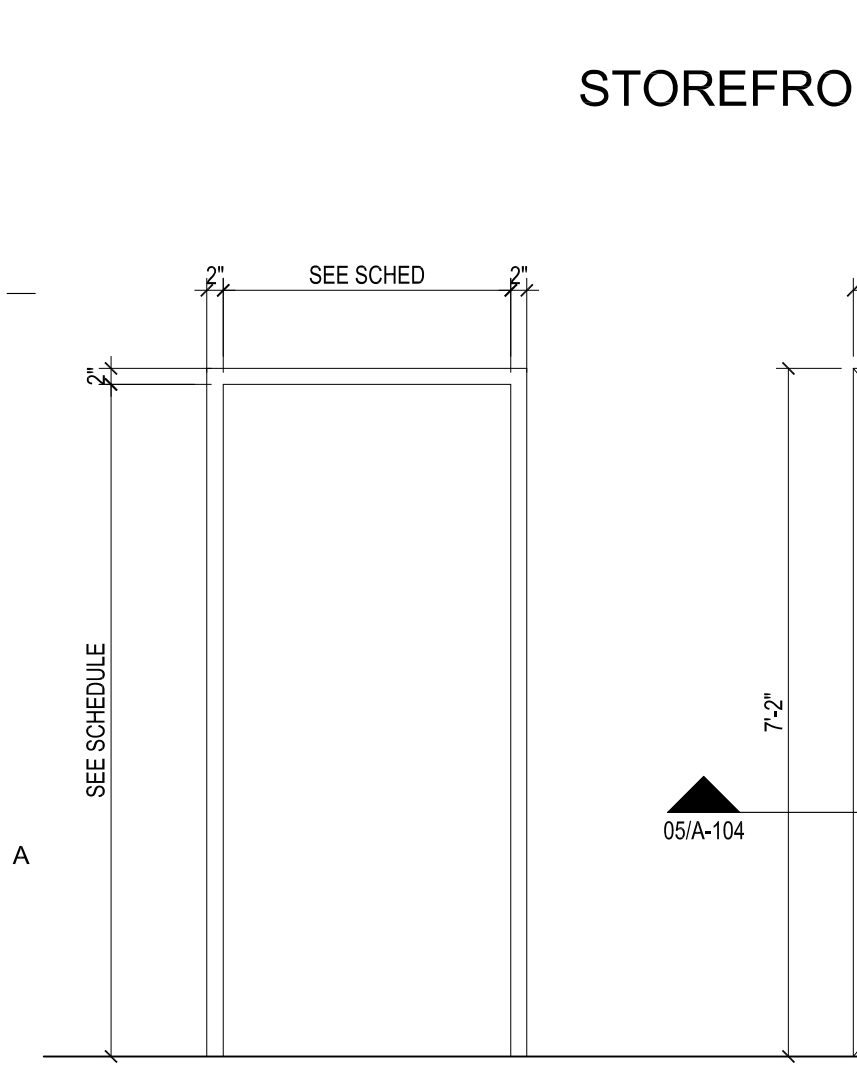
08 STOREFRONT HEAD DETAIL
SCALE: 1-1/2" = 1'-0"



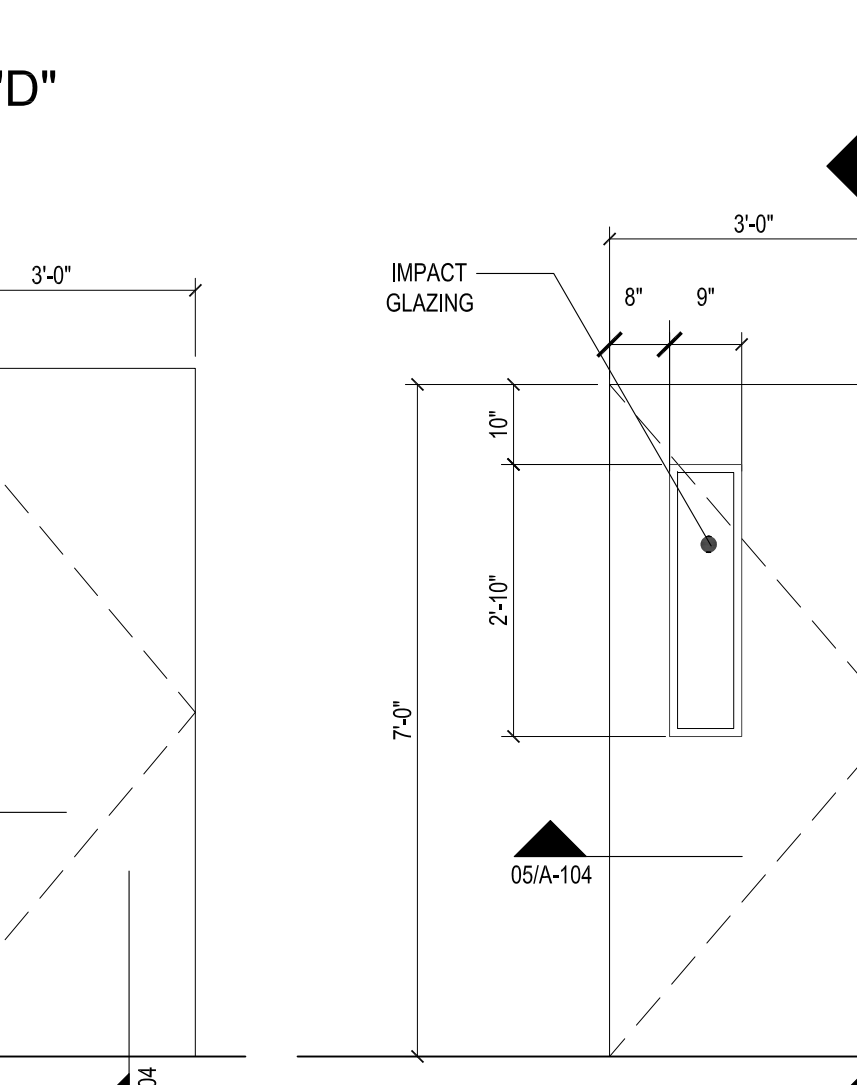
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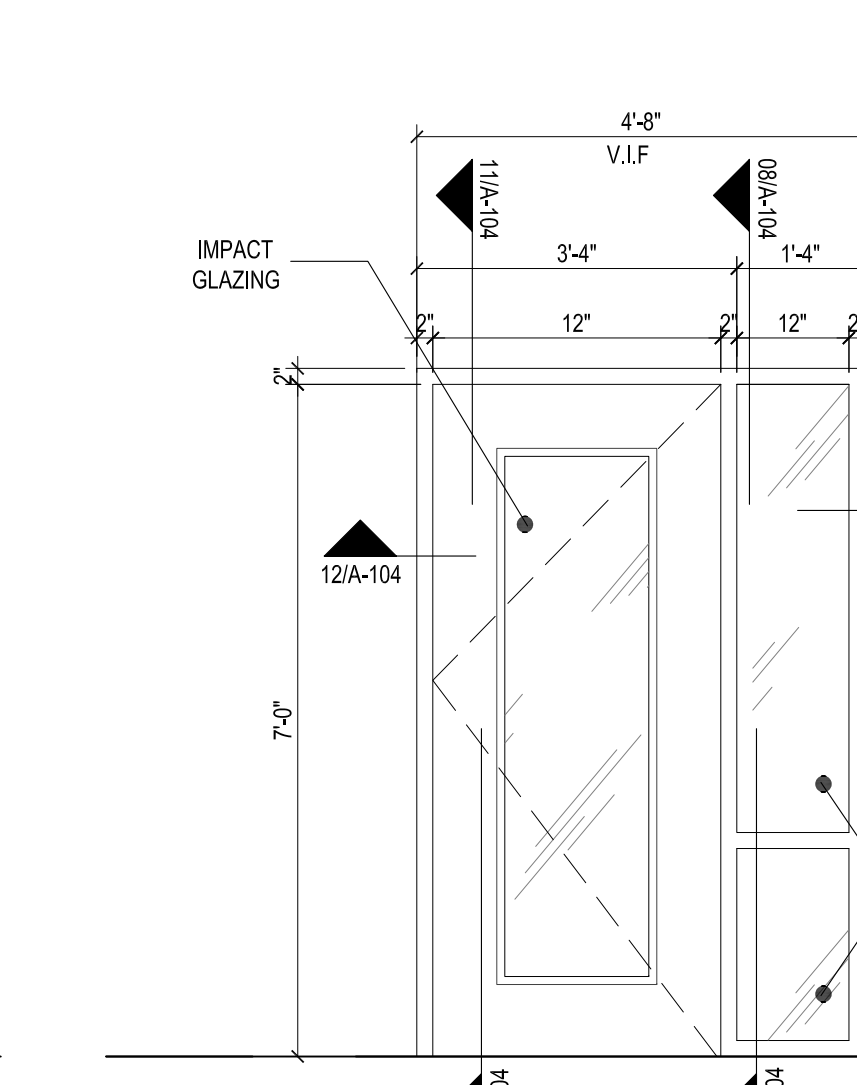
12 STOREFRONT DETAIL-J2
SCALE: 1-1/2" = 1'-0"



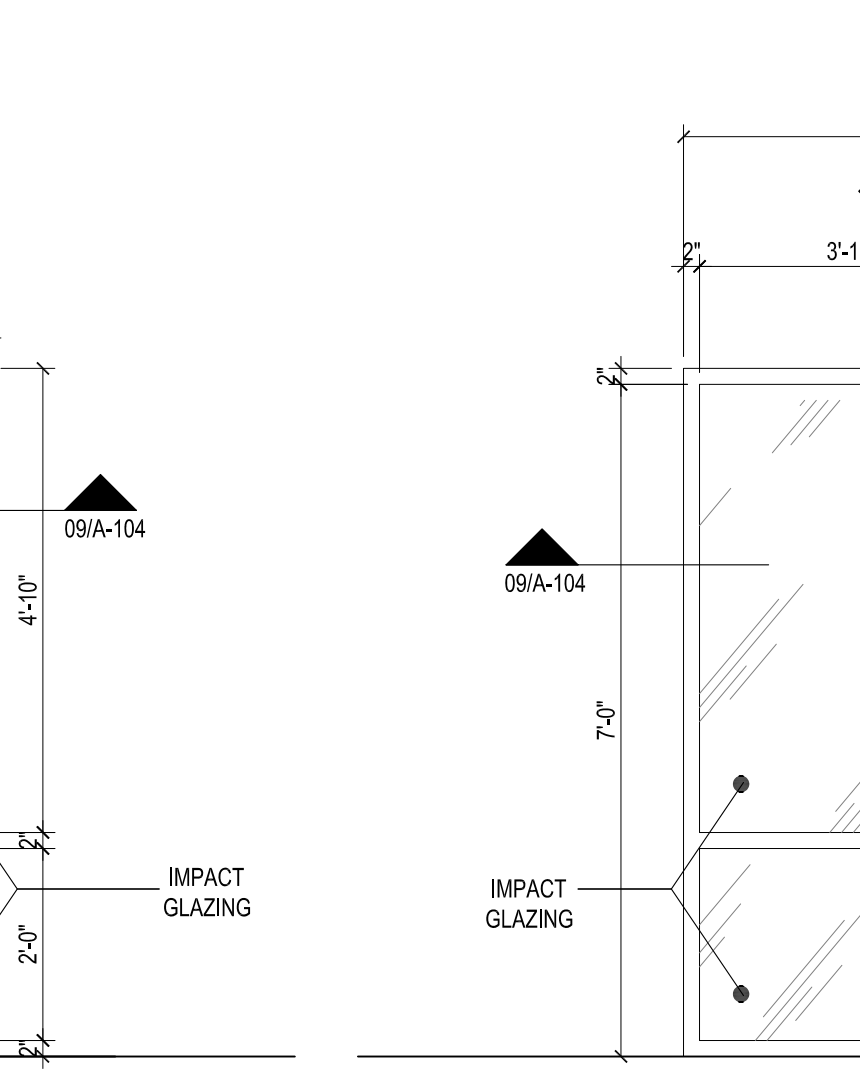
09 STOREFRONT JAMB DETAIL
SCALE: 1-1/2" = 1'-0"



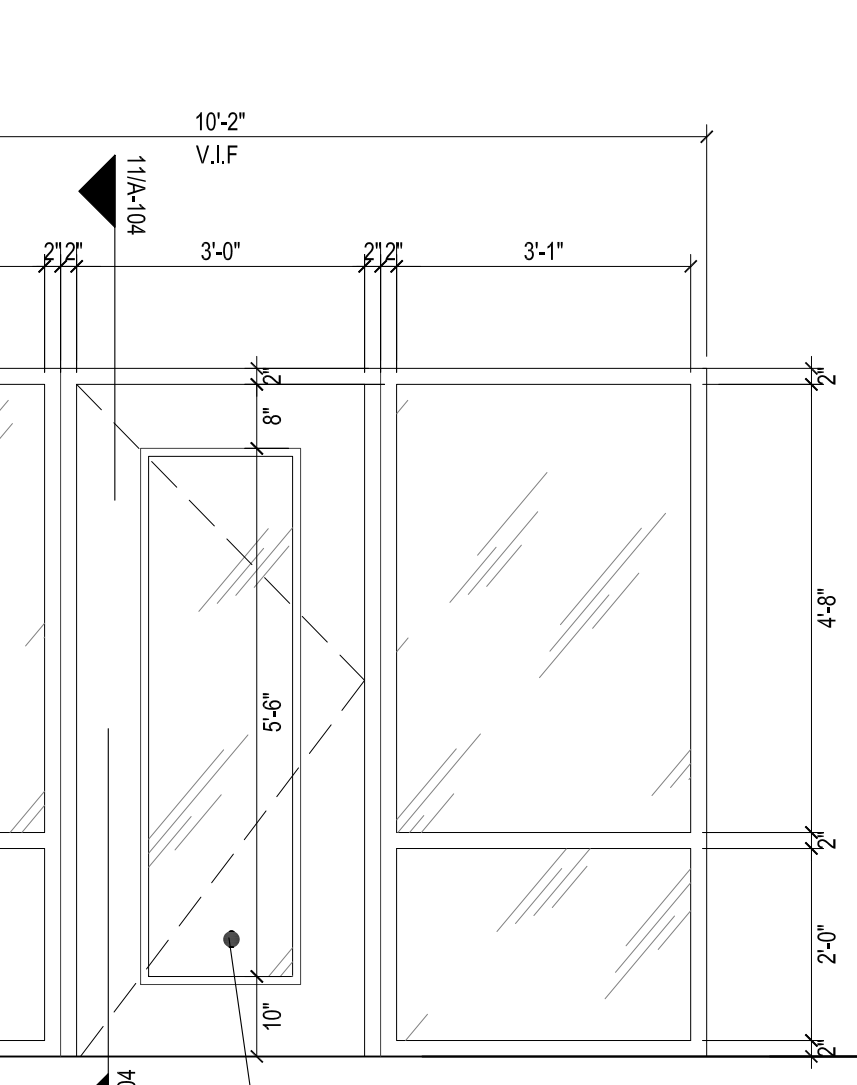
10 STOREFRONT SILL DETAIL
SCALE: 1-1/2" = 1'-0"



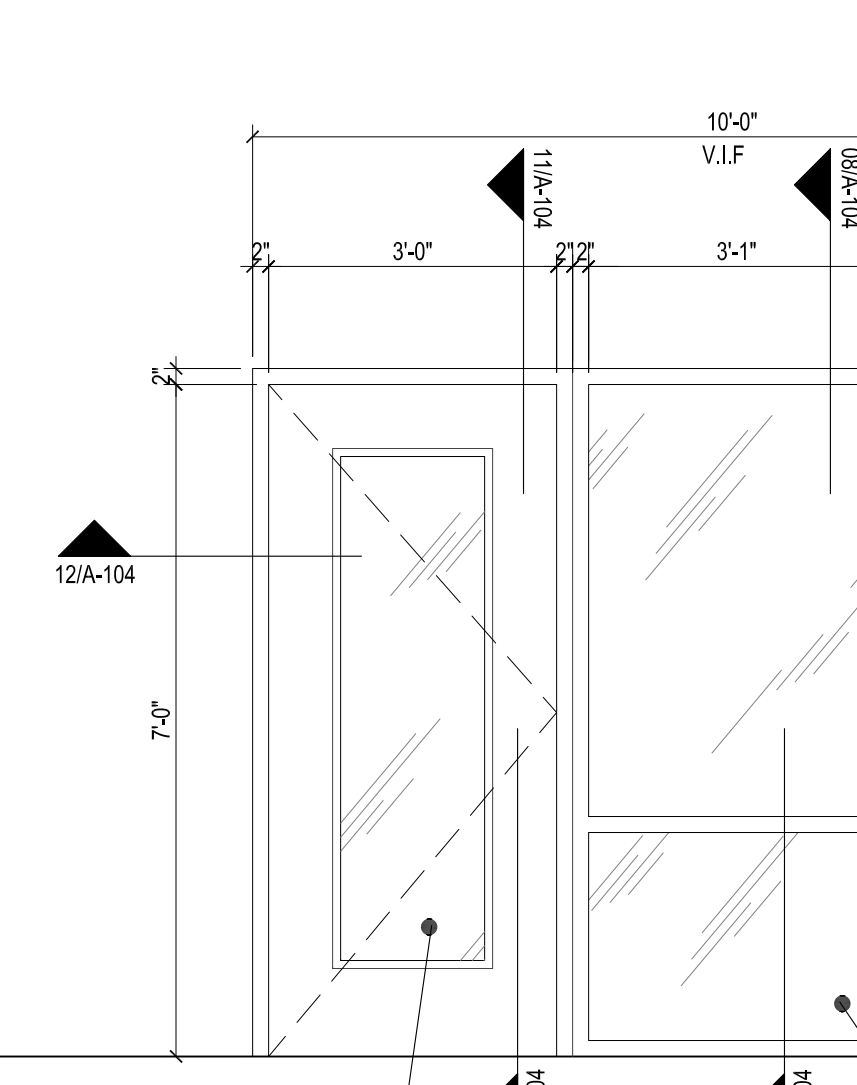
13 STOREFRONT DETAIL-S2
SCALE: 1-1/2" = 1'-0"



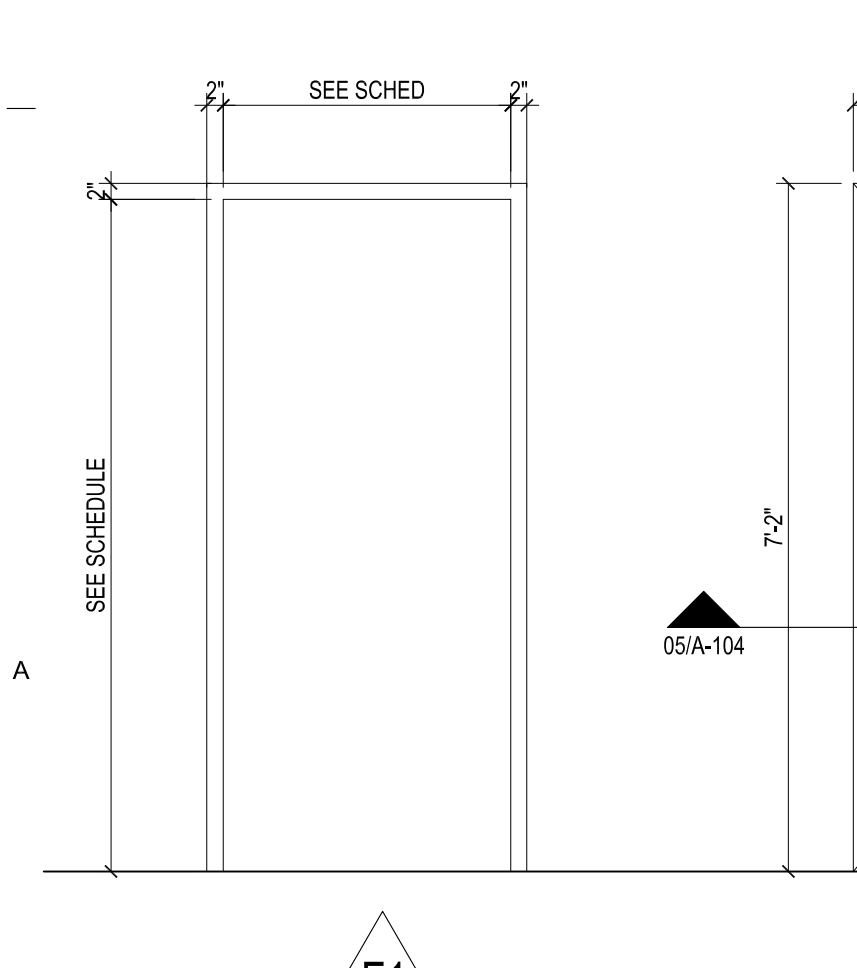
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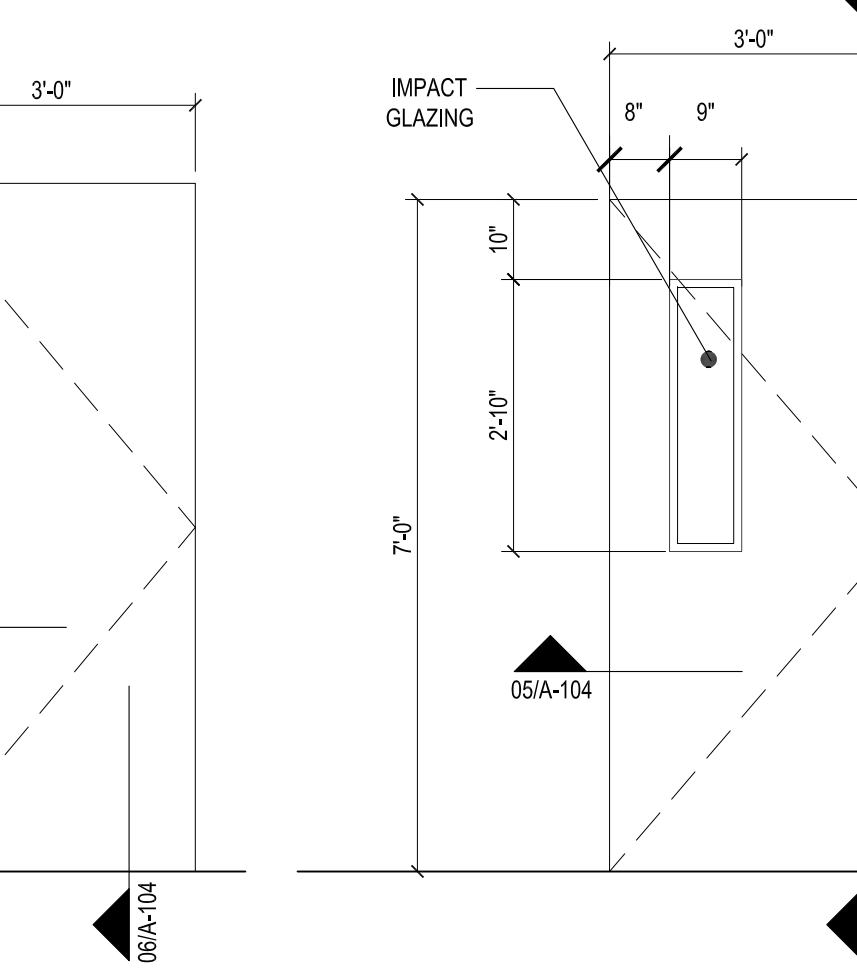
06 SILL DETAIL-S1
SCALE: 1-1/2" = 1'-0"



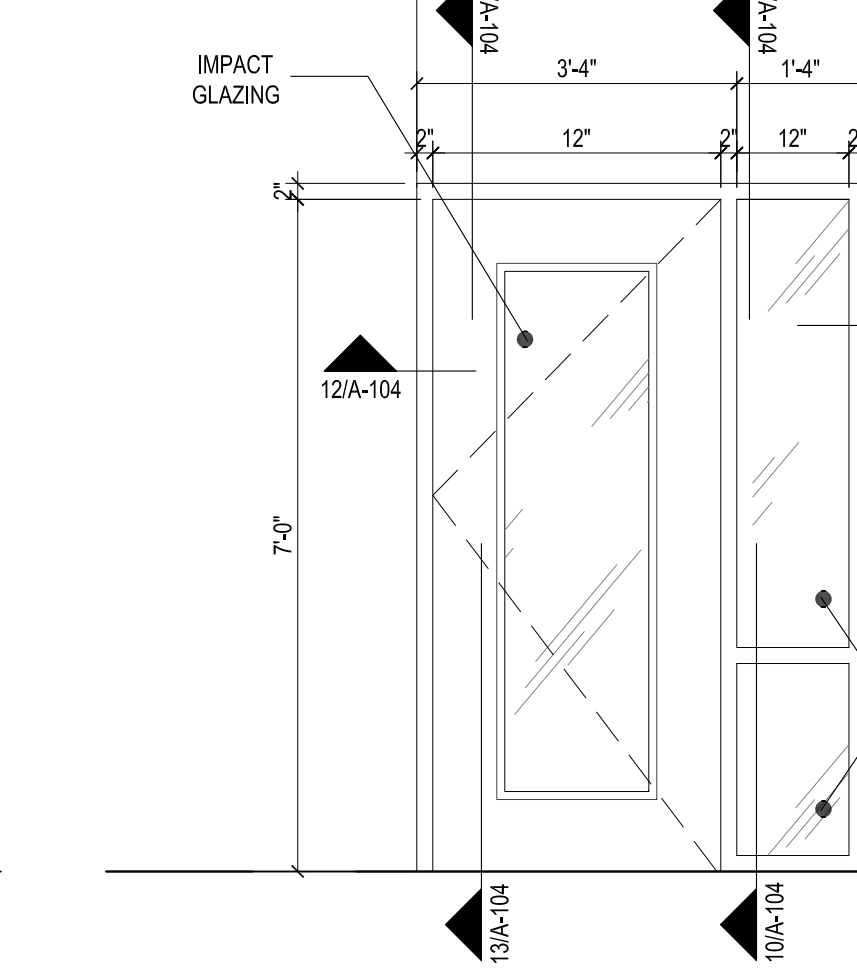
STOREFRONT "D"



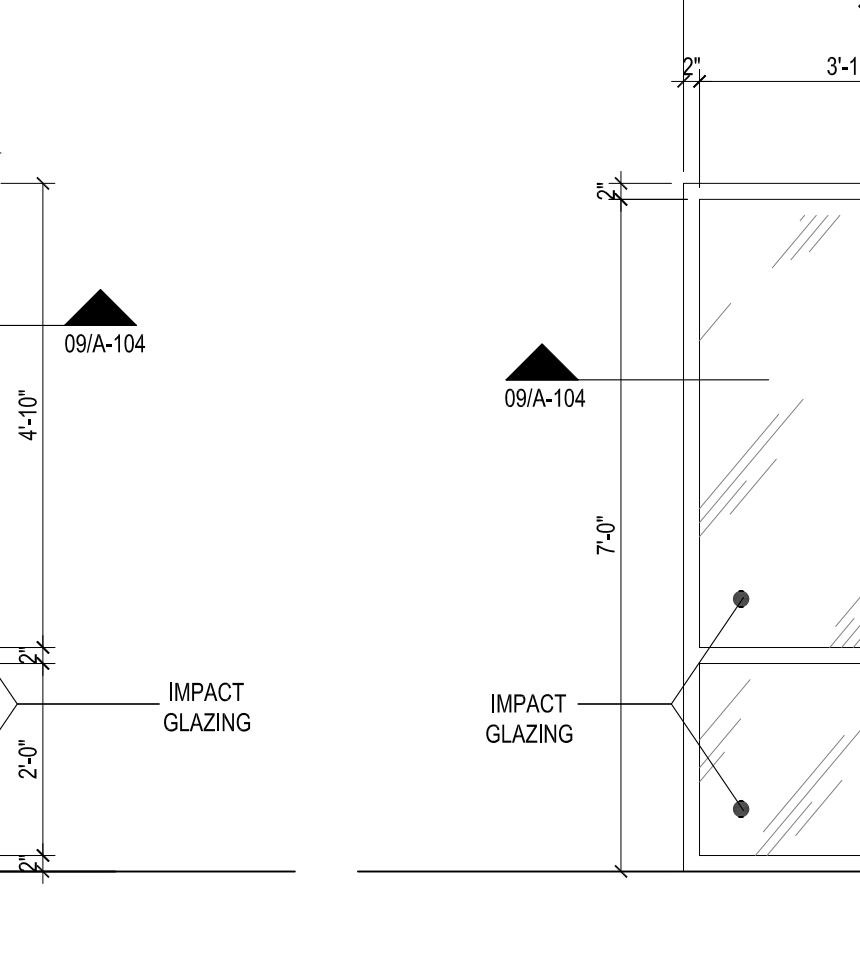
STOREFRONT "A"



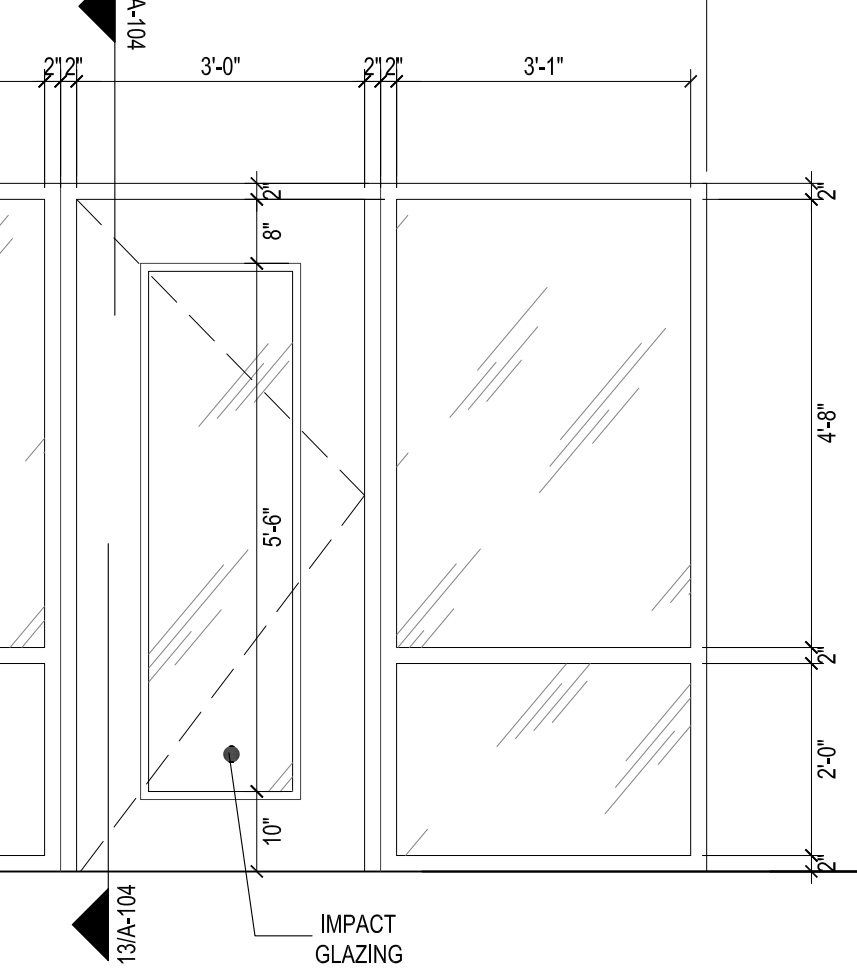
STOREFRONT "B"



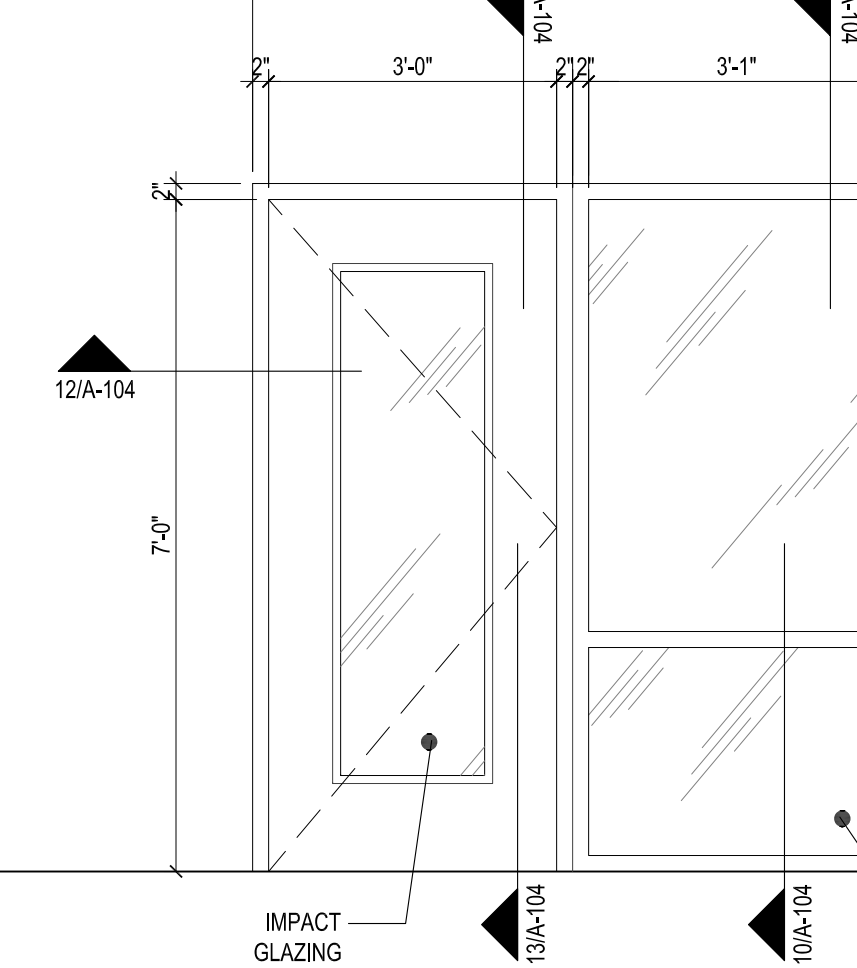
STOREFRONT "A"



STOREFRONT "B"



STOREFRONT "C"



HARVARD JOLLY ARCHITECTURE
2047 Vista Parkway, Suite 100 West Palm Beach, FL 33411 | 561-478-4457 | www.harvardjolly.com | AAC000119

Martin County School District
Warfield Elementary School
Enhanced Security Project A2
15260 SW 150th Street Indiantown, FL 34956
Permit Documents Submittal

Comm. No: 16025.21
Date: 07/30/2020
Drawn: ER

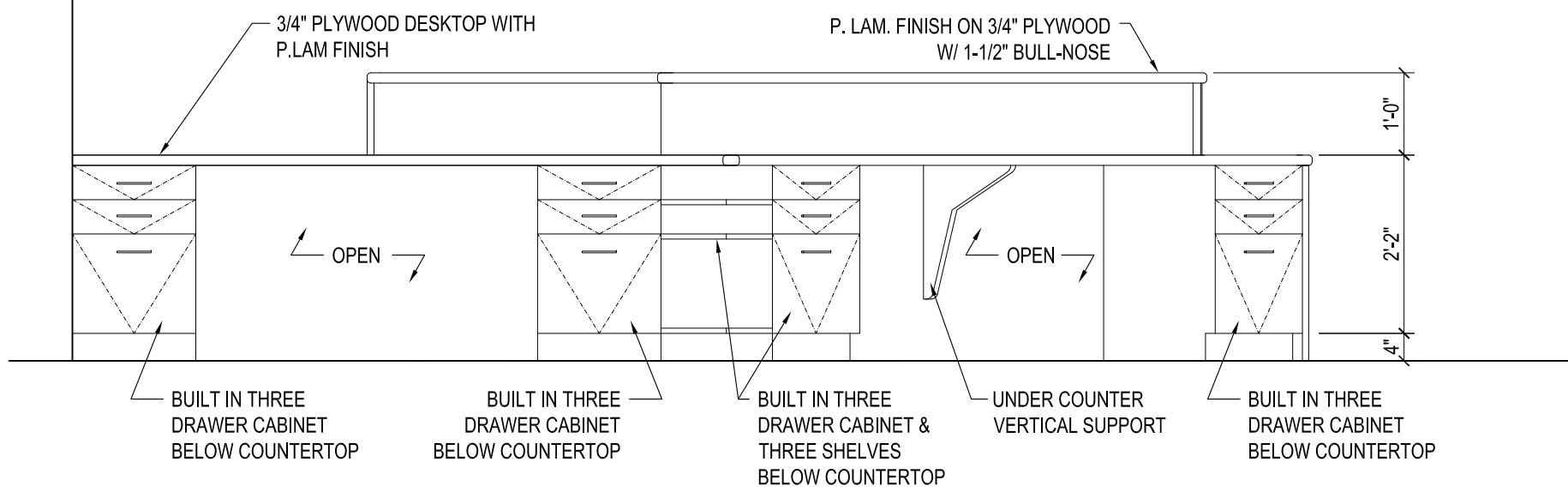
Revisions		
No.	Date	Note

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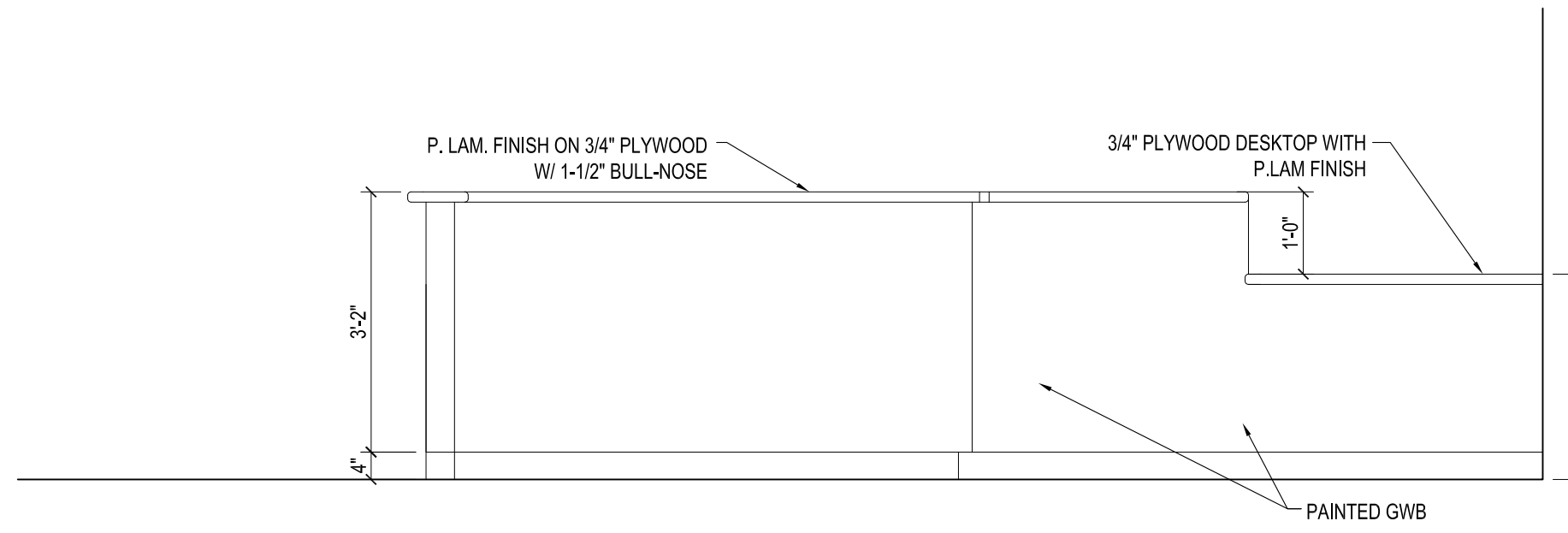
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ELEVATIONS, SECTIONS & DETAILS

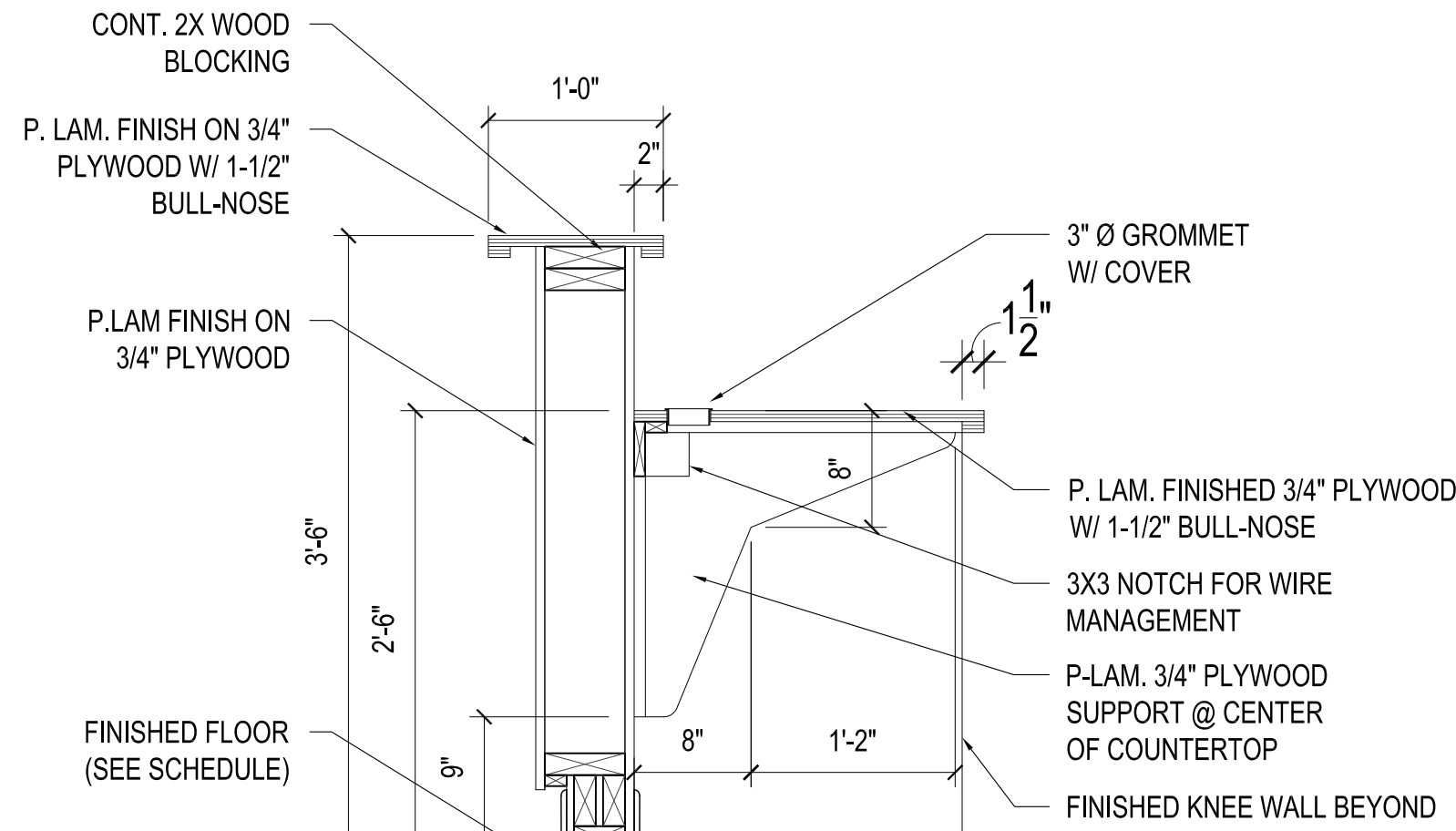
A-104



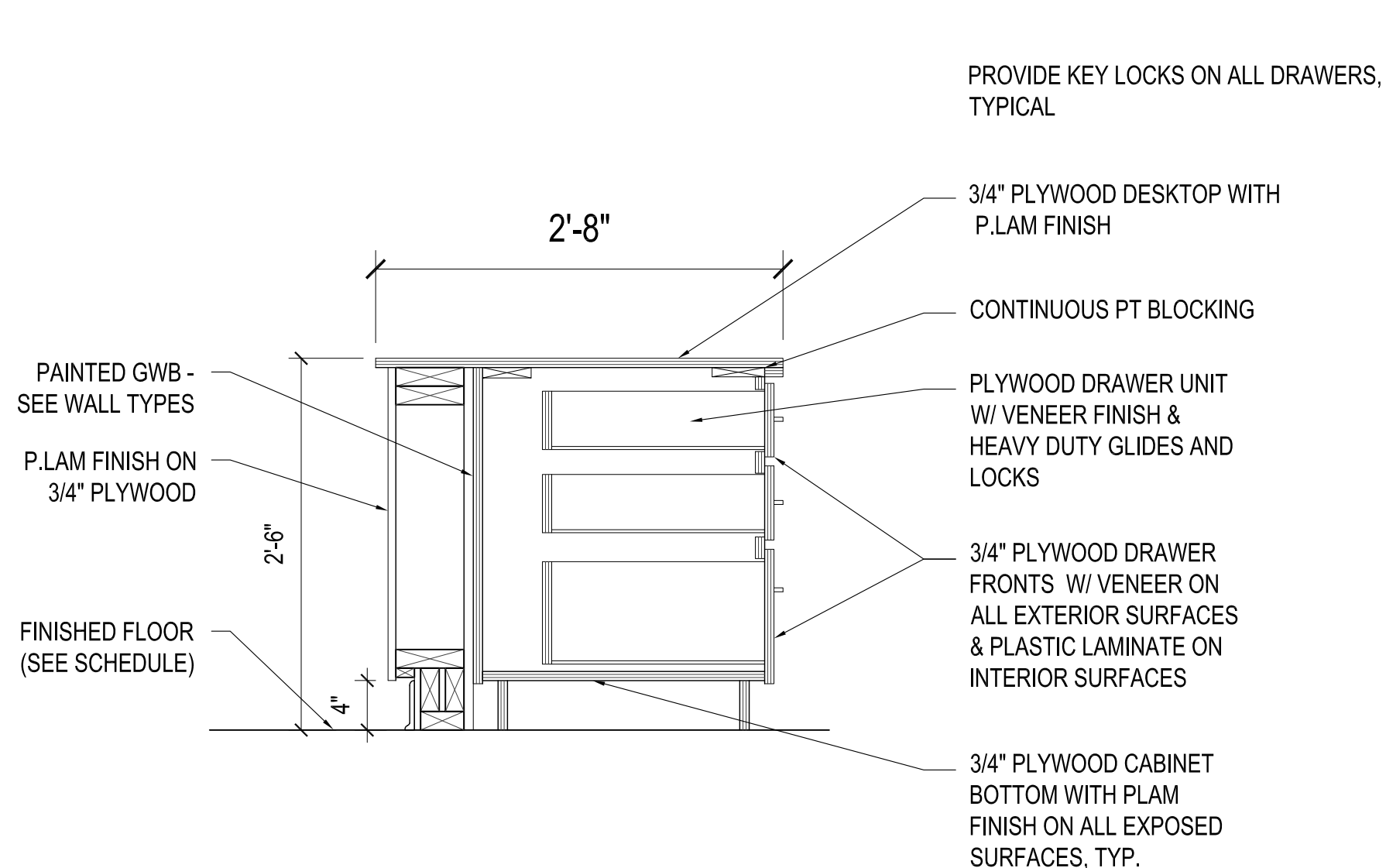
07 CASEWORK ELEVATION
SCALE: 1/2" = 1'-0"



06 CASEWORK ELEVATION
SCALE: 1/2" = 1'-0"



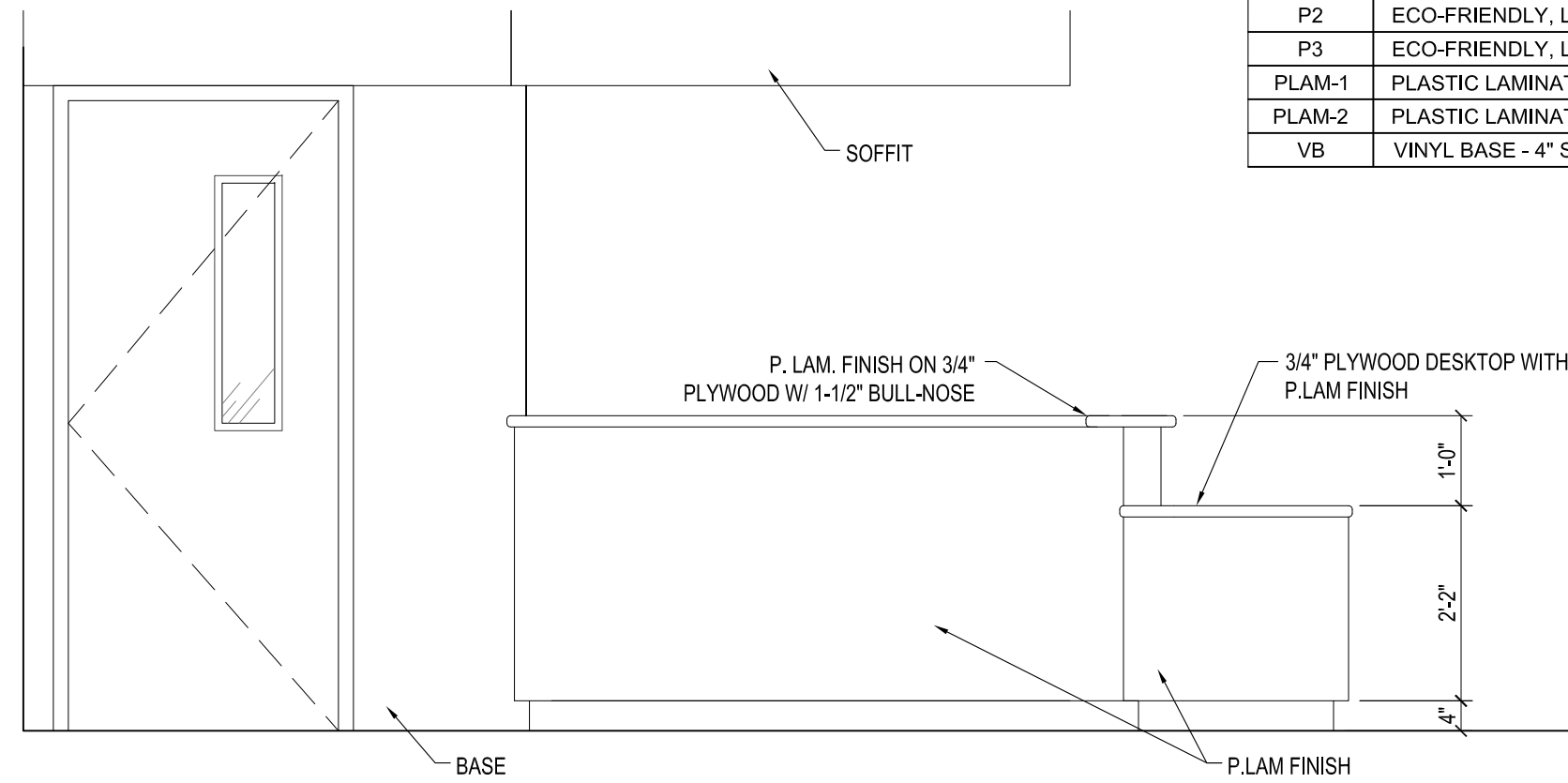
04 CASEWORK DETAIL
SCALE: 1" = 1'-0"



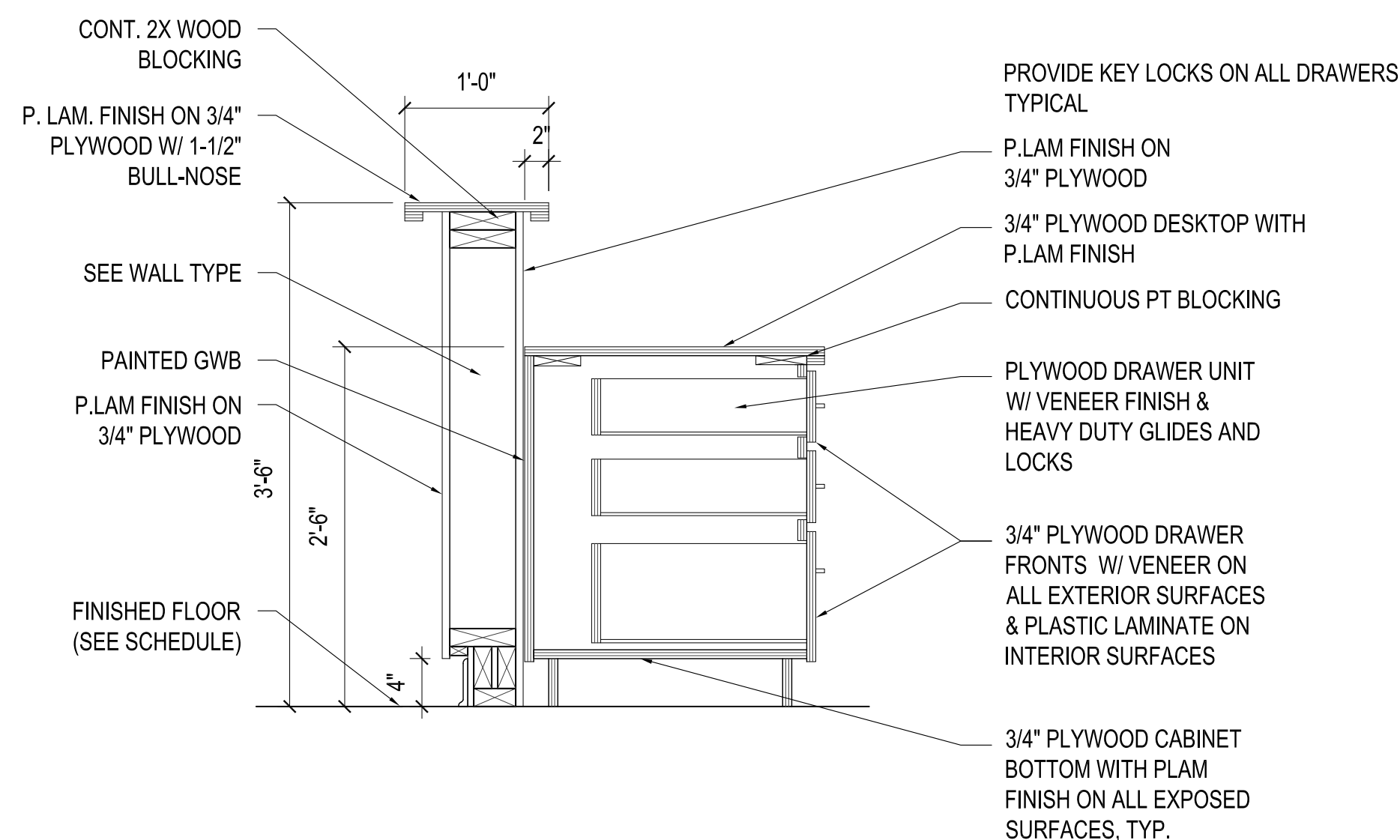
03 CASEWORK DETAIL
SCALE: 1" = 1'-0"

FINISH GENERAL NOTES

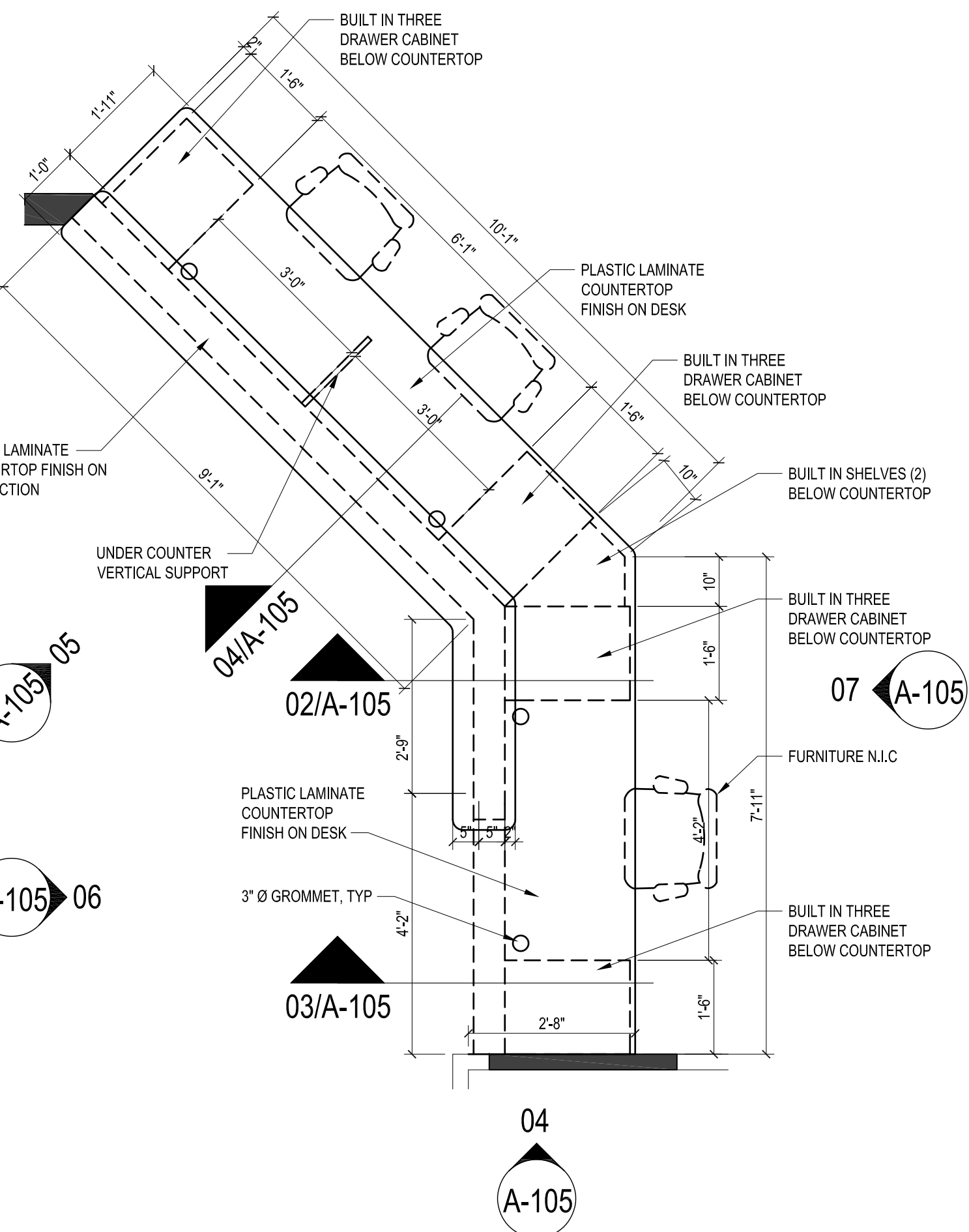
- GENERAL CONTRACTOR SHALL PREPARE SUBMITTALS OF ALL INTERIOR FINISHES FOR APPROVAL BY ARCHITECT PRIOR TO APPLICATION. SAMPLES SHALL OBTAINED AND SUBMITTED IN A TIMELY MANNER.
- ALL WALLS SHALL BE PROPERLY PREPARED, SPACKLED, SANDED, ETC. TO PROVIDE A LEVEL 4 SMOOTH FINISH AND SURFACE.
- UPON COMPLETION OF PAINTING, CONTRACTOR SHALL REMOVE ALL PAINT FROM SURFACES WHERE IT WAS SPILLED, SPLASHED, SPLATTERED INCLUDING SWITCH AND OUTLET PLATES, BASE AND HARDWARE.
- GENERAL CONTRACTOR SHALL PROVIDE FLOOR SURFACES THAT ARE INSTALLED FLUSH AND EVEN. ALL ADJACENT FLOOR AREAS ARE TO HAVE SMOOTH LEVEL TRANSITION SURFACES. ALL DOORS AND SILL TRANSITIONS SHALL BE TAKEN INTO CONSIDERATION PRIOR TO INSTALLATION.
- FLOORING CONTRACTOR SHALL ADJUST ALL TILE LAYOUTS PER ACTUAL BUILD OUT CONDITIONS. MITER ALL INSIDE AND OUTSIDE CORNER EDGES OF ALL WALL BASE INCLUDING DIFFERENT BASE MATERIALS.
- FLOORING CONTRACTOR TO FURNISH AND INSTALL FLOOR TRANSITION MATERIAL WHICH SHALL BE METAL SCHLUTER STRIPS UNLESS OTHERWISE NOTED. FINISH TO BE SATIN STAINLESS. FIELD CONDITIONS TO BE VERIFIED BEFORE ORDERING APPROPRIATE PROFILES. MULTIPLE PROFILES MAY BE REQUIRED. TRANSITION MATERIAL REQUIRED AT EACH CHANGE OF FLOORING HEIGHT. CHANGE IN LVT TO TILE MATERIAL AT DOORWAYS WILL REQUIRE TRANSITION STRIPS.
- GENERAL CONTRACTOR TO PROVIDE NEW SIGNAGE AT EACH ROOM/SPACE AS REQUIRED. SEE SPECIFICATIONS FOR ADDITIONAL INFORMATION AND CRITERIA.



05 CASEWORK ELEVATION
SCALE: 1/2" = 1'-0"



02 CASEWORK DETAIL
SCALE: 1" = 1'-0"



01 ENLARGED RECEPTION DESK PLAN
SCALE: 1/2" = 1'-0"

STOREFRONT SCHEDULE										
TYPE	STORE FRONT SIZE			FRAME		HEAD	JAMB	SILL	HDW GROUP	NOTES
	WD	HGT	THK	MATL	MATL					
A	4'-8"	7'-0"	1 3/4"	ALUM	ALUM	H2	J2	S2	2	CARD READER
B	10'-2"	7'-0"	1 3/4"	ALUM	ALUM	H2	J2	S2	3	PROVIDE ELECTRIC STRIKE RELEASE; PANIC HARDWARE; CARD READER
C	10'-0"	7'-0"	1 3/4"	ALUM	ALUM	H2	J2	S2	3	PROVIDE ELECTRIC STRIKE RELEASE; CARD READER
D	16'-1"	3'-8"	1 3/4"	ALUM	ALUM	H2	J2	S2	3	

DOOR SCHEDULE											
NUMBER	TYPE	DOOR SIZE			FRAME		HEAD	JAMB	SILL	HDW GROUP	NOTES
		WD	HGT	THK	MATL	MATL					
1-64A	B	3'-0"	7'-0"	1 3/4"	SC	F1	HM	H1	J1	S1	FINISH TO MATCH EXISTING DOORS
1-66	B	3'-6"	7'-0"	1 3/4"	SC	F1	HM	H1	J1	S1	FINISH TO MATCH EXISTING DOORS
1-67	B	3'-0"	7'-0"	1 3/4"	SC	F1	HM	H1	J1	S1	FINISH TO MATCH EXISTING DOORS
1-62	A	3'-0"	3'-6"	1 3/4"	SC	F1	HM	--	J1	S1	FINISH TO MATCH EXISTING DOORS
1-63E	EXIST	EXIST	EXIST	EXIST	EXIST	EXIST	EXIST	EXIST	EXIST	EXIST	CARD READER

ROOM FINISH SCHEDULE									COMMENTS
RM NO	ROOM NAME	BASE MAT.	FLOOR MAT.	WALL FINISHES				CEILING MAT.	
				NORTH	SOUTH	EAST	WEST		
52	OFFICE	VB	LVT	P1	P1	P1	P1	EXIST	
53	PRINCIPAL OFFICE	VB	LVT	P1	P1	P1	P1	EXIST	
54A	IPS OFFICE	VB	LVT	P1	P1	P1	P1	ACT-1	
54	ASSISTANT PRINCIPAL	VB	LVT	P1	P1	P1	P1	ACT-1	
55	CONFERENCE	VB	LVT	P1	P1	P1	P1	EXIST	
56	CLINIC	VB	LVT	P1	P1	P1	P1	EXIST	
56D	STORAGE	VB	LVT	P1	P1	P1	P1	EXIST	
57	ASSISTANT PRINCIPAL	VB	LVT	P1	P1	P1	P1	EXIST	
58	SECRETARIAL SPACE	VB	LVT	P1	P1	P1	P1	EXIST	
59	OFFICE	VB	LVT	P1	P1	P1	P1	EXIST	
62	RECEPTION AREA	VB	LVT	P2	P1	P2	P1	ACT-1	
62B	ADMINISTRATION	VB	LVT	P1	P2	P2	P1	ACT-1	
63	VESTIBULE	VB	LVT	P1	P1	P2	P1	ACT-1	
--	CORRIDOR	VB	LVT	P1	P1	P1	P1	EXIST	

- NOTES:
- CONFIRM ALL FINISH MATERIALS WITH OWNER PRIOR TO INSTALLATION, INCLUDING BUT NOT LIMITED TO FLOORING, WALL TILE, WALL BASE, COUNTERTOPS, ETC. PROVIDE SAMPLES FOR APPROVAL.
 - PAINT TO BE APPLIED AS FOLLOWS: ONE (1) COAT OF PRIMER AND TWO (2) COATS OF FINISH PAINT, LATEX (EGG SHELL FINISH) FOR ALL AREAS.
 - CONTRACTOR TO PROVIDE WALL BACKING FOR WALL MOUNTED FIXTURES AND MILLWORK.
 - CONTRACTOR TO REMOVE ANY EXISTING OBSTRUCTIONS IN THE FLOOR AND PATCH TO MATCH EXISTING. PREP. FLOOR FOR NEW FLOOR FINISHES.
 - CONTRACTOR TO PROVIDE ADA COMPLIANT FLOORING TRANSITIONS AT THE CENTER OF ALL DOOR OPENINGS WHERE DIFFERING FLOORING MATERIALS MEET.
 - TEMPORARILY REMOVE EXISTING FIXTURES/ ITEMS OFF OF THE WALLS TO PAINT WALLS COMPLETELY. CONTRACTOR SHALL THEN REPLACE ITEMS BACK IN THE ORIGINAL LOCATIONS. COORDINATE W/ OWNER.
 - SEE FLOOR PLAN FOR WALL PAINT LOCATIONS.

ROOM FINISH LEGEND	
CODE	ITEM
ACT-1	ACOUSTICAL CEILING TILE - 24" x 24" TEGULAR WHITE - ARMSTRONG ULTIMA TEGULAR; 1894; USE WITH ARMSTRONG PRELUDE XL15/16" EXPOSED TEE SYSTEMS; SEE SPECIFICATIONS
EXIST	EXISTING TO REMAIN
LVT	LUXURY VINYL TILE - COBALT SURFACES; TANGENT COLLECTION; COLOR: CHARCOAL; SKU: T20-600; 7"x48" 2.5 MM 20 MIL PLANK
P1	ECO-FRIENDLY, LOW VOC PAINT; FIELD COLOR SHERWIN WILLIAMS SW 6763 RETIRING BLUE; EGG-SHELL FINISH
P2	ECO-FRIENDLY, LOW VOC PAINT; ACCENT COLOR SHERWIN WILLIAMS SW 6766 MARINER; EGG-SHELL FINISH
P3	ECO-FRIENDLY, LOW VOC PAINT; DOOR FRAME COLOR SHERWIN WILLIAMS SW 7004 SNOWBOUND; EGG-SHELL FINISH
PLAM-1	PLASTIC LAMINATE VERTICAL SURFACES - FORMICA NEUTRAL TWILL MATTE FINISH 8826-58
PLAM-2	PLASTIC LAMINATE COUNTERTOP SURFACES - FORMICA FOG MATTE FINISH 961-58
VB	VINYL BASE - 4" STANDARD BASE - TARKETT 63 BURNT UMBER

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Date: 07/30/2020
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Revisions		
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Daniel T Canavan, AIA
Florida License #AR10250
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CASEWORK, DETAILS & SCHEDULES

A-105

ELECTRICAL SYMBOL LEGEND	
	GROUND TYPE SINGLE RECEPTACLE 120V-20A. +18" AFF UNLESS NOTED OTHERWISE
	GROUND TYPE DUPLEX RECEPTACLE 120V-20A. +18" AFF UNLESS NOTED OTHERWISE
	GROUND TYPE DUPLEX RECEPTACLE 120V-20A. MOUNT ABOVE COUNTER OR AT HEIGHT NOTED.
	GROUND TYPE DUPLEX RECEPTACLE 120V-20A. WITH INTEGRAL GROUND FAULT INTERRUPT PROTECTION.
	RECEPTACLE 120V-20A. MOUNT 18" AFF UNLESS OTHERWISE NOTED.
	TAMPER RESISTANT GROUND TYPE DUPLEX RECEPTACLE 120V-20A. MOUNT 18" AFF UNLESS OTHERWISE NOTED.
	GROUND TYPE DUPLEX RECEPTACLE 120V-20A. WITH BLUE FACE AND COVER. MOUNT 18" AFF UNLESS OTHERWISE NOTED.
	GROUND TYPE DOUBLE DUPLEX RECEPTACLE 120V-20A. MOUNT IN TWO GANG OUTLET BOX 18" AFF UNLESS OTHERWISE NOTED.
	TAMPER RESISTANT GROUND TYPE DOUBLE DUPLEX RECEPTACLE 120V-20A. MOUNT IN TWO GANG OUTLET BOX 18" AFF UNLESS OTHERWISE NOTED.
	GROUND TYPE DUPLEX RECEPTACLE 120V-20A. MOUNT IN FLUSH FLOOR BOX.
	120V SPECIAL PURPOSE OUTLET (SUFFIX INDICATES AMPS)
	3 WIRE 18 OR 4 WIRE 30 SPECIAL PURPOSE OUTLET (SUFFIX INDICATES AMPS)
	TRANSFORMER - SEE SCHEDULE FOR RATING
	DISCONNECT SWITCH SEE SCHEDULE FOR RATING
	120/208V PANELBOARD
	277/480V PANELBOARD
	CELL BOOSTER ACCESS POINT
	CELL BOOSTER ANTENNA
	PATCH PANEL - (DEDICATED FOR CCTV)
	NETWORK VIDEO RECORDER
	POWER OVER ETHERNET
	WIRELESS ACCESS POINT
	SECURED ACCESS DOOR
	SECURITY - KEYPAD (ALARM COMMAND CENTER)
	SECURITY - DOOR CONTACT
	INDICATES "TELECOM/POWER" POWER POLE
	CARD READER
	VIDEO INTERCOM
	LIGHT SWITCH WITH OCCUPANCY/VACANCY SENSOR - DUAL TECHNOLOGY
	DIMMER SWITCH WITH OCCUPANCY/VACANCY SENSOR - DUAL TECHNOLOGY
	EXIT LIGHT
	LIGHTING FIXTURE
	EMERGENCY WALL PACK WITH BACKUP BATTERY
	EQUIPMENT SCHEDULE NOTATION
	T.V. ANTENNA OUTLET
	T.V. ORIGINATION OUTLET
	JUNCTION PULL BOX
	SECURITY JUNCTION BOX
	VIDEO JUNCTION BOX
	CARD ACCESS JUNCTION BOX
	COMMUNICATIONS OUTLET
	BELL
	TELEPHONE OUTLET
	FIRE ALARM HORN/STROBE
	FIRE ALARM STROBE LIGHT ONLY
	FIRE ALARM PULL STATION
	COMBINATION FIXED TEMPERATURE AND RATE OF RISE HEAT DETECTOR
	CEILING MTD SMOKE DETECTOR (PHOTO ELECTRIC TYPE)
	DUCT MOUNTED SMOKE DETECTOR (PHOTO ELECTRIC TYPE)
	SMOKE DETECTOR REMOTE INDICATOR/RESET
	MAGNETIC DOOR HOLDER
	POST INDICATING VALVE SWITCH
	TAMPER SWITCH
	PRESSURE SWITCH
	FLOW SWITCH
	CLOCK
	MICROPHONE OUTLET - WALL MOUNTED
	PUBLIC ADDRESS/INTERCOM SPEAKER-CEILING
	PUBLIC ADDRESS/INTERCOM SPEAKER-WALL
	PUSH BUTTON STATION (ONE OR MORE BUTTONS) "P" INDICATES PRIVACY TYPE "K" INDICATES KEY-OPERATED
	CAMERA - SINGLE HEAD VIEW
	CAMERA - DOUBLE HEAD VIEW
	CAMERA - TRIPLE HEAD VIEW
	CAMERA - FOUR HEAD VIEW

HEIGHTS AND LOCATIONS:	
WALL BRACKET FIXTURES	7'-0" TO CENTER OF OUTLET
INTERCOM SPEAKERS	7'-0" TO CENTER
CLOCKS	7'-0" TO CENTER (IN GENERAL)
FIRE ALARM HORN/STROBES AND STROBES	6'-8" TO CENTER
PANELBOARDS	6'-0" TO TOP
LIGHTING SWITCHES	42" TO CENTER
FIRE ALARM PULL STATIONS	42" TO CENTER
WALL MOUNTED TELEPHONE	42" TO CENTER
INTERCOM CALL BACK	42" TO CENTER
RECEPTACLES	18" TO CENTER
BROADBAND TV OUTLETS	18" TO CENTER OR 6'-8" TO CENTER (MIP)
TELEPHONE OUTLETS	18" TO CENTER
OTHER DEVICES	18" TO CENTER
COORDINATE ALL DEVICE LOCATIONS WITH ARCHITECTURAL ELEVATIONS PRIOR TO ROUGH-IN.	

GENERAL ELECTRICAL NOTES	
1.	ALL ELECTRICAL WORK SHALL COMPLY WITH NATIONAL ELECTRICAL CODE, THE NATIONAL FIRE CODES, THE AMERICANS WITH DISABILITIES ACT, AND THE FLORIDA BUILDING CODE.
2.	THE CONTRACTOR SHALL THOROUGHLY REVIEW THE PROJECT TO ENSURE THAT ALL WORK SHALL MEET OR EXCEED THE ABOVE REQUIREMENTS. ANY ALLEGED DISCREPANCIES SHALL BE BROUGHT TO THE ENGINEER'S ATTENTION PRIOR TO BID.
3.	THE CONTRACTOR IS DIRECTED TO OBTAIN COPIES OF ALL RELATED PLANS, SPECIFICATIONS, SHOP DRAWINGS AND ADDENDUM TO COORDINATE THE RELATED WORK AND SCHEDULING.
4.	THE CONTRACTOR IS REMINDED THAT ELECTRICAL SERVICE TO AND FOR MECHANICAL AND OTHER EQUIPMENT ARE BASED ON EQUIPMENT DESIGN DATA. THE VALUES MAY DIFFER DEPENDING UPON THE ACTUAL EQUIPMENT TO BE FURNISHED. ANY MODIFICATION TO THE ELECTRICAL, BASED UPON ACTUAL EQUIPMENT SELECTION, SHALL RESULT IN NO ADDITIONAL COST TO THE OWNER.
5.	THE CONTRACTOR SHALL THOROUGHLY REVIEW THE ARCHITECTURAL AND MECHANICAL PLANS TO ASSURE THAT ELECTRICAL SERVICE FOR ALL ITEMS AND/OR EQUIPMENT REQUIRING ELECTRICAL SERVICE IS INCLUDED. ANY ITEM AND/OR EQUIPMENT NOT PROVIDED WITH ELECTRICAL SERVICE, REQUIRING ELECTRICAL SERVICE, SHALL BE BROUGHT TO THE ENGINEER'S ATTENTION.
6.	MECHANICAL AND ELECTRICAL EQUIPMENT HAVE BEEN LOCATED AND ARRANGED TO MINIMIZE THE INTERFERENCES OF EQUIPMENT AND STRUCTURE. THE CONTRACTOR SHALL THOROUGHLY FAMILIARIZE HIMSELF WITH THE WORK TO BE PERFORMED BY OTHER TRADES AND THE PHYSICAL CHARACTERISTICS OF THE STRUCTURE IN ORDER TO SCHEDULE AND INSTALL EQUIPMENT AND TO MINIMIZE POSSIBLE INTERFERENCE. FAILURE TO PROPERLY COMMUNICATE AND SCHEDULE WORK WITH OTHER TRADES RESULTING IN ADDITIONAL WORK AND MATERIAL SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR. THE MODIFICATIONS REQUIRED TO RESOLVE THE CONFLICT SHALL BE DECIDED BY THE ENGINEER.
7.	ALL PANELBOARDS SHALL BE PROVIDED WITH A TYPED SCHEDULE SHOWING CIRCUIT NUMBERS AND A COMPLETE DESCRIPTION OF EACH CIRCUIT.
8.	MINIMUM TRADE SIZE CONDUIT PERMITTED SHALL BE 1/2 INCH UNLESS NOTED OTHERWISE.
9.	ALL CONDUCTOR METAL SHALL BE COPPER WITH 600 VOLT INSULATION TYPE THHN. (MINIMUM SIZE SHALL BE #12AWG.) CONTRACTOR SHALL ADJUST WIRE AND CONDUIT SIZES IF OTHER INSULATION TYPES ARE USED.
10.	ALL LIGHT SWITCHES AND DUPLEX RECEPTACLES SHALL BE RATED FOR 20 AMPERE AT 125/277 VOLTS A/C. WIRING DEVICES SHALL BE MANUFACTURED BY HUBBELL OR APPROVED EQUAL. PROVIDE BARRIERS AT 277V SWITCHES WHERE REQUIRED BY N.E.C. ARTICLE 404-8(b).
11.	ALL ELECTRICAL WIRING DEVICES INDICATED TO BE INSTALLED IN MASONRY WALLS OR FLOORS SHALL BE FLUSH MOUNTED, INCLUDING BRANCH CIRCUIT PANELBOARDS, UNLESS OTHERWISE NOTED. THE CONDUITS TO ASSOCIATED ELECTRICAL EQUIPMENT SHALL BE CONCEALED IN WALLS OR FLOOR.
12.	ALL CONDUIT RUNS SHALL BE CONCEALED UNLESS SPECIFICALLY NOTED OTHERWISE.
13.	THE FIXTURE SCHEDULE IS FOR REFERENCE ONLY. MODEL NUMBERS LISTED MAY NOT INCLUDE ALL REQUIRED OPTIONS. REFER TO SPECIFICATIONS FOR ADDITIONAL INFORMATION. EQUAL FIXTURES OF OTHER MANUFACTURERS MAY BE SUBSTITUTED AS EQUAL. ALL SUBSTITUTIONS ARE SUBJECT TO APPROVAL AS EQUAL BY THE ENGINEER.
14.	ALL EXIT LIGHTS SHALL BE PROVIDED WITH UNIVERSAL MOUNTING BRACKETS. THE CONTRACTOR SHALL VERIFY ALL DIRECTIONAL ARROWS PRIOR TO ORDERING FIXTURES.
15.	THE CONTRACTOR SHALL FURNISH THE AIR CONDITIONING SUBCONTRACTOR AND THE CEILING SUBCONTRACTOR COPIES OF APPROVED LIGHT FIXTURE SHOP DRAWINGS.
16.	ALL RECESSED LIGHTING FIXTURES IN FIRE RATED CEILINGS SHALL BE TENTED TO COMPLY WITH THE APPLICABLE CEILING RATING. THE CONTRACTOR SHALL VERIFY REQUIREMENTS.
17.	THE CONTRACTOR SHALL COORDINATE WITH THE MECHANICAL SUBCONTRACTOR TO ENSURE THAT ALL NECESSARY CONDUITS FOR AIR CONDITIONING CONTROLS ARE INCLUDED. IT IS THE ELECTRICAL SUBCONTRACTOR'S RESPONSIBILITY TO ENSURE THAT ALL EQUIPMENT IS WIRED PROPERLY AND ALL CONTROLS ARE OPERATIONAL. THE ELECTRICAL SUBCONTRACTOR SHALL FURNISH ALL MATERIALS NOT SUPPLIED BY THE MECHANICAL SUBCONTRACTOR.
18.	COMMUNICATION CONDUITS ARE TO BE LONG RADIUS TYPE AND SHALL CONTAIN PULL WIRES. PROVIDE PLATES FOR ALL OUTLETS.
19.	ALL SPECIAL PURPOSE OUTLETS SHALL BE PROVIDED TO MATCH EQUIPMENT TO BE SUPPLIED.
20.	THE PLANS INDICATE THE DESIRED ARRANGEMENT AND GENERAL LOCATIONS OF LIGHT FIXTURES. THE ARCHITECTURAL PLANS INDICATE ADDITIONAL DATA AS TO THE FINAL FIXTURE PLACEMENT.
21.	ALL PANELBOARDS, SWITCHES AND CIRCUIT BREAKERS SHALL BE ITE, SQUARE D, GE, OR CUTLER HAMMER.
22.	ALL CONDUITS SHALL HAVE A SEPARATE GREEN GROUND CONDUCTOR INSTALLED FOR GROUNDING.
23.	ANY EXISTING UTILITIES LOCATED IN THE AREA OF CONSTRUCTION WHICH REQUIRE RELOCATION BY THE OWNER SHALL BE COORDINATED WITH THE OWNER'S REPRESENTATIVE A MINIMUM OF TEN DAYS IN ADVANCE.
24.	ALL DISCONNECT SWITCHES SHALL BE THE HEAVY DUTY TYPE WITH BUSSMAN TIME DELAY, DUAL ELEMENT AND CURRENT LIMITING FUSES.
25.	THE CONTRACTOR SHALL CHECK THE ARCHITECTURAL DRAWINGS FOR EXACT LOCATION AND/OR DIMENSIONS FOR INSTALLATION OF ALL ELECTRICAL ITEMS. ALL QUESTIONABLE LOCATIONS SHALL BE APPROVED BY OWNER'S REPRESENTATIVE PRIOR TO INSTALLATION.
26.	ALL EMPTY CONDUITS SHALL CONTAIN JET LINE #232 POLYOFIN 200 LB. TEST.
27.	ALL WORK SHOWN ON THE ELECTRICAL PLANS SHALL BE PERFORMED BY THE CONTRACTOR UNLESS NOTED OTHERWISE.
28.	ALL EXIT FIXTURES SHALL BE CONNECTED TO THE BUILDING EMERGENCY PANEL UNSWITCHED.
29.	ALL SURGE PROTECTED OUTLETS SHALL BE EQUAL TO HUBBELL #5352 IS.
30.	EQUIPMENT INSTALLED WITHIN CONCEALED SPACES SHALL HAVE REASONABLE ACCESS PANELS PROVIDED NEARBY FOR INSPECTION, TESTING AND SERVICE CONSIDERATIONS.
31.	ALL SECURITY SYSTEM WIRING AND DEVICE INSTALLATIONS SHALL BE DONE BY THE PALM BEACH COUNTY SCHOOL DISTRICT.
32.	THE FIRE ALARM MANUFACTURER SHALL PROVIDE CERTIFIED TECHNICIAN TO SUPERVISE THE INSTALLATION. FINAL CONNECTIONS AND TESTING OF THE FIRE ALARM SYSTEM. AT THE COMPLETION OF THE PROJECT, THE MANUFACTURER SHALL INSPECT THE SYSTEM AND CERTIFY THAT IT IS INSTALLED IN ACCORDANCE WITH NFPA 72. ALL FIRE ALARM COMPONENTS SHALL COMPLY WITH ADA REQUIREMENTS.
33.	REFER TO SPECIFICATIONS FOR MORE INFORMATION.
34.	THE CONTRACTOR SHALL VERIFY CEILING TYPES AND INSTALLATION REQUIREMENTS PRIOR TO ORDERING LIGHT FIXTURES.

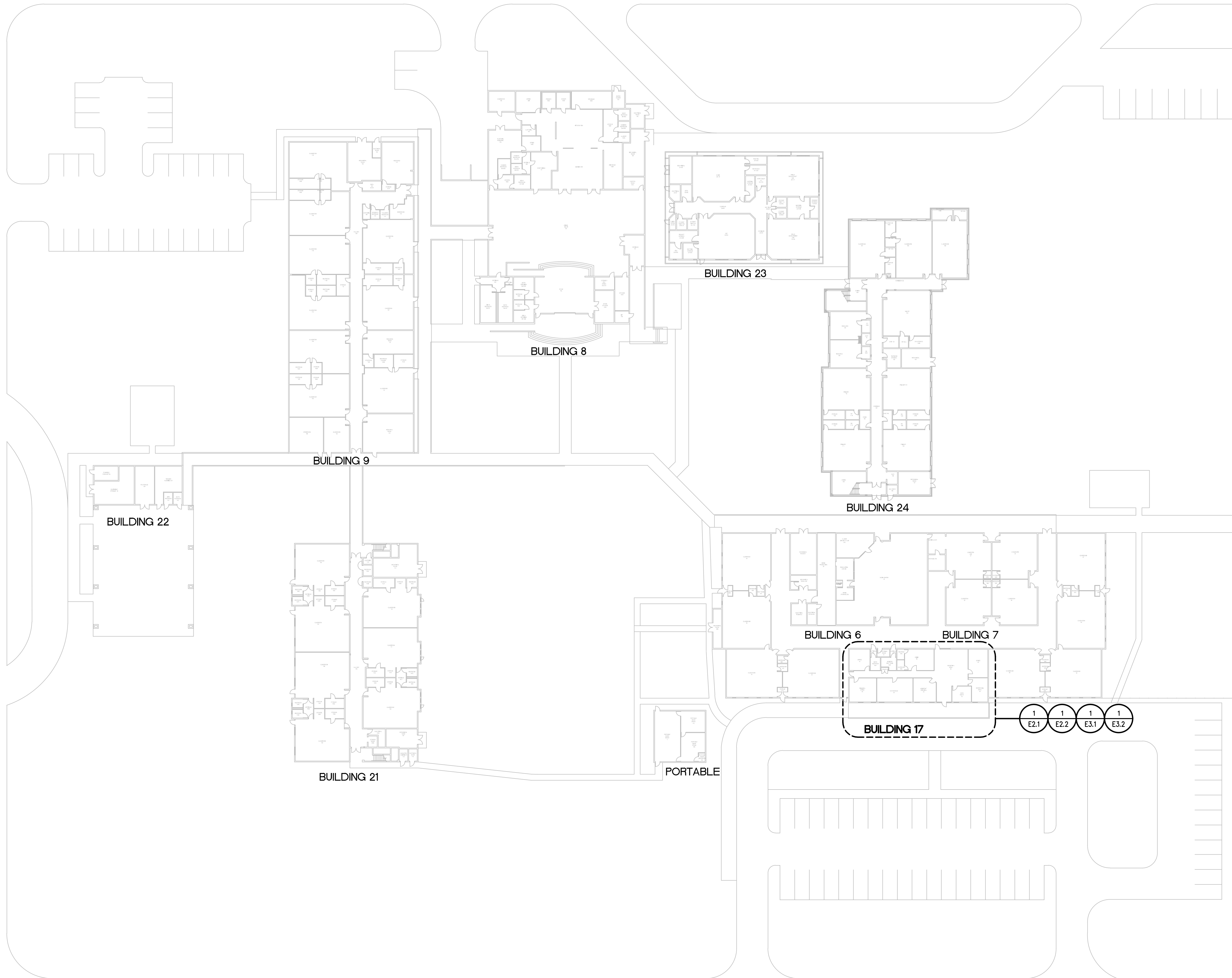
DRAWING INDEX	
SHEET NO.	DESCRIPTION
E0.1	ELECTRICAL NOTES AND LEGEND
E1.1	ELECTRICAL PLAN - OVERALL
E2.1	LIGHTING PLAN - DEMOLITION
E2.2	LIGHTING PLAN - NEW WORK
E3.1	POWER AND SYSTEMS PLAN - DEMOLITION
E3.2	POWER AND SYSTEMS PLAN - NEW WORK
E4.1	ELECTRICAL RISERS AND SCHEDULES
E5.1	ELECTRICAL DETAILS

Revisions		
No.	Date	Note

TO THE BEST OF MY KNOWLEDGE, THE PLANS AND SPECIFICATIONS COMPLY WITH THE MINIMUM BUILDING CODES.

Certification Number 60559
 Charles C. Gableman, P.E. 51916
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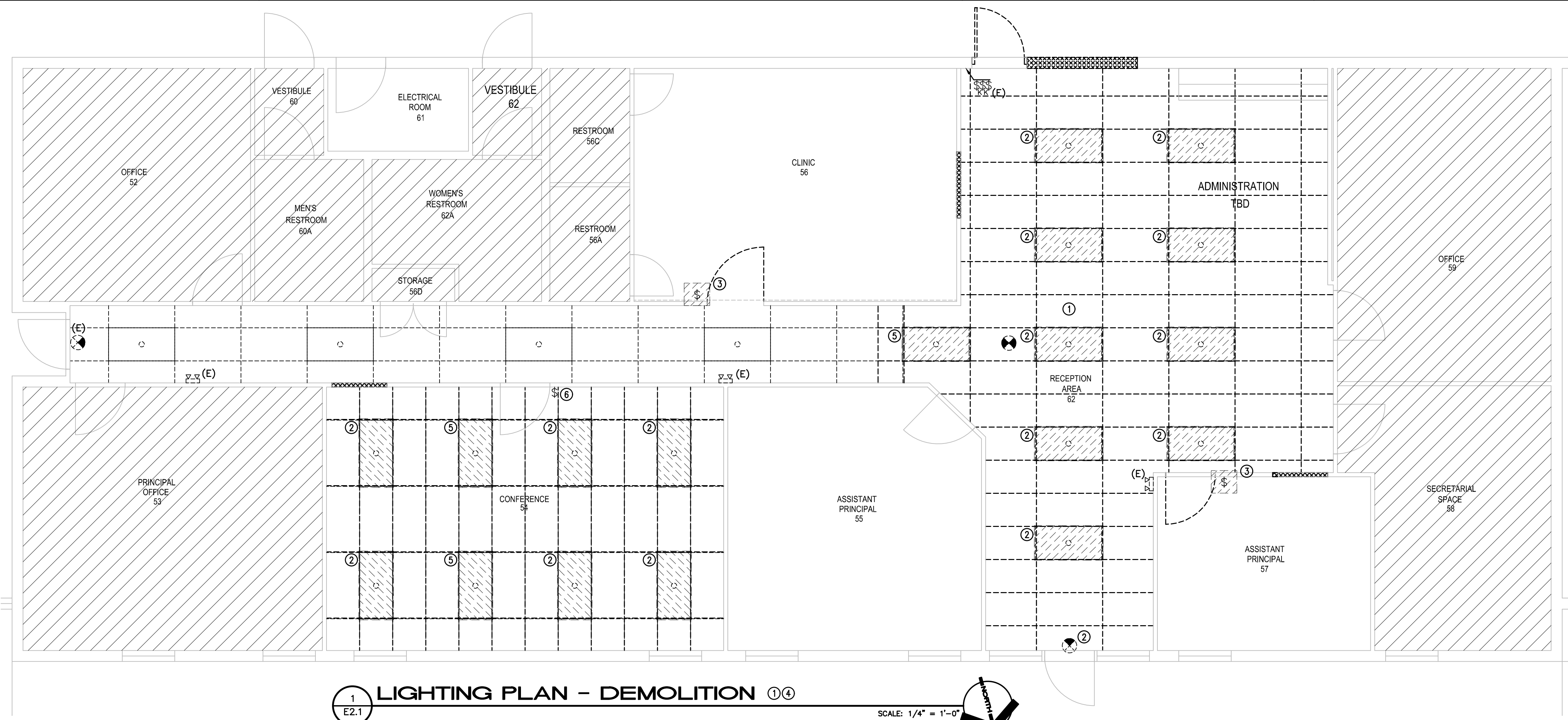
ELECTRICAL NOTES AND LEGEND



1 ELECTRICAL PLAN - OVERALL
 E1.1 SCALE: 1/32"=1'-0"

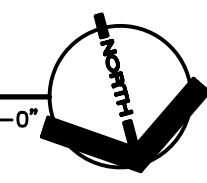
Revisions		
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TO THE BEST OF MY KNOWLEDGE, THE PLANS AND SPECIFICATIONS COMPLY WITH THE MINIMUM BUILDING CODES.



1 LIGHTING PLAN - DEMOLITION ①④

SCALE: 1/4" = 1'-0"



GENERAL NOTE

FIELD VERIFY ALL EXISTING CIRCUITS TO BE REUSED PRIOR TO ROUGH-IN.

- PLAN NOTES**
- ① EXISTING CEILING GRID TO BE REMOVED. TEMPORARILY REMOVE, SUPPORT FROM STRUCTURE, AND REINSTALL CEILING MOUNTED DEVICES AS REQUIRED. FIRE ALARM DEVICES SHALL BE PROVIDED WITH APPROPRIATE DUST COVERS OR BAGGED.
 - ② EXISTING LIGHTING FIXTURE TO BE REMOVED. EXISTING CIRCUITING TO REMAIN FOR INSTALLATION OF NEW FIXTURES.
 - ③ EXISTING WALL SWITCH TO BE RELOCATED, SEE NEW WORK PLAN.
 - ④ WALL SWITCHES TO REMAIN UNLESS NOTED OTHERWISE AND SHOWN FOR REFERENCE ONLY.
 - ⑤ FIXTURE TO BE DEMOLISHED. CIRCUITING TO BE REWORKED. SEE NEW WORK PLAN E2.2.
 - ⑥ EXISTING LIGHT SWITCH TO BE REPLACED WITH A DIMMER WITH INTEGRAL OCCUPANCY SENSOR.

- GENERAL DEMOLITION NOTES**
- A. ALL EXISTING ELECTRICAL EQUIPMENT/FIXTURES/DEVICES IN THE REMODELING AREAS SHALL BE ADDRESSED AS INDICATED BY THE DEMO. PLAN NOTES.
 - B. DISCONNECT AND REMOVE ALL CONDUIT, CONDUCTORS, BOXES, SUPPORTS, ETC. ASSOCIATED WITH ELECTRICAL EQUIPMENT/FIXTURE/DEVICES TO BE REMOVED, AS DESCRIBED IN DEMO. PLAN NOTES. REMOVE CONDUIT AND CONDUCTORS BACK TO SOURCE - FOR THOSE CIRCUITS THAT SERVE OTHER EQUIPMENT/FIXTURES/DEVICES THAT ARE TO REMAIN, REMOVE CONDUIT AND CONDUCTORS SERVING DEMOLISHED EQUIPMENT, BACK TO NEAREST JUNCTION POINT, AND SAFELY DEAD-END.
 - C. THE CONTRACTOR IS CAUTIONED THAT EXISTING SERVICES ARE ROUTED CONCEALED IN PARTITIONS AND IN OR UNDER FLOOR SLABS. PRIOR TO DEMOLITION OR ANY CUTTING, DRILLING, BORING, ETC., THE CONTRACTOR SHALL CONFIRM THE LOCATION OF ANY SUCH SERVICES. ANY DISRUPTION OR DAMAGE TO SERVICES THAT MUST REMAIN IN-TACT, SHALL BE REPAIRED IMMEDIATELY BY THE CONTRACTOR, AT NO EXPENSE TO THE OWNER, EXCEPT IN THE CASE OF MUTUALLY AGREED UPON UNFORESEEABLE CONDITIONS.

Martin County School District
 Warfield Elementary School
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 15260 SW 150th Street Indiantown, FL 34956
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Comm. No: 16025.21
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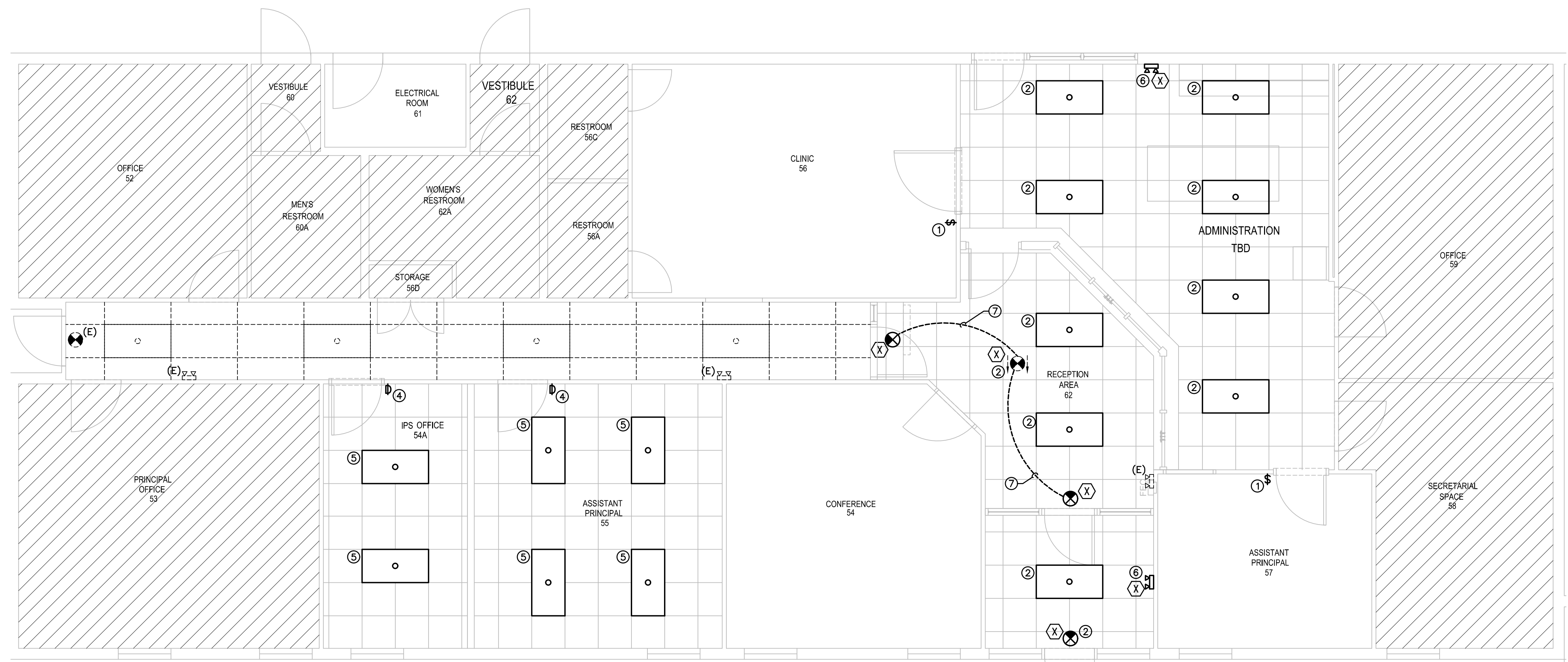
Revisions		
No.	Date	Note

TO THE BEST OF MY KNOWLEDGE, THE PLANS AND SPECIFICATIONS COMPLY WITH THE MINIMUM BUILDING CODES.

Certification Number 6059
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LIGHTING PLAN -
 DEMOLITION

E2.1



1 LIGHTING PLAN - NEW WORK
 E2.2 SCALE: 1/4" = 1'-0"

LIGHTING FIXTURE SCHEDULE									
FIX. TYPE	MANUFACTURER	CATALOG NUMBER	LAMPS	TYPE OF FIXTURE	MOUNTING			VOLTS	NOTES
					REC	SUR	SUS		
A	METALUX	24C22-70HE-UNV-LB40-CD1-U	LED 51W	2x4 LED CENTER BASKET TROFFER DIMMABLE	•			120-277	
	COLU	2BLT4 72LHE SDP GZ10 LP835							
	ISOLITE	LCA24-40VLG-ED1U							
X	ABL	RL-EM-R-WW-SD	LED 2W	LED EXIT SIGN		•		120-277	
	COMP	LQM S W 3 R 120/277 EL N SD							
		CERSD							

FIXTURE SCHEDULE NOTES:
 1. CONTRACTOR SHALL VERIFY AVAILABLE VOLTAGE FOR LIGHTS PRIOR TO ORDERING FIXTURE.

GENERAL NOTE

FIELD VERIFY ALL EXISTING CIRCUITS TO BE REUSED PRIOR TO ROUGH-IN.

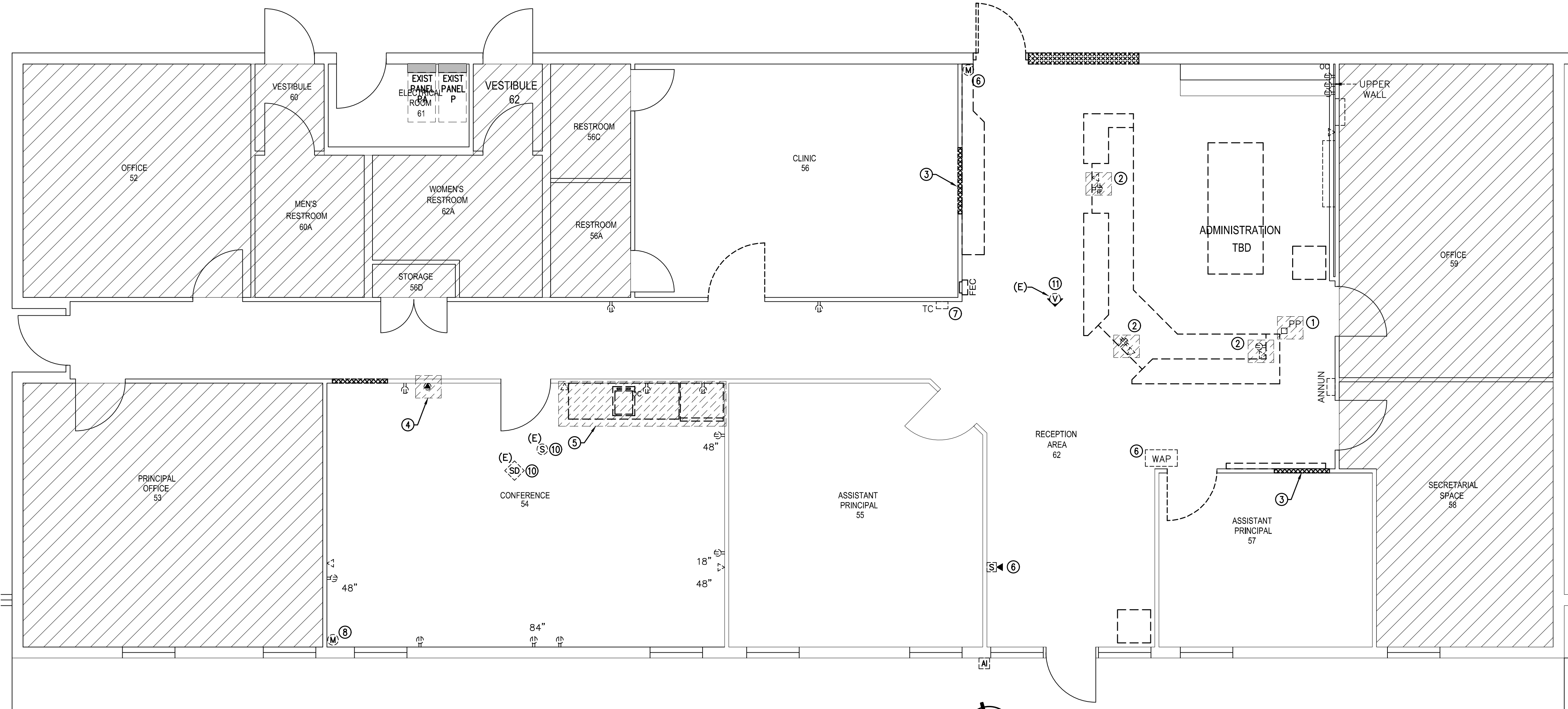
- NEW WORK NOTES**
- RELOCATED LIGHT SWITCH. INTERCEPT AND EXTEND CONDUIT AND CONDUCTORS AS NECESSARY TO MAINTAIN ORIGINAL CONTROL.
 - CONNECT TO EXISTING CORRIDOR LIGHTING CIRCUIT AND CONTROLS.
 - CONNECT TO EXISTING LOBBY LIGHTING CIRCUIT AND CONTROLS.
 - NEW LIGHTING CONTROL DEVICE. INTERCEPT EXISTING CIRCUIT FOR CONTROL OF NEWLY RENOVATED SPACE.
 - CONNECT TO EXISTING CIRCUIT IN SPACE. FIXTURES TO BE OPERATED BY NEW SWITCH.
 - CONNECT EMERGENCY BATTERY BACKUP FIXTURE TO LOCAL LIGHTING CIRCUIT, UNSWITCHED. MATCH EXISTING FIXTURE TYPES TO PREVIOUSLY INSTALLED.
 - EXTEND EXISTING EXIT LIGHTING CIRCUIT AS REQUIRED.

Comm. No: 16025.21
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Revisions		
No.	Date	Note

TO THE BEST OF MY KNOWLEDGE, THE PLANS AND SPECIFICATIONS COMPLY WITH THE MINIMUM BUILDING CODES.

Certification Number 60259
 Charles C. Gableman, P.E. 51936
 Kyle E. Lortman, P.E. 60228



1 POWER AND SYSTEMS PLAN - DEMOLITION
 SCALE: 1/4" = 1'-0"

GENERAL NOTE
 FIELD VERIFY ALL EXISTING CIRCUITS TO BE REUSED PRIOR TO ROUGH-IN.

- PLAN NOTES**
- ① EXISTING POWER POLE TO BE REMOVED. DISCONNECT AND PULL POWER/DATA CONDUCTORS BACK TO NEAREST JUNCTION BOX FOR RE-USE.
 - ② DISCONNECT AND REMOVE POWER AND DATA TO ACCOMMODATE REMOVAL OF EXISTING COUNTERS.
 - ③ CONTRACTOR TO VERIFY IF RECEPTACLE OR DATA PORT IS LOCATED IN AREA OF WALL TO BE DEMOLISHED AND PREPARE TO RELOCATE AS NECESSARY
 - ④ SPECIALTY RECEPTACLE TO BE REMOVED. ALL ASSOCIATED CONDUIT/CONDUCTORS TO BE REMOVED BACK TO SOURCE. PROVIDE COVER PLATE AND RE-LABEL PANEL AS SPARE.
 - ⑤ KITCHENETTE TO BE REMOVED. ALL ASSOCIATED RECEPTACLES TO BE REMOVED. ALL ASSOCIATED CONDUIT/CONDUCTORS TO BE REMOVED BACK TO SOURCE AND PANEL TO BE RE-LABELED ACCORDINGLY.
 - ⑥ EXISTING DEVICE TO REMAIN.
 - ⑦ EXISTING TIMECLOCK TO REMAIN.
 - ⑧ EXISTING TO BE REMOVED. REMOVE CONDUIT AND WIRING BACK TO COMMON J-BOX OR LOCAL TERMINAL/CONTROL PANEL PANEL.
 - ⑨ EXISTING DEVICES TO REMAIN UNLESS OTHERWISE NOTED.
 - ⑩ EXISTING DEVICE TO BE RELOCATED.
 - ⑪ EXISTING CEILING GRID TO BE REMOVED. TEMPORARILY REMOVE, SUPPORT FROM STRUCTURE, AND REINSTALL CEILING MOUNTED DEVICES AS REQUIRED. FIRE ALARM DEVICES SHALL BE PROVIDED WITH APPROPRIATE DUST COVERS OR BAGGED.

GENERAL DEMOLITION NOTES

- A. ALL EXISTING ELECTRICAL EQUIPMENT/FIXTURES/DEVICES IN THE REMODELING AREAS SHALL BE ADDRESSED AS INDICATED BY THE DEMO. PLAN NOTES.
- B. DISCONNECT AND REMOVE ALL CONDUIT, CONDUCTORS, BOXES, SUPPORTS, ETC. ASSOCIATED WITH ELECTRICAL EQUIPMENT/FIXTURE/DEVICES TO BE REMOVED, AS DESCRIBED IN DEMO. PLAN NOTES. REMOVE CONDUIT AND CONDUCTORS BACK TO SOURCE - FOR THOSE CIRCUITS THAT SERVE OTHER EQUIPMENT/FIXTURES/DEVICES THAT ARE TO REMAIN, REMOVE CONDUIT AND CONDUCTORS SERVING DEMOLISHED EQUIPMENT, BACK TO NEAREST JUNCTION POINT, AND SAFELY DEAD-END.
- C. THE CONTRACTOR IS CAUTIONED THAT EXISTING SERVICES ARE ROUTED CONCEALED IN PARTITIONS AND IN OR UNDER FLOOR SLABS. PRIOR TO DEMOLITION OR ANY CUTTING, DRILLING, BORING, ETC., THE CONTRACTOR SHALL CONFIRM THE LOCATION OF ANY SUCH SERVICES. ANY DISRUPTION OR DAMAGE TO SERVICES THAT MUST REMAIN IN-TACT, SHALL BE REPAIRED IMMEDIATELY BY THE CONTRACTOR, AT NO EXPENSE TO THE OWNER, EXCEPT IN THE CASE OF MUTUALLY AGREED UPON UNFORESEEABLE CONDITIONS.

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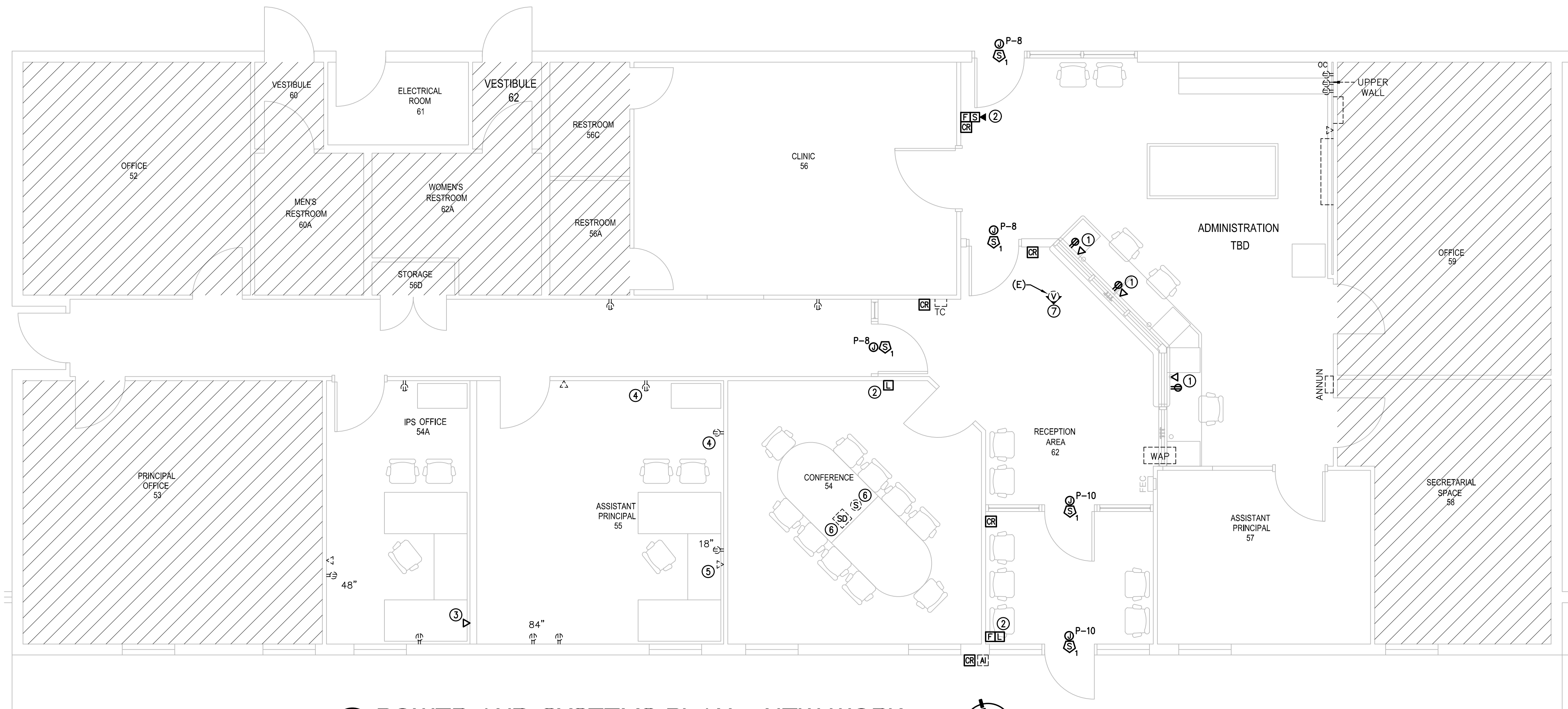
Revisions		
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TO THE BEST OF MY KNOWLEDGE, THE PLANS AND SPECIFICATIONS COMPLY WITH THE MINIMUM BUILDING CODES.

Certification Number 60259
 Charles C. Gableman, P.E. 51936
 Kyle E. Lortman, P.E. 86228

POWER AND SYSTEMS - DEMOLITION

E3.1



1
E3.2

POWER AND SYSTEMS PLAN - NEW WORK

SCALE: 1/4" = 1'-0"

GENERAL NOTE

FIELD VERIFY ALL EXISTING CIRCUITS TO BE REUSED PRIOR TO ROUGH-IN.

PLAN NOTES

- ① INTERCEPT AND EXTEND EXISTING POWER AND DATA FROM DEMOLISHED POWER POLE AND ROUTE TO NEW MILLWORK. CONNECT NEW OUTLETS TO EXISTING 120V CIRCUIT AND CONNECT DATA AS NECESSARY.
- ② CONNECT NEW FIRE ALARM DEVICE TO EXISTING FIRE ALARM SYSTEM. ADD NAC PANEL BATTERY CAPACITY AS REQUIRED.
- ③ ADD NEW DATA DROP WITH 3/4" CONDUIT WITH PULL STRING ROUTED TO ACCESSIBLE CEILING SPACE.
- ④ LOWER EXISTING RECEPTACLE TO 18" AFF.
- ⑤ LOWER EXISTING DATA OUTLET TO 18" AFF.
- ⑥ RELOCATED DEVICE. INTERCEPT AND EXTEND CONDUIT AND CONDUCTORS AS NECESSARY.
- ⑦ RECONNECT EXISTING DEVICE IN SAME LOCATION.

Martin County School District
 Warfield Elementary School
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TO THE BEST OF MY KNOWLEDGE, THE PLANS AND SPECIFICATIONS COMPLY WITH THE MINIMUM BUILDING CODES.

Certification Number 60259
 Charles C. Gableman, P.E. 51936
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POWER AND SYSTEMS
 PLAN - NEW WORK

E3.2

LOCATION: ELECTRICAL ROOM 061 PANELBOARD SCHEDULE EXISTING PANEL **P**

BUS AMPS			LOAD	POLES	TRIP	CIRC.	BUS			CIRC.	TRIP	POLES	LOAD	BUS AMPS		
A	B	C					A	B	C					A	B	C
-	-	-	ROOM #64 & 65 RECEPTACLES	1	20	1	2	20	1	20	1	ROOM #67 RECEPTACLES	-	-	-	
-	-	-	ROOM #64 & 65 RECEPTACLES	1	20	3	4	20	1	20	1	ROOM #66 RECEPTACLES	-	-	-	
-	-	-	ROOM #64 & 65 RECEPTACLES	1	20	5	6	20	1	20	1	ROOM #66 RECEPTACLES	-	-	-	
-	-	-	CORRIDOR LIGHTS	1	20	7	8	20	1	20	1	ACCESS CONTROLS	0.2	-	-	
-	-	-	CORRIDOR EM LIGHTS	1	20	9	10	20	1	20	1	ACCESS CONTROLS	0.2	-	-	
-	-	-	CORRIDOR LIGHTS SPARE	1	20	11	12	30	1	20	1	SPARE	-	-	-	
-	-	-	MARQUE SIGN	1	30	13	14	30	1	20	1	SPARE	-	-	-	
-	-	-	SPARE	1	40	15	16	30	1	20	1	SPARE	-	-	-	
-	-	-	MAGNETIC STARTER PANEL PB	-	-	17	18	-	-	-	-	-	-	-	-	
-	-	-	MAGNETIC STARTER PANEL PB	3	40	19	20	30	2	20	1	SPARE	-	-	-	
-	-	-	MAGNETIC STARTER PANEL PB	-	-	21	22	-	-	-	-	-	-	-	-	
-	-	-	SPARE	-	-	23	24	20	3	20	1	SPARE	-	-	-	
-	-	-	SPARE	3	20	25	26	-	-	-	-	-	-	-	-	
-	-	-	SPARE	-	-	27	28	-	-	-	-	-	-	-	-	
-	-	-	BATHROOM RECEPTACLES	1	20	29	30	30	2	20	1	EWB	-	-	-	

RATED VOLTAGE: 120/208 3 PHASE, 4 WIRE FEED IS TO BE (●)BOTTOM: ()TOP FROM: 'MDP'

RATING IS TO BE ()100 (●)225 (●)400 AMPS GROUND BAR IS REQUIRED

(●)MAIN BREAKER 225 AMPS () MAIN LUGS ONLY NEUTRAL BUS IS TO BE (●)FULL ()DOUBLE SIZE

BRANCH POLES= ()12 ()24 (●)30 ()42 HINGED DOOR WITH KEYED LATCH (●)IS ()IS NOT REQUIRED

PANELBOARD IS TO BE ()FUSED (●)BOLT IN CIRCUIT BREAKER TYPE HARD WIRED SURGE PROTECTION (●)IS ()IS NOT REQUIRED

ALL BREAKERS MUST BE RATED TO INTERRUPT A SHORT CIRCUIT CURRENT I_{sc} = XX,000 AMPS, SYM RMS

LOCATION: ELECTRICAL ROOM 061 PANELBOARD SCHEDULE EXISTING PANEL **PA**

BUS AMPS			LOAD	POLES	TRIP	CIRC.	BUS			CIRC.	TRIP	POLES	LOAD	BUS AMPS		
A	B	C					A	B	C					A	B	C
-	-	-	SURGE SUPPRESSOR	1	20	1	2	20	1	20	1	ROOM #50 LIGHTS	-	-	-	
-	-	-	SURGE SUPPRESSOR	1	20	3	4	20	1	20	1	ROOM #50 LIGHTS	-	-	-	
-	-	-	SURGE SUPPRESSOR	1	20	5	6	20	1	20	1	ROOM #50 LIGHTS	-	-	-	
-	-	-	ROOM #49 LIGHTS	1	20	7	8	20	1	20	1	ROOM #50 LIGHTS	-	-	-	
-	-	-	ROOM #65 LIGHTS	1	20	9	10	20	1	20	1	ROOM #67 EM LIGHTS	-	-	-	
-	-	-	ROOM #67 LIGHTS	1	20	11	12	20	1	20	1	ROOM #66 LIGHTS & EM	-	-	-	
-	-	-	ROOM #48 LIGHTS	1	20	13	14	20	1	20	1	ROOM #64 LIGHTS	-	-	-	
-	-	-	ROOM #65 & 66 RECEPTACLES	1	20	15	16	20	1	20	1	ROOM #64 LIGHTS & EM	-	-	-	
-	-	-	CLINIC LIGHTS	1	20	17	18	20	1	20	1	ROOM #53A & 52 LIGHTS	-	-	-	
-	-	-	LIGHTS ROOM #52 & 53	1	20	19	20	20	1	20	1	ROOM #53A & 52 LIGHTS	-	-	-	
-	-	-	LIGHTS ROOM #52 & 53	1	20	21	22	20	1	20	1	ROOM #50 LIGHTS	-	-	-	
-	-	-	ROOM #49 LIGHTS	1	20	23	24	20	1	20	1	ROOM #50 LIGHTS	-	-	-	
-	-	-	ROOM #49 LIGHTS	1	20	25	26	20	1	20	1	ROOM #50 RECEPTACLES	-	-	-	
-	-	-	ROOM #50 RECEPTACLES	1	20	27	28	20	1	20	1	ROOM #50 RECEPTACLES	-	-	-	
-	-	-	ROOM #50 RECEPTACLES	1	20	29	30	20	1	20	1	ROOM #50 RECEPTACLES	-	-	-	
-	-	-	ROOM #50 RECEPTACLES	1	20	31	32	20	1	20	1	FRONT ENTRANCE LIGHTS	-	-	-	
-	-	-	ROOM #51 LIGHTS	1	20	33	34	20	1	20	1	CLINIC RECEPTACLES	-	-	-	
-	-	-	OFFICE RECEPTACLES	1	20	35	36	20	1	20	1	COPY MACHINE	-	-	-	
-	-	-	OFFICE RECEPTACLES	1	20	37	38	20	1	20	1	CLINIC RECEPTACLES	-	-	-	
-	-	-	OFFICE RECEPTACLES	1	20	39	40	60	2	20	1	CLINIC RECEPTACLES	-	-	-	
-	-	-	OFFICE RECEPTACLES	1	20	41	42	-	-	-	-	-	-	-	-	

RATED VOLTAGE: 120/208 3 PHASE, 4 WIRE FEED IS TO BE (●)BOTTOM: ()TOP FROM: 'P'

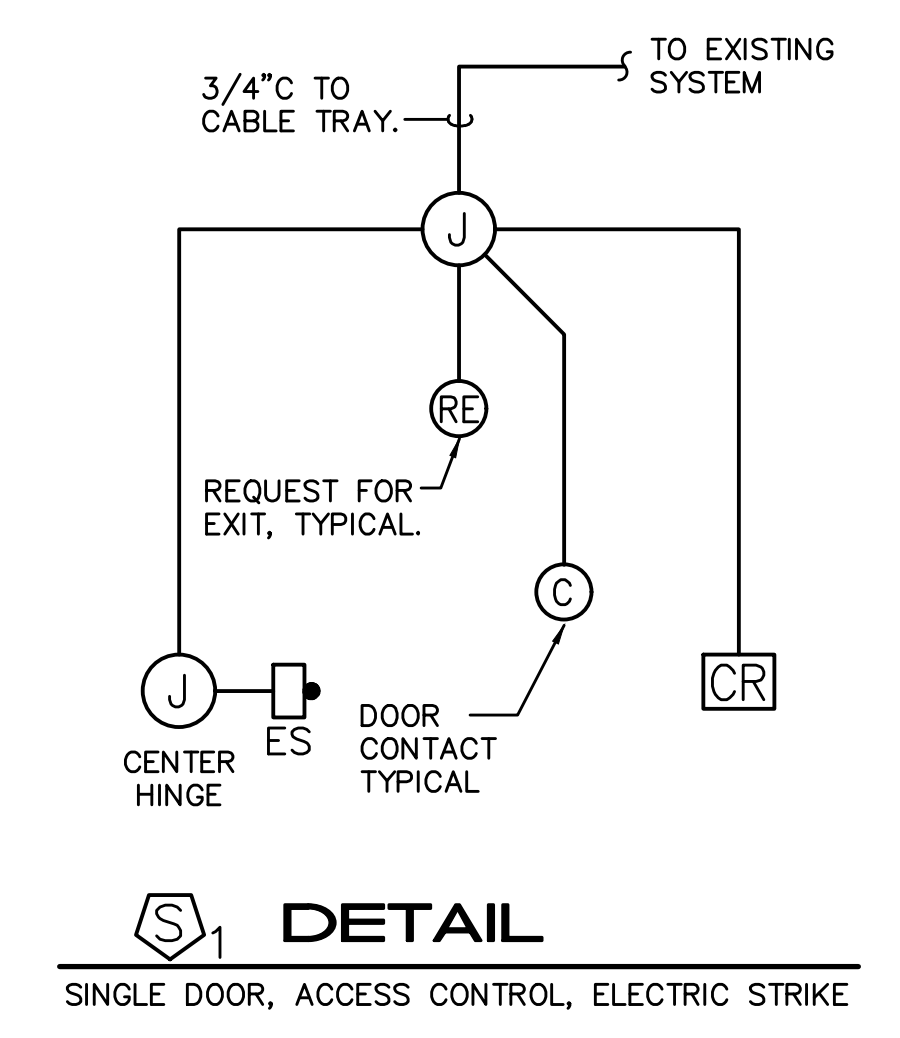
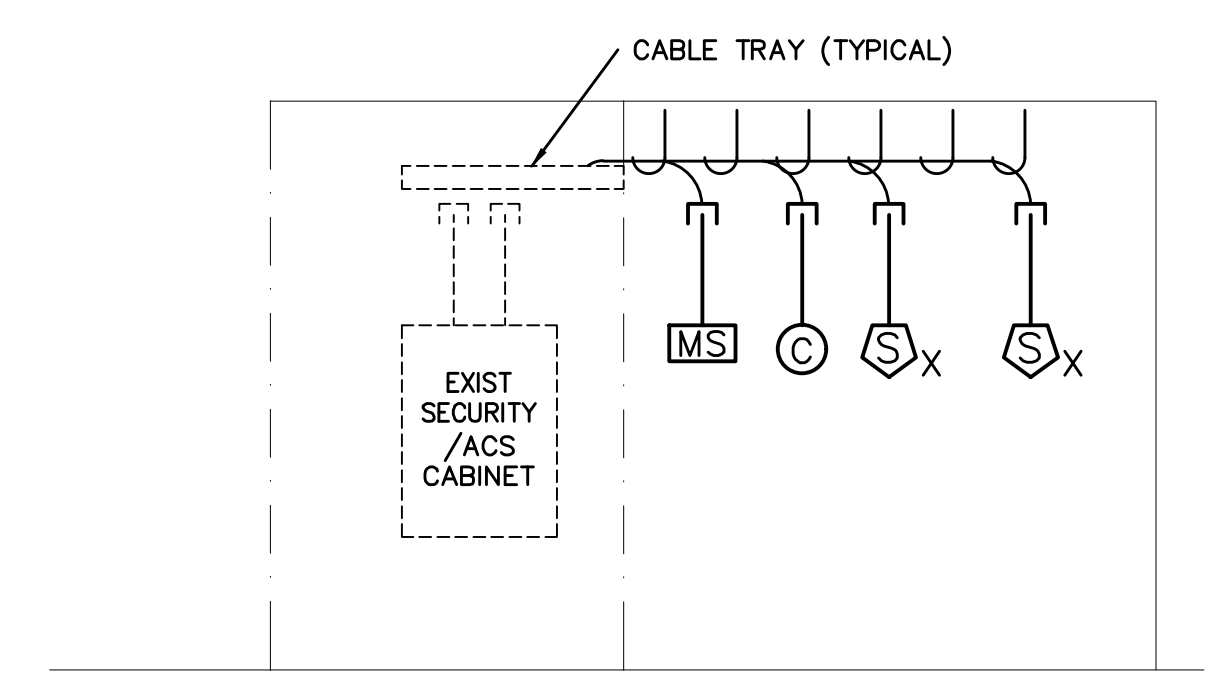
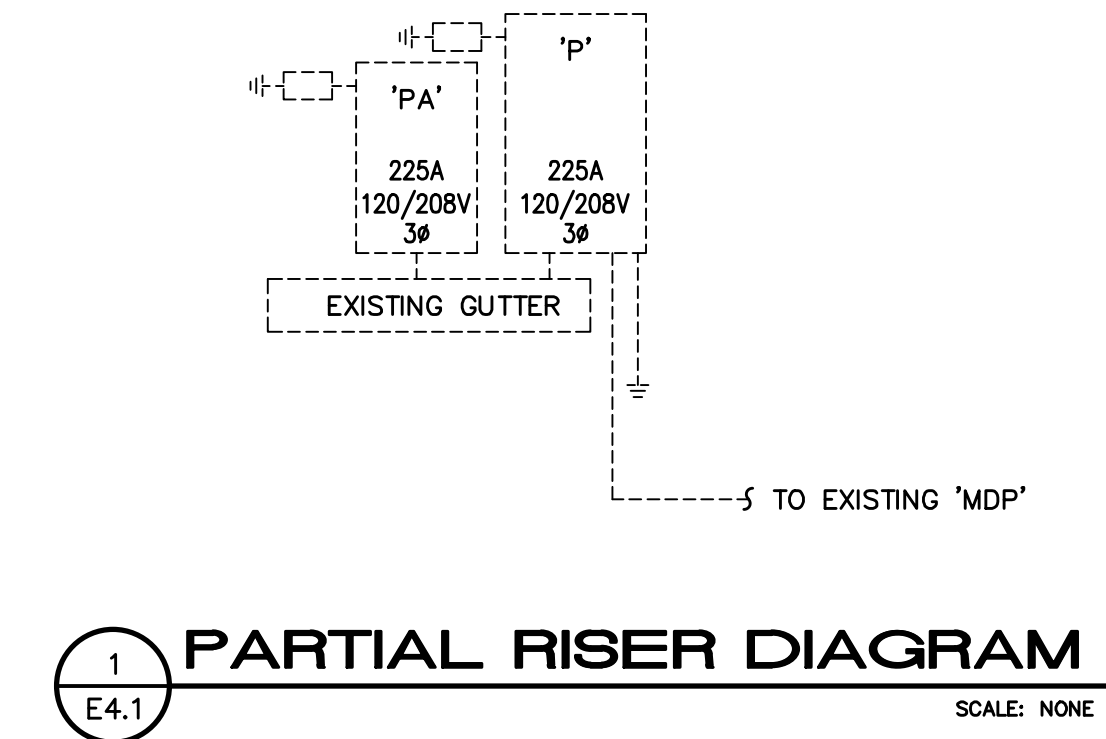
RATING IS TO BE ()100 (●)225 ()400 AMPS GROUND BAR IS REQUIRED

()MAIN BREAKER . AMPS (●) MAIN LUGS ONLY NEUTRAL BUS IS TO BE (●)FULL ()DOUBLE SIZE

BRANCH POLES= ()12 ()24 ()30 (●)42 HINGED DOOR WITH KEYED LATCH (●)IS ()IS NOT REQUIRED

PANELBOARD IS TO BE ()FUSED (●)BOLT IN CIRCUIT BREAKER TYPE HARD WIRED SURGE PROTECTION (●)IS ()IS NOT REQUIRED

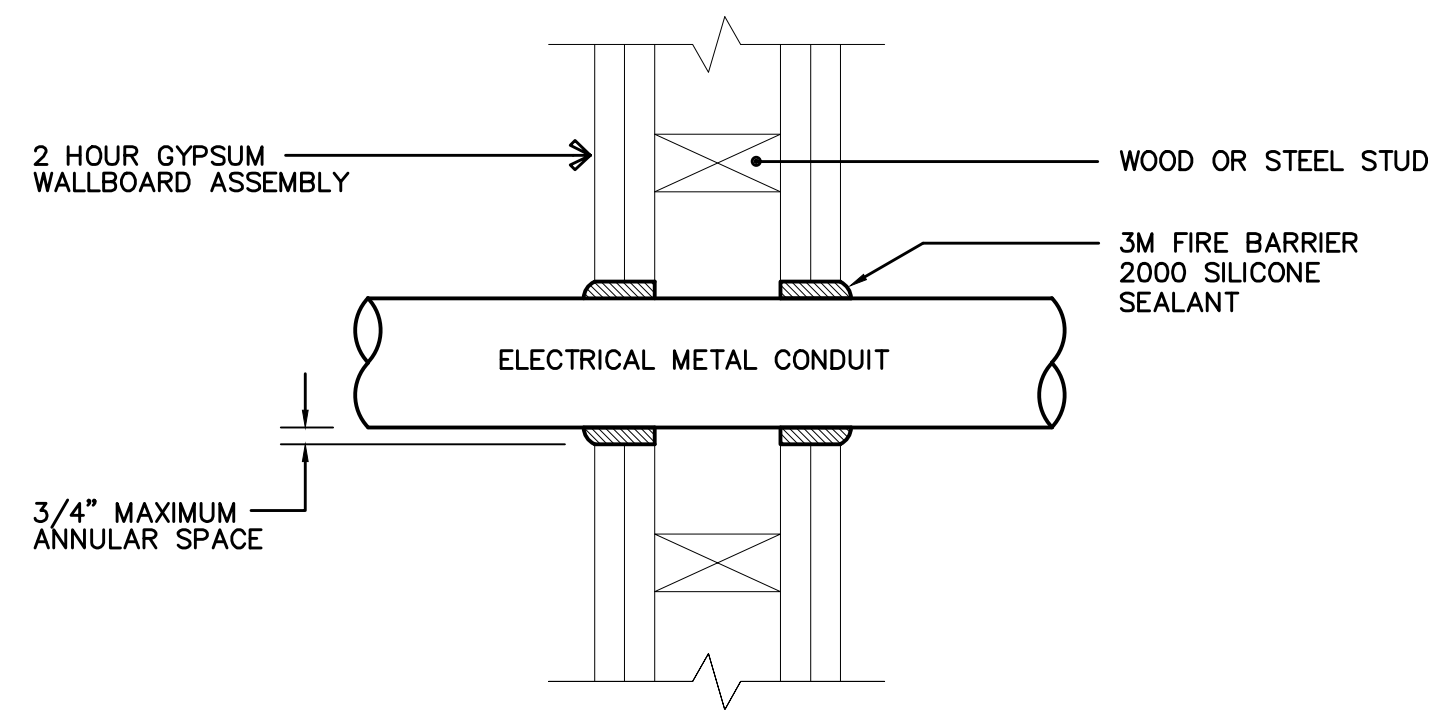
ALL BREAKERS MUST BE RATED TO INTERRUPT A SHORT CIRCUIT CURRENT I_{sc} = XX,000 AMPS, SYM RMS



2 ACCESS CONTROL DOOR DETAILS
E4.1

Comm. No: 16025.21
Date: 07/30/2020
Drawn: SL/WG

Revisions		
No.	Date	Note



1 CONDUIT PENETRATION THROUGH RATED GYPSUM WALL

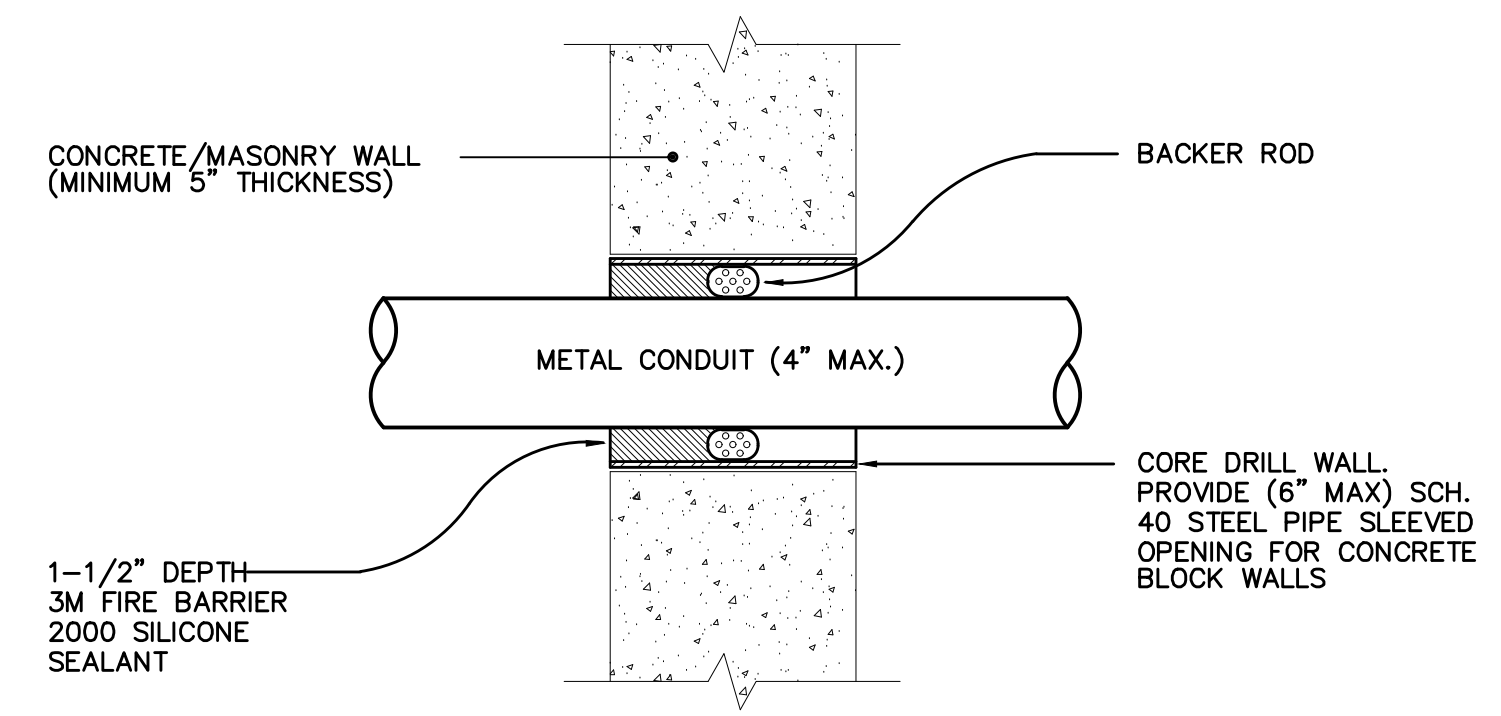
ES.1

(UL #W-L-1010)

SCALE: NONE

CONDUIT PENETRATION NOTES (GYPSUM):

1. MAXIMUM 3/4" ANNULAR SPACE.
2. INSTALL 3M FIRE BARRIER 2000 SILICONE SEALANT TO COMPLETELY FILL THE ANNULAR SPACE BETWEEN THE PIPE AND THE WALL ASSEMBLY. FILL TO THE FULL THICKNESS OF THE GYPSUM WALL (MINIMUM 1-1/4 INCH SEALANT THICKNESS) PLUS AN ADDITIONAL 1/4 INCH CROWN AROUND THE PERIMETER OF THE CONDUIT.



2 CONDUIT PENETRATION THROUGH RATED CONCRETE/MASONRY WALL

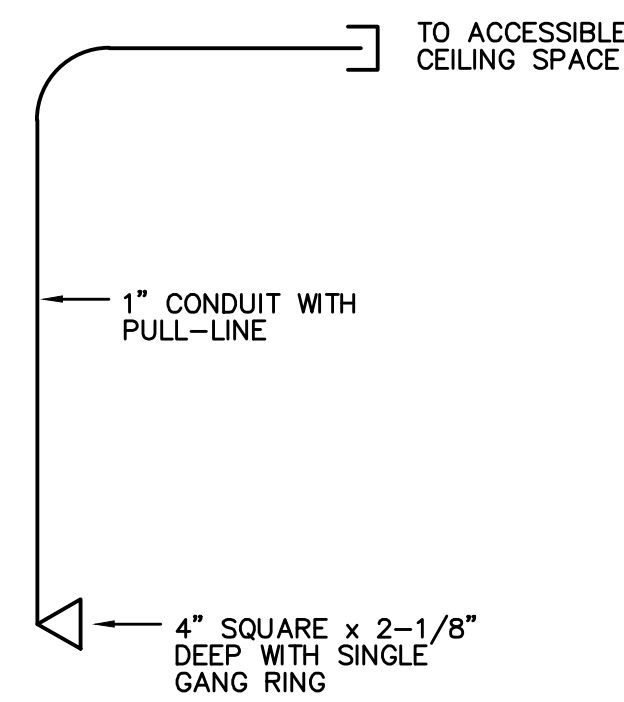
ES.1

(UL #C-AJ-1014)

SCALE: NONE

CONDUIT PENETRATION NOTES (CONCRETE/MASONRY):

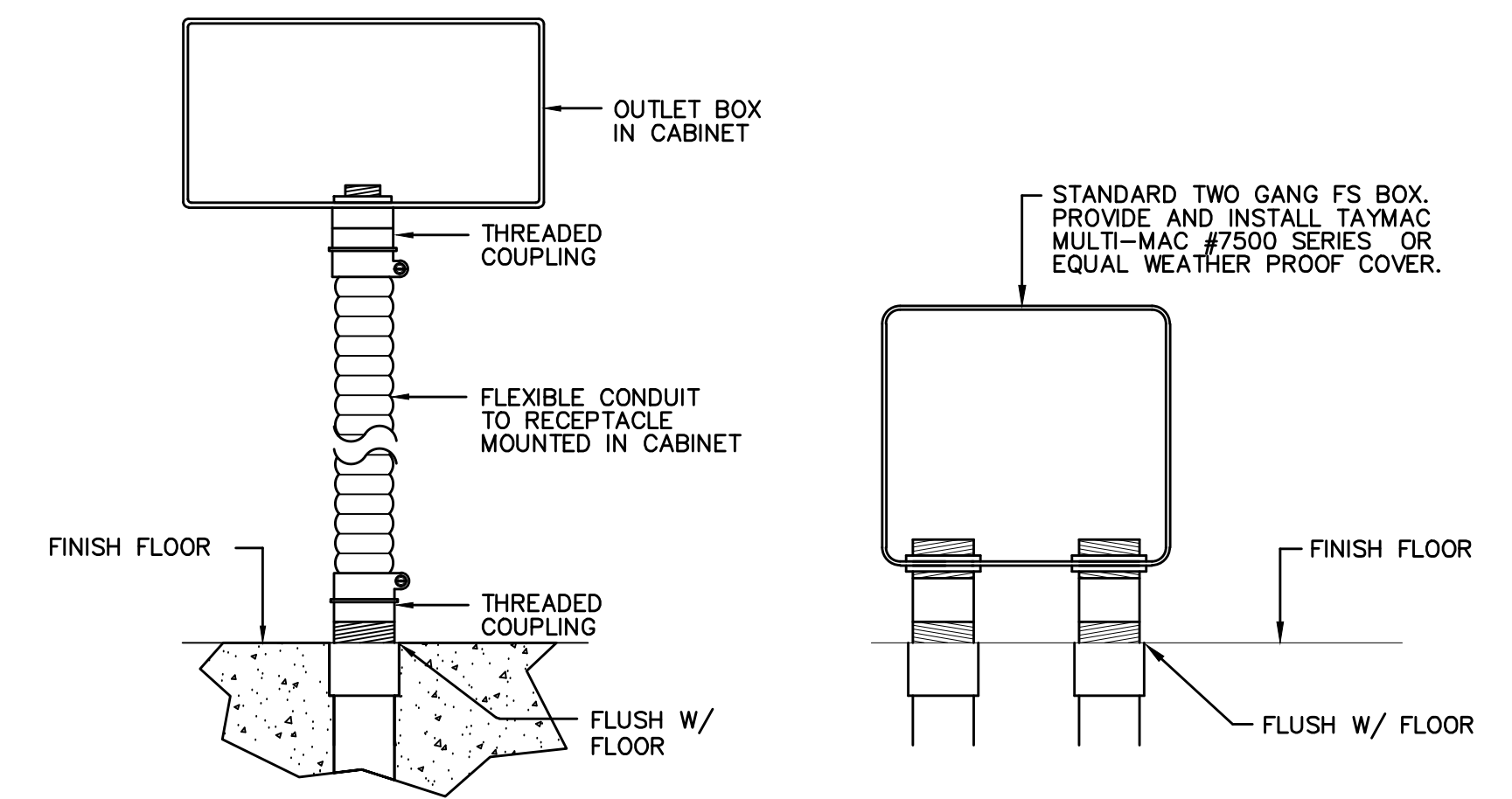
1. CORE DRILL FOR A MAXIMUM 6 INCH DIAMETER OPENING WITH MAXIMUM 6 INCH SCHEDULE 40 STEEL PIPE SLEEVED OPENING FOR CONCRETE BLOCK OR BRICK WALLS OR MAXIMUM 3/4 INCH ANNULAR SPACE.
2. INSTALL OPEN CELL POLYURETHANE BACKER ROD IN OPENING. RECESS 1-1/2 INCHES FROM WALL SURFACE.
3. INSTALL A MINIMUM OF 1-1/2 INCHES OF 3M FIRE BARRIER 2000 SILICONE SEALANT OVER BACKER ROD.



3 DATA OUTLET

ES.1

SCALE: NONE



4 OUTLET DETAILS

ES.1

SCALE: NONE

Comm. No: 16025.21

Date: 07/30/2020

Drawn: SL/WG

Revisions		
No.	Date	Note

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Certification Number 6059
 Charles C. Gableman, P.E. 51936
 Kyle E. Lortson, P.E. 80228

ELECTRICAL DETAILS

E5.1

LEGEND

	REVISIONS
	ACCESS DOOR (DUCT)
	ACCESS PANEL (CEILING MOUNTED)
AFF	ELEVATION/ABOVE FINISHED FLOOR
— C —	CONDENSATE DRAIN LINE
BOJ	BOTTOM OF JOIST
RBJ	RUN BETWEEN JOISTS
RTJW	RUN THRU JOIST WEBBING
SA	SUPPLY AIR
RA	RETURN AIR
OA	OUTDOOR AIR
EA	EXHAUST AIR
	CEILING SUPPLY AIR DEVICE → ARROW DENOTES DIRECTION OF THROW
	NEW SUPPLY, RETURN, EXHAUST OR OUTSIDE AIR DUCTWORK FIRST DESIGNATION IS SIDE SHOWN.
	DOUBLE WALL INSULATED DUCT, SUPPLY OR RETURN FIRST DESIGNATION IS SIDE SHOWN, FREE AREA DIMENSION.
	ALUMINUM EXHAUST DUCT
	TYPE 304 STAINLESS STEEL DUCT
	TURNING VANES (NUMBER OF VANES SHALL BE BASED ON ACTUAL DUCT SIZE & NOT ON SCHEMATIC SYMBOL ON DRAWING - SEE SMACNA)
	RETURN OR OUTSIDE AIR DUCT
	DISCHARGE OR SUPPLY DUCT
	EXHAUST FAN
	EXHAUST GRILLE
	FLEXIBLE DUCT CONNECTION
	VOLUME DAMPER (WITH OR WITHOUT MD)
	FIRE DAMPER WITH ACCESS DOOR
	SMOKE DAMPER WITH ACCESS DOOR
	FIRE SMOKE DAMPER WITH ACCESS DOOR
	DROP IN DIRECTION OF AIR FLOW
	RISE IN DIRECTION OF AIR FLOW
	FLEXIBLE AIR DUCT
	SPIN COLLAR WITH MANUAL DAMPER
	AUTOMATIC MOTORIZED DAMPER
	THERMOSTAT OR TEMPERATURE SENSOR
	SMOKE DETECTOR
	HUMIDISTAT OR HUMIDITY SENSOR
	STATIC PRESSURE SENSOR
	OUTDOOR AIR SENSOR
	0-12 HOUR TIMER SWITCH
	ELECTRIC DUCT HEATER WITH CONTROL AND TERMINAL CABINET

GENERAL MECHANICAL NOTES

- ALL SUPPLY, RETURN, EXHAUST, AND OUTSIDE AIR DUCTWORK SHALL BE CONSTRUCTED OF GALVANIZED SHEET METAL. DUCTS SHALL BE FABRICATED IN COMPLIANCE WITH SMACNA "HVAC DUCT CONSTRUCTION STANDARDS METAL AND FLEXIBLE." REFER TO THE PROJECT SPECIFICATIONS FOR PRESSURE CLASSIFICATION AND SEALING REQUIREMENTS. THE FIRST 20 FEET OF SUPPLY AND RETURN AIR DUCTWORK FROM THE AIR HANDLING UNITS SHALL BE CONSTRUCTED OF THE DUAL WALL TYPE WITH A PERFORATED GALVANIZED INNER WALL, 1" THICK MYLAR ENCAPSULATED DUCT LINER, AND GALVANIZED OUTER WALL EQUAL TO UNITED MCGILL K-27.
- EXHAUST DUCTWORK SHALL BE UNINSULATED. ALL DUCTWORK SHALL BE SLOPED BACK TOWARDS LOUVER AT 1/8" INCH PER FOOT.
- SUPPLY AND OUTSIDE AIR DUCTWORK LOCATED INSIDE MECHANICAL EQUIPMENT ROOMS SHALL BE EXTERNALLY INSULATED PER THE SPECIFICATIONS. INSULATION IN MECHANICAL ROOM SHALL BE RIGID. DUAL WALL PRE-INSULATED DUCTWORK DOES NOT REQUIRE ADDITIONAL INSULATION.
- ALL CONCEALED SUPPLY AND RETURN AIR DUCTS SHALL BE EXTERNALLY INSULATED WITH DUCT WRAP AS INDICATED IN SPECIFICATIONS. RIGID INSULATION SHALL BE PROVIDED IN EXPOSED LOCATIONS SUCH AS MECHANICAL ROOMS.
- EXACT LOCATION OF AIR DISTRIBUTION DEVICES SHALL BE COORDINATED WITH THE ARCHITECTURAL CEILING PLANS.
- COORDINATE INSTALLATION WITH ALL OTHER INVOLVED TRADES. IN THE CASE OF CONFLICT BETWEEN DRAWINGS AND SPECIFICATION, THE MORE STRINGENT REQUIREMENT AS DETERMINED BY THE ARCHITECT / ENGINEER SHALL TAKE PRECEDENT.
- REFER TO PLANS FOR ADDITIONAL NOTES
- FLEXIBLE AIR DUCT SHALL BE USED FOR RUNOUTS BETWEEN THE SUPPLY AND RETURN AIR DUCTS AND AIR DISTRIBUTION DEVICES WHERE INDICATED. FLEXIBLE DUCT SHALL BE A MINIMUM OF SIX AND MAXIMUM OF TEN FOOT IN LENGTH AND OF THE MYLAR-COATED WIRE HELIX TYPE WITH FIBERGLASS INSULATION WITH A VALUE OF R6 OR GREATER AND METALIZED MYLAR LAMINATE VAPOR BARRIER COVER. ATTACH FLEXIBLE AIR DUCT TO DIFFUSERS AND SPIN COLLARS WITH PLASTIC OR METAL DRAW BANDS AND SEAL THE ENDS WITH TAPE AND MASTIC TO MAINTAIN THE VAPOR BARRIER. FLEXIBLE DUCT AND SPIN COLLAR SIZE SHALL BE THE SAME NOMINAL DIAMETER AS THE NECK OF THE AIR DISTRIBUTION DEVICE IT IS CONNECTED TO. FLEXIBLE DUCT SHALL BE ONE-PIECE AND NOT BE SPLICED TOGETHER.
- SPIN COLLARS SHALL BE OF THE INTEGRAL DAMPER TYPE WITH LOCKING WING NUT AND 2 INCH TALL STAND OFF BRACKET. ALL SPIN COLLARS SHALL BE ATTACHED TO THE SIDE OF DUCT WITH THE CONNECTION SEALED WITH MASTIC. CONNECTION TO TOP OR BOTTOM OF DUCT SHALL NOT BE USED UNLESS SPECIFICALLY APPROVED BY THE ENGINEER. SPRAY PAINT DAMPER HANDLES DAY-GLOW ORANGE AND INSTALL A 24 INCH LONG RED RIBBON ON THE HANDLE FOR T.A.B. PURPOSES AFTER INSTALLATION.
- ELEVATIONS GIVEN: B.E. = BOTTOM ELEVATION, C.E. = CENTERLINE ELEVATION, T.E. = TOP ELEVATION, ARE TAKEN FROM THE CONCRETE FLOOR SLAB. THESE ELEVATIONS ARE APPROXIMATE AND MUST BE VERIFIED IN THE FIELD BY THE CONTRACTOR PRIOR TO FABRICATION OF ANY DUCTWORK OR PIPING.
- PROVIDE SINGLE THICKNESS METAL TURNING VANES IN ALL SQUARE ELBOWS INCLUDING SUPPLY, RETURN, EXHAUST, RELIEF AND OUTSIDE AIR DUCTS. WHERE UNEQUAL SQUARE ELBOWS ARE SHOWN, TURNING VANES WITH TRAILING EDGE EXTENSIONS SHALL BE USED.
- DOCUMENTS ARE SCHEMATIC IN NATURE AND DO NOT INDICATE EVERY BEND, ELBOW, OR OFFSETS REQUIRED IN DUCTWORK. FIELD VERIFY ALL SIZES AND ELEVATIONS PRIOR TO FABRICATION/INSTALLATION. PROVIDE MODIFICATIONS WHERE REQUIRED FOR COORDINATION IN BASE CONTRACT PRICE AT NO ADDITIONAL COST.
- ENDS OF DUCTWORK SHALL BE KEPT SEALED USING PLASTIC SHEETING AND DUCT TAPE DURING CONSTRUCTION.
- LOCATIONS FOR THERMOSTATS AND TEMPERATURE SENSORS ARE APPROXIMATE IN NATURE AND SHALL NOT BE SCALED FROM THE DRAWINGS. COORDINATE EXACT LOCATIONS WITH ROOM FURNITURE LAYOUT AND CONFIRM PROPOSED LOCATION WITH THE OWNERS REPRESENTATIVE PRIOR TO ROUGH-IN.
- EQUIPMENT SHALL BE SUPPLIED AND INSTALLED WITH PROVISION FOR IN-PLACE LEANING AND SIMILAR MAINTENANCE TASKS IN ACCORDANCE WITH THE REQUIREMENTS OF ASHRAE 62.
- PROVIDE MISCELLANEOUS STRUCTURAL STEEL TO SPAN ACROSS JOISTS WHERE REQUIRED FOR INTERMEDIATE SUPPORT. PROVIDE WEIGHT AND SUPPORT POINTS TO STRUCTURAL ENGINEER FOR INCLUSION IN CALCULATIONS.
- IN ALL FINISHED ROOMS WITH NO SUSPENDED CEILINGS, ALL EXPOSED DUCTWORK SHALL BE CLEANED, PRIMED AND PAINTED WITH TWO COATS OF GLIDDEN ICI SPRAY MASTER, UNIGRIP, PITTSBURGH G9514, OR APPROVED EQUAL.
- CONTRACTOR SHALL OBTAIN A COMPLETE SET OF CONSTRUCTION DRAWINGS AND SPECIFICATIONS, AND REVIEW TO ENSURE ALL ITEMS INDICATED ON THE DRAWINGS ARE INCLUDED IN HIS BASE BID. ALL ITEMS REQUIRING A MECHANICAL CONNECTION (DUCTWORK, PIPING, ETC.) SHALL BE HOOKED-UP TO PROVIDE A FULLY OPERATIONAL AND FUNCTIONAL SYSTEM, AND INCLUDED IN THE BASE BID.
- ACCESS PANELS IN HARD CEILINGS SHALL BE A MINIMUM OF 24 X 24 TO ALLOW FOR TEST AND BALANCE ACCESS. WHERE 24 X 24 ACCESS DOOR CANNOT BE USED DUE TO CONFLICT, PROVIDE MAXIMUM ALLOWABLE PANEL AS NOT TO CONFLICT WITH OTHER TRADES. COORDINATE COLOR OF PANEL WITH ARCHITECT.
- PAINT INSIDE OF ALL VISIBLE PLENUMS FLAT BLACK.
- THE CONTRACTOR SHALL PERFORM A PRE-TEST AND BALANCE TO DOCUMENT EXISTING EQUIPMENT OPERATING CONDITIONS AND PROVIDE A BASELINE FOR THE NEW EQUIPMENT OR SYSTEMS TO BE COMPARED TO. THIS SCOPE SHALL APPLY TO RETURN GRILLES AND SUPPLY DIFFUSERS WITHIN THE SCOPE OF WORK ONLY. FINAL TEST AND BALANCE PERFORMANCE VALUES SHALL BE AS INDICATED ON THE NEW WORK PLANS.
- WORK SHALL BE IN ACCORDANCE WITH THE FOLLOWING CODES:
 - FLORIDA BUILDING CODE, MECHANICAL, 2017 SIXTH EDITION
 - FLORIDA BUILDING CODE, ENERGY CONSERVATION, 2017 SIXTH EDITION
 - FLORIDA STATE FIRE PREVENTION CODE 2017
 - NFPA-90A, 2016-STANDARD FOR THE INSTALLATION OF AIR CONDITIONING AND VENTILATION SYSTEMS
 - NFPA-101 (2016) LIFE SAFETY CODE

DIFFUSER AND GRILLE SCHEDULE

PLAN MARK	MAKE	MODEL NUMBER	MODULE SIZE	NECK SIZE	FINISH	MATERIAL	MOUNTING	REMARKS
CD-1	TITUS	T3SQ-4	12x12	12"ø	WHITE	ALUMINUM	LAY-IN	①②③
RG-1	TITUS	4FL	24x24	10x10	WHITE	ALUMINUM	LAY-IN	①③④
RG-2	TITUS	4FL	24x24	16x16	WHITE	ALUMINUM	LAY-IN	①③④

① CONFIRM ALL MOUNTING TYPES PRIOR TO ORDERING
 ② INSULATE BACK OF LAY-IN OR SURFACE MOUNTED PANEL
 ③ COORDINATE COLOR WITH ARCHITECT PRIOR TO ORDERING OR MOUNTING.
 ④ PROVIDE INSULATED PLENUM BOX AS REQUIRED FOR FLEX CONNECTION. PAINT INSIDE OF CONNECTING PLENUM/ DUCTWORK MATTE BLACK.

MECHANICAL SHEET LISTING

M0.1	MECHANICAL LEGEND AND GENERAL NOTES
M1.1	FIRST FLOOR HVAC DEMOLITION
M1.2	FIRST FLOOR HVAC NEW WORK
M2.1	MECHANICAL DETAILS

DIFFUSER AND GRILLE DESIGNATION

PLAN MARK:

CD = CEILING SUPPLY DIFFUSER
 RG = RETURN GRILLE
 EX = EXISTING (TYPE PREFIX)

UNIT NUMBER
 CD-X
 XXX
 AIR QUANTITY IN CFM (CUBIC FEET PER MINUTE)

Martin County School District
 Warfield Elementary School
 Enhanced Security Project A2
 15260 SW 150th Street Indiantown, FL 34956
 Permit Documents Submittal

Comm. No: 16025.21
 Date: 07/30/2020
 Drawn: SL/WG

Revisions		
No.	Date	Note

TO THE BEST OF MY KNOWLEDGE, THE PLANS AND SPECIFICATIONS COMPLY WITH THE MINIMUM BUILDING CODES.

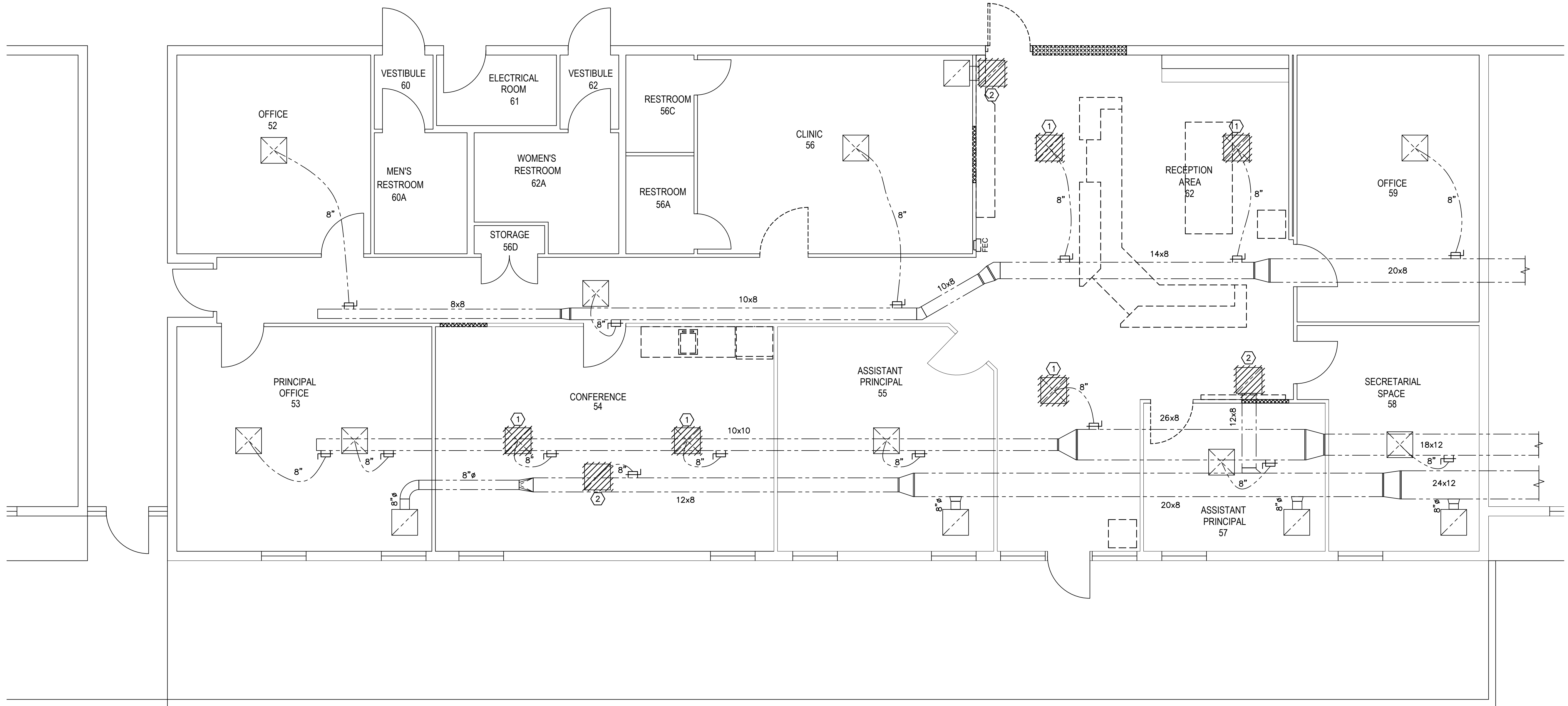
Certification Number 6059
 Charles C. Gableman, P.E. 51936
 Kyle E. Lortson, P.E. 60528

MECHANICAL
 LEGEND AND
 GENERAL
 NOTES

M0.1

HARVARD JOLLY ARCHITECTURE
 2047 Vista Parkway, Suite 100 West Palm Beach, FL 33411
 561-478-4457 | www.harvardjolly.com | AAC000119

J L R D
 JOHNSON, LEVINSON
 RAGAN, DAVILA, INC.
 CONSULTING ENGINEERS
 1405 Centerville Boulevard, Suite 300
 West Palm Beach, Florida 33411
 (561) 699-2303 (561) 699-2302 Fax
 www.jlr.com



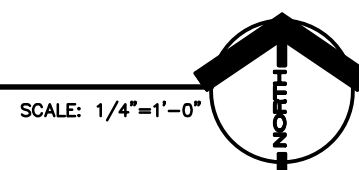
GENERAL NOTES

1. DUCTWORK, AIR DEVICES, AND ASSOCIATED INSULATION WHICH ARE EXISTING TO REMAIN SHALL BE PROTECTED FROM DAMAGE DURING CONSTRUCTION, CONTRACTOR SHALL BE PROTECTED FROM DAMAGE DURING CONSTRUCTION, CONTRACTOR SHALL REPLACE ANY INSULATION DAMAGED AS A RESULT OF CONSTRUCTION.
2. CONTRACTOR SHALL TAKE PRE-CONSTRUCTION AIRFLOW READINGS AT ALL SUPPLY DIFFUSERS, TRANSFER GRILLES, AND RETURN GRILLES SHOWN. READINGS SHALL BE PERFORMED AND SUBMITTED TO THE ENGINEER PRIOR TO ANY DEMOLITION.

PLAN NOTES

- ① EXISTING DIFFUSER TO BE RELOCATED. REFER TO NEW WORK PLAN FOR NEW LOCATION.
- ② EXISTING RETURN GRILLE TO BE RELOCATED. REFER TO NEW WORK PLAN FOR NEW LOCATION.

FIRST FLOOR HVAC PLAN - DEMOLITION



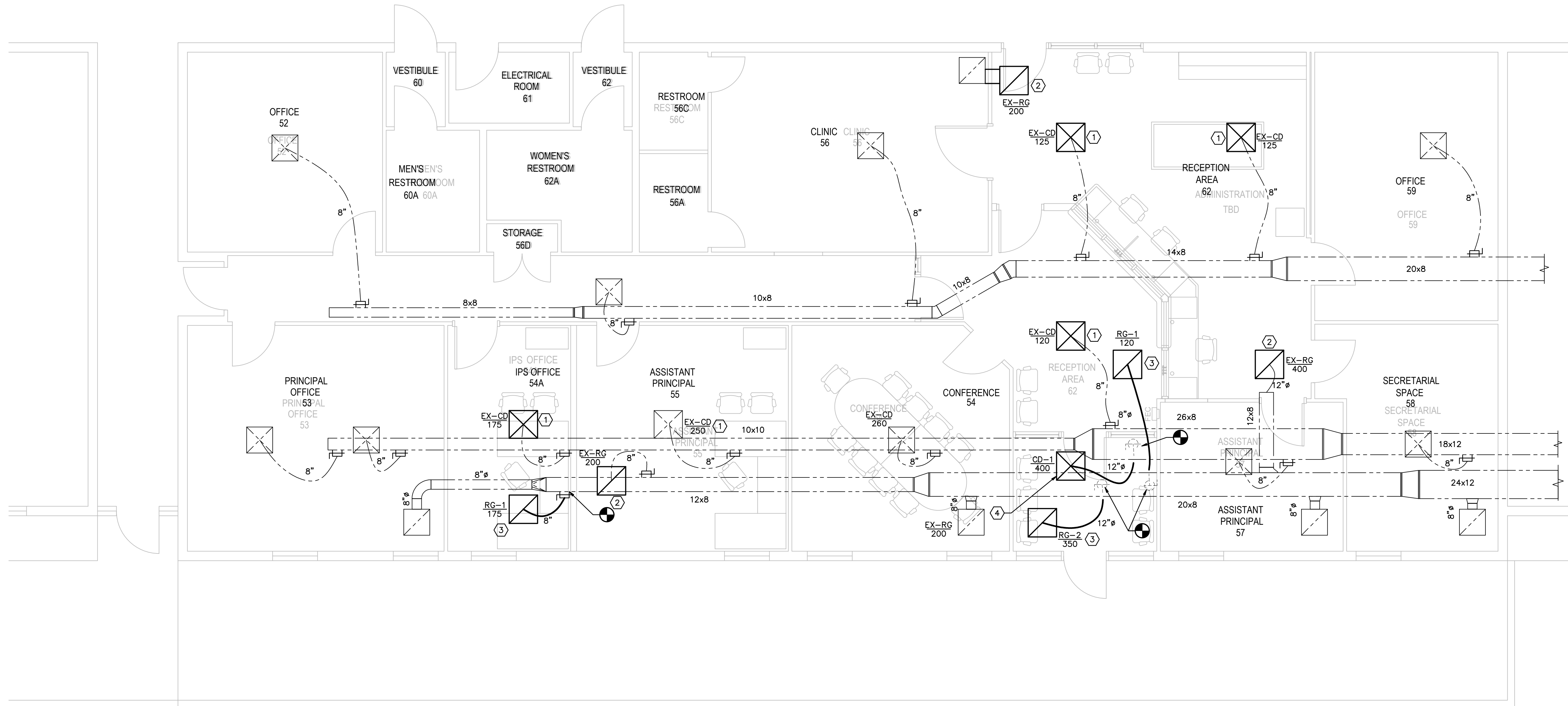
Revisions		
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 Kyle E. Lortzow, P.E. 80238

FIRST FLOOR HVAC
 DEMOLITION

M1.1



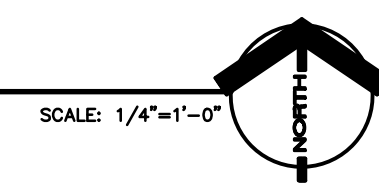
GENERAL NOTES

1. CONTRACTOR SHALL BALANCE ALL SUPPLY DIFFUSERS, TRANSFER GRILLES, AND RETURN GRILLES TO AIR QUANTITIES SHOWN. WHERE AIR QUANTITY HAS NOT BEEN INDICATED FOR AN EXISTING AIR OUTLET, CONTRACTOR SHALL BALANCE TO MATCH AIR QUANTITY IN CONTRACTOR'S PRE CONSTRUCTION AIRFLOW READINGS REPORT.

PLAN NOTES

- ① RELOCATED DIFFUSER. EXTEND OR REPLACE EXISTING FLEXIBLE DUCTWORK AS NECESSARY TO RECONNECT DIFFUSER.
- ② RELOCATED RETURN GRILLE. EXTEND OR REPLACE EXISTING FLEXIBLE DUCTWORK AS NECESSARY TO RECONNECT RETURN GRILLE.
- ③ NEW 24 X 24 RETURN GRILLE BASED ON MODEL 4FL AS MANUFACTURED BY TITUS. CONTRACTOR SHALL MATCH EXISTING RETURN GRILLES AND VERIFY EXISTING MAKE AND MODEL PRIOR TO ORDERING. PROVIDE INSULATED PLENUM BOX AS REQUIRED FOR FLEX CONNECTION. PAINT INSIDE OF CONNECTING PLENUM/ DUCTWORK MATTE BLACK.
- ④ NEW 24 X 24 SUPPLY DIFFUSER BASED ON MODEL T3SQ-4 AS MANUFACTURED BY TITUS. CONTRACTOR SHALL MATCH EXISTING SUPPLY DIFFUSERS AND VERIFY EXISTING MAKE AND MODEL PRIOR TO ORDERING.

FIRST FLOOR HVAC PLAN - NEW WORK



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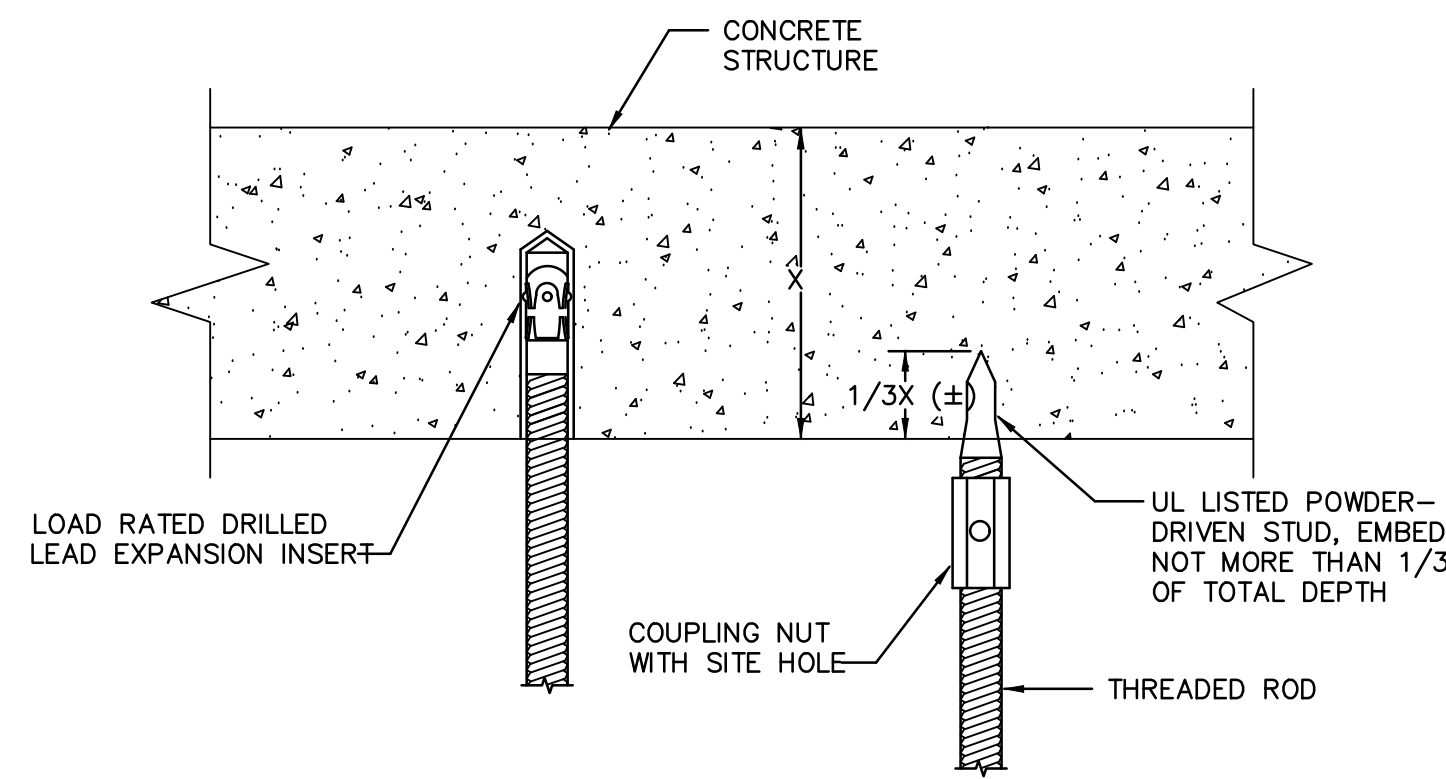
Revisions		
No.	Date	Note

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 Kyle E. Lortwein, P.E. 80228

FIRST FLOOR HVAC-NEW WORK

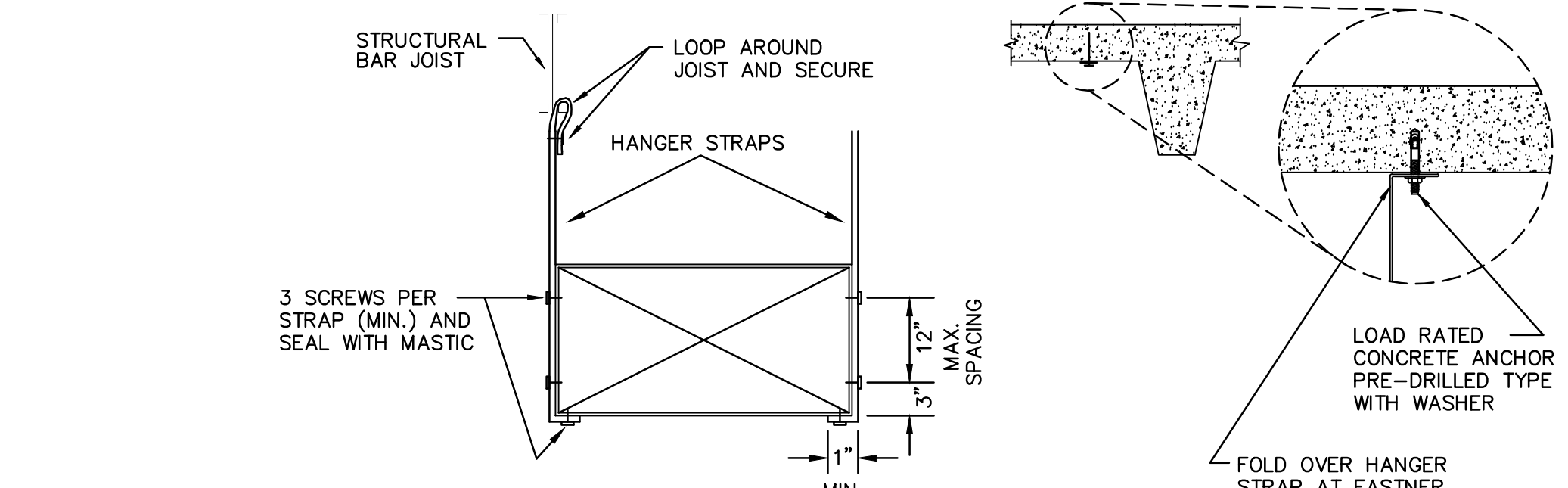
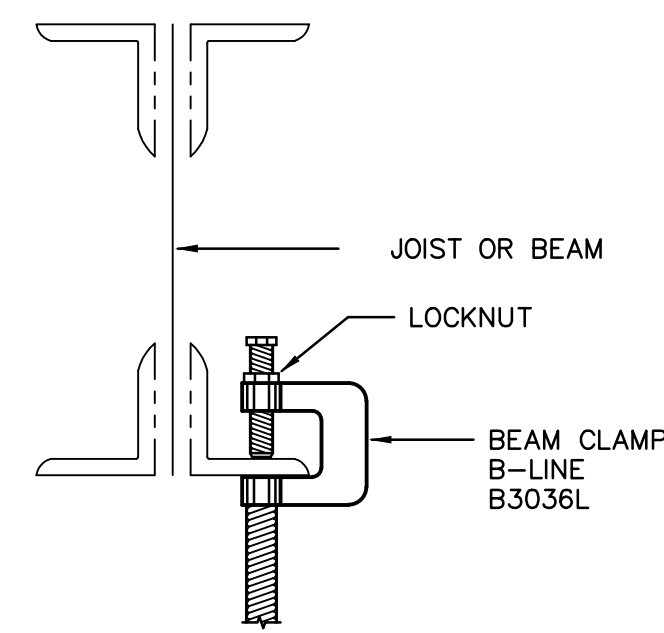
M1.2



A PULL-OUT ULTIMATE LOAD TEST SHALL BE PERFORMED FOR POWDER-DRIVEN STUDS ON FOUR REPRESENTATIVE SAMPLES, AT 1200 LBS. IF ANY ANCHOR FAILS, ONLY LEAD EXPANSION ANCHORS SHALL BE USED. INSTALLATION SHALL BE IN ACCORDANCE WITH MANUFACTURERS RECOMMENDATIONS. PIPING 4" AND LARGER SHALL UTILIZE LEAD EXPANSION ANCHORS.

UPPER ATTACHMENT TO STRUCTURE

SCALE: NONE

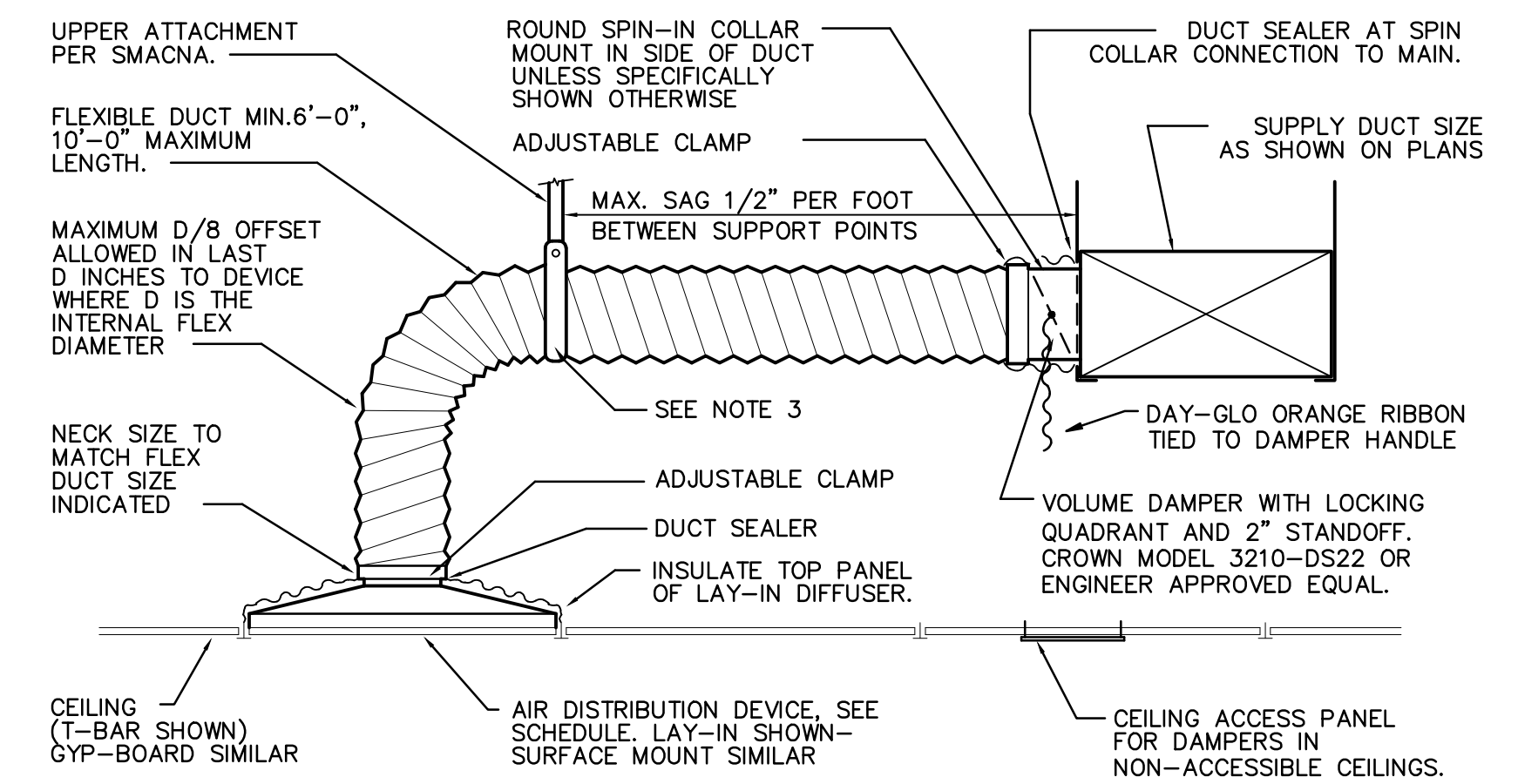


DUCT HANGER NOTES:

1. USE TRAPEZE HANGERS FOR DUCTS WIDER THAN 59"
2. MAXIMUM SPACING BETWEEN HANGER LOCATIONS SHALL BE 8'-0" PER PAIR.
3. STRAPS SHALL BE MINIMUM 1 1/2" X 22 GAGE GALVANIZED STEEL. SEE "RECTANGULAR DUCT HANGERS", SMACNA TABLES 4-1, 4-2.
4. RECTANGULAR DUCT SHOWN, SEE "LOWER HANGER ATTACHMENTS", FIGURE 4-4 FOR ROUND/OVAL DUCT.
5. FOR ATTACHMENTS OTHER THAN SHOWN, PROVIDE SHOP DRAWINGS TO ENGINEER FOR APPROVAL.

DUCT HANGING DETAIL

SCALE: NONE

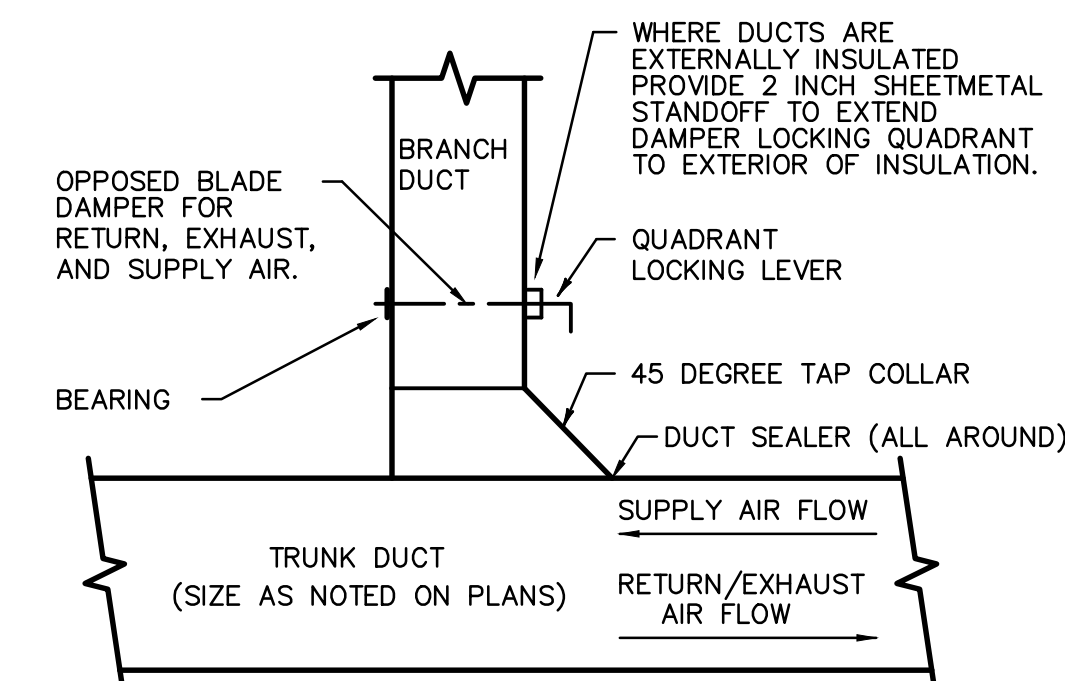


FLEXIBLE DUCT NOTES

1. FLEXIBLE DUCTS SHALL BE ONE-PIECE AND SHALL NOT BE SPLICED TOGETHER.
2. EXTEND FLEXIBLE DUCT INSULATION TO DUCT/DIFFUSER PANEL INSULATION AND SEAL WITH MASTIC.
3. MINIMUM 1-1/2" WIDE 22 GAUGE GALVANIZED STRAP HANGER WITH HEMMED EDGES PER SMACNA FIGURE 3-10.
4. FLEXIBLE AIR DUCT SHALL BE FULLY EXTENDED AND NOT COMPRESSED WITH ELBOW RADIUS NO LESS THAN R/D = 1.0.

FLEXIBLE DUCT DETAIL

SCALE: NONE



BRANCH DUCT TAKE-OFF DETAIL

RECTANGULAR LOW PRESSURE

SCALE: NONE

NOTE: DAMPER SHALL BE LOW LEAKAGE TYPE WHERE BRANCH AIRFLOW IS 75 CFM OR LESS

Revisions		
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Certification Number 6059
 Charles C. Gableman, P.E. 51936
 Kyle E. Lortman, P.E. 86238

MECHANICAL DETAILS

M2.1



SECTION IX
SAMPLE CONSTRUCTION CONTRACT

.....



CONTRACT NO. 1005-0-2021LD

**CONTRACT FOR
MARTIN COUNTY SCHOOL DISTRICT (MCSD)
ENHANCED SECURITY PROJECT**

**PURCHASING DEPARTMENT
2845 SE DIXIE HWY STUART, FL 34997
TELEPHONE (772) 219-1255
EMAIL: bids@martinschools.org**



CONSTRUCTION CONTRACT

INVITATION TO BID #1005-0-02021LD

**MARTIN COUNTY SCHOOL DISTRICT (MCSD)
ENHANCED SECURITY PROJECT**

THIS CONTRACT, approved and awarded on this _____ day of _____ 2021, between **THE SCHOOL DISTRICT OF MARTIN COUNTY**, a political subdivision of the State of Florida, hereinafter called the "DISTRICT", and _____ of **XXX**, their successors, executors, administrators, and assigns hereinafter called the "CONTRACTOR".

WHEREAS, the Martin County School District issued Invitation to Bid (ITB)#/**NAME** _____, to solicit ITBs from qualified firms to provide these named services, and;

WHEREAS, at its meeting of _____ 2021, by Agenda Item # _____ the DISTRICT Board authorized the proper DISTRICT officials to execute this Contract hereinafter referred to as "Contract # _____ to **CONTRACTOR NAME**, and;

WHEREAS, the CONTRACTOR is willing and able to perform the work of providing _____ services in accordance with the project manual specifications, and contract documents for the compensation as specified in below, and on the terms hereinafter set forth.

NOW, THEREFORE, the DISTRICT and CONTRACTOR hereto, in consideration of the mutual covenants, contracts, terms, and conditions contained herein, do agree as follows:

WITNESSETH:

1. PURPOSE

That Contractor agrees with DISTRICT, for the consideration herein mentioned, at his, its or their own proper cost and expense to do all the Work and furnish all the materials, equipment, supplies, and labor necessary to carry out this Contract in the manner and to the full extent as set forth in the Contract Documents, per the terms and conditions of Invitation to Bid # _____ and to the satisfaction of the duly authorized representatives of the DISTRICT, who shall have at all times full opportunity to inspect the materials to be furnished and the Work to be done under this Contract.

2. GENERAL DESCRIPTION OF WORK

It is agreed that the Work to be done under this Contract is: _____.

3. BUSINESS OPERATIONS

Unless otherwise directed by the Facilities Director; or designee, the Contractor(s) shall insure that the following schedule is adhered to and services as required must be scheduled to insure that **all work must be between the hours of 2:30 PM and 10:30pm**, including weekends from the hours of 7:00am until 7:00pm.

Upon approval by the Representative or Delegate of the District, the Contractor may cease operations of services during inclement weather conditions.



Contractor's employees and subcontractors furnished under this Contract will observe holidays as observed by the District. Contractor's employees will not work under this Contract on such holidays and no payment will be made by the District to Contractor for such holidays, without the written consent of the District Project Manager.

New Year's Day
President's Day
Memorial Day
Labor Day
Thanksgiving Day & Day After

Martin Luther King Day
Spring Break
Independence Day
Veteran's Day
Christmas Break

4. START OF WORK AND TIME FOR COMPLETION

The Contract Times shall commence to run on the dates as stated in the Notice to Proceed. All work is to be completed within _____ (XXX) calendar days. CONTRACTOR shall begin to perform the WORK on the commencement date stated in the Notice to Proceed, but no WORK shall be done at the Site prior to said commencement date. Contractor is to prosecute the work uninterrupted in such a manner, with sufficient labor, equipment and/or materials so as to insure work is completed within designated completion time. In the event the Contractor, due to circumstances beyond his/her control, cannot complete the project within this time frame, he/she shall immediately make this fact known to the Project Manager or designee.

The Contractor shall, within _____ () business days from the beginning of such delay, notify Project Manager, in writing, with copy to the Procurement Director, of the cause(s) of the delay. If the Contractor shall be delayed in the completion of its work by reason of unforeseeable causes beyond its control and without fault or negligence, including, but not restricted to, acts of God or neglect of any other Contractor, the period herein specified above specified for the completion of delivery shall be extended by such time as shall be approved by the Project Manager.

5. INSPECTION

The work will be conducted under the general direction of the Facilities Department, and is subject to inspection by an appointed inspector to insure compliance with the terms of the bid. No inspector is authorized to change any provision of the specifications without written authorization from the Project Manager, nor shall the presence or absence of an inspector relieve the Contractor from any requirements of the bid. Appointments for the final inspection shall be made three (3) days in advance.

6. PROJECT MANAGER

DISTRICT Project Manager is:
Name/Title:
Email:
Phone:
Cell:
Fax:

CONTRACTOR Project Manager is:
Name/Title:
Email:
Phone:
Cell:
Fax:

The parties shall direct all matters arising in connection with the performance of this Contract, other than invoices and notices, to the attention of the Project Managers for attempted resolution or action. Except as otherwise provided for in this Contract, the Project Managers shall be responsible for overall resolution or action. The Project Managers shall be responsible for overall coordination and oversight relating to the performance of this Contract. The Project Manager, however, has no authority to approve or execute Change Order Work.

7. COMPENSATION AND METHOD OF PAYMENT

7.1 Contract Payment

The DISTRICT shall pay the Contractor for the performance of this Contract and completion of the project in accordance with Contractor's pricing schedule formalized in "Exhibit B-Schedule of Bid Prices" to this Contract for a Not to Exceed (NTE) amount of \$_____ (written amount).



7.2 Invoices (Progress Payments)

Contractor shall submit invoices to the District for work accomplished and accepted by the District under this Contract. Each invoice shall be detailed and include, but not be limited to, a legible copy of the estimate approved by the Project Manager, and the date work was completed and accepted by the District. All invoices submitted shall consist of an original and one (1) copy to the following.

Martin County School District
Attn: Accounts Payable Department
1939 SE Federal Highway
Stuart, FL., 34994
invoices@martinschools.org

All invoices shall be based upon and submitted with an approved Schedule of Values. Said Schedule of Values shall also contain a percentage breakdown of the supplies and services completed for which payment is requested in comparison to the total contract.

7.3 Payment by means of the Purchasing Card (Pcard)

Contractor acknowledges acceptance of purchasing card. Therefore, all payments for services rendered shall be compensated within 10 days of invoice, approval by the District. District shall not pay any service charges or fees for Pcard transactions.

8. NOTICES

All notices, requests, consents, and other communications required or permitted under this Contract shall be in writing and shall be (as elected by the person giving such notice) hand delivered by messenger or courier service, telecommunicated, or mailed by registered or certified mail (postage prepaid) return receipt requested, addressed to:

As To DISTRICT:

Director of Facilities
Martin County School District
1939 SE Federal Highway
Stuart, Fl., 34994

With A Copy To:

Director of Purchasing
Martin County School District
2845 S.E. Dixie Hwy
Stuart, Fl., 34997

As To CONTRACTOR:

or to such other address as any party may designate by notice complying with the terms of this Section. Each such notice shall be deemed delivered (a) on the date delivered if by personal delivery, (b) on the date upon which the return receipt is signed or delivery is refused or the notice is designated by the postal authorities as not deliverable, as the case may be, if mailed.

All original documents that result from the Contractor's services pursuant to this Agreement shall be the sole property of the District.

9. GUARANTEE

The Contractor guarantees all workmanship/labor for a period of 12 months from date of completion and final acceptance by the Facilities Department designee. Should any defect in workmanship, excepting ordinary wear and tear, appear during the above stated warranty period, the Contractor shall repair or replace same at no cost to the District, immediately upon written notice from the Facilities Department Designee.

Contractor further guarantees the successful performance of the work for the service intended. If the District deems it inexpedient to require the Contractor to correct deficient or defective materials or labor, an equitable deduction from the contract price shall be made therefore or in the alternative the District may sue for damages, or both. The performance Bond may also be used in the performance of the work.



10. **AUDIT**

The Contractor agrees that the District or any of its duly authorized representatives shall, until the expiration of three years after expenditure of funds under this Agreement, have access to and the right to examine any directly pertinent books, documents, papers, and records of the Contractor involving transactions related to this Agreement. The Contractor agrees that payment(s) made under this Agreement shall be subject to reduction for amounts charged thereto which are found on the basis of audit examination not to constitute allowable costs under this Agreement. The Contractor shall refund by check payable to the Martin County School Board the amount of such reduction of payments. All required records shall be maintained until an audit is completed and all questions arising therefrom are resolved, or three years after completion of the project and issuance of the final certificate, whichever is sooner. Refusal to do so shall constitute a material breach of this contract and cause for dismissal of any litigation.

11. **CONTRACTOR RESPONSIBILITY**

11.1 **Independent Contractor**

The Contractor is an independent Contractor and is not an employee or agent of the District. Nothing in this Agreement shall be interpreted to establish any relationship other than that of an independent Contractor, between the District and the Contractor, its employees, agents, subContractors, or assigns, during or after the performance of this Agreement.

11.2 **Non-Exclusive Contract**

Contractor agrees and understands that the contract shall not be construed as an exclusive arrangement and further agrees that the District may, at any time, secure similar or identical services at its sole option.

11.3 **Contractor Supplied Equipment**

Contractor shall provide their own equipment and tools required to perform services. Contractor shall also provide their own cell phone, vehicle, fuel, vehicle maintenance and insurance.

11.4 **Subcontracting**

If Contractor, subcontracts any portion of the work under this contract for any reason, he must include, in writing the **name and address of the Subcontractor**. Include the name of the person to be contacted, telephone number and extent of work to be performed.

If Contractor should need to change subcontractor information, changes are subject to the approval by the District. The District reserves the right to reject a subcontractor who has previously failed in the proper performance or failed to deliver on time contract of a similar nature, or who is not in a position to perform properly under this agreement.

All Contractors, including any independent Contractors and subcontractors utilized, must comply with the insurance requirements as set forth in the documents identified and listed in "**Exhibit D**" attached hereto.

11.5 **Responsibility for Work**

The Contractor shall take the whole responsibility of the Agreement Work and shall bear all losses resulting to him because of bad weather, or because of errors or omissions in his or its bid on the Agreement price, or except as otherwise provided in the Agreement Documents because of any other causes whatsoever.

11.6 **Professional Standards**

All work performed by Contractor will be in accordance with the highest professional standards and in accordance with all applicable governmental regulations.

11.7 **Performance and Payment Bond**

Contractor shall furnish a performance bond with a carrier duly licensed and authorized to do business in the State of Florida, equal to one hundred percent (100%) of the projected total amount of the contract to assure faithful performance and timely payments to all persons providing labor, materials or supplies used in the performance of the work as incorporated in Exhibit C.



Provide evidence confirming the firm's ability to obtain Payment and Performance Bonds for the construction project as detailed herein. The successful Bidder will be required to furnish payment and performance bonds with a carrier duly licensed and authorized to do business in the State of Florida, equal to one hundred percent (100%) of the total amount of the contract to assure faithful performance and timely payments to all persons providing labor, materials or supplies used in the performance of the work.

11.8 Liquidated Damages

The Contractor shall pay to the party of the first part, as damages for non-completion of the work within the time stipulated for its completion, _____ (\$_____) for each and every day which may exceed the stipulated time for its completion, is hereby agreed upon, fixed and determined by the parties hereto as liquidated damages that the party of the first part will suffer by reason of such default and not by way of penalty.

The party of the first part is hereby authorized to deduct the said sum of one thousand dollars (\$_____) per day from the moneys which may be due or become due said Contractor for the work under this contract, or as much thereof as the Owner may, at its own option, deem just and reasonable.

11.9 Protection of Property

The Contractor shall provide all signs, barricades, and/or flashing lights, and take all necessary precautions to protect buildings and personnel. All work shall be complete in every respect and accomplished in a satisfactory, workmanlike manner and Contractor shall provide for timely removal of all debris which results from this contracted service.

The Contractor shall at all times guard against damage or loss to all persons and property, including but not limited to safeguard sidewalks, curbing, road surfaces and motor vehicles on or around all job sites. Damage to public or private property shall be the responsibility of the Contractor and shall be held responsible for replacing or repairing any such loss or damage at the expense of the Contractor. The District may withhold payment or make such deductions, as deemed necessary, to ensure reimbursement or replacement for loss or damage to property through negligence of the Contractor or their agents.

The Contractor shall be responsible for the protection of property in the areas in the adjacent vicinity of the project(s); and for the protection of his own equipment, supplies, materials and work, against any damage resulting from the elements (such as flooding, rainstorms, wind damage, or other acts of God) or vandalism.

12. CONTRACT PROVISIONS

12.1 Contract Terms

Contract shall be governed in all respects as to validity, construction, capacity, performance, or otherwise by the laws of the State of Florida. Contractors providing service under this contract assure the School Board that they are conforming to and otherwise complying with the following, as applicable:

- Jessica Lunsford Act, Florida Statute FS1012.465
- The Civil Rights Act of 1964, as amended.
- Clean Air and Water Pollution Acts, Executive Order 11738, 42 U.S.C. 7401-7671q.
- Federal Water Pollution Control Act, 33 U.S.C. 1251-1387.
- Federal Debarment Certification, as required by Executive Order 12549, Debarment and Suspension, and implemented at 34 CFR, Part 85, as defined at 34 CFR Part 85, Sections 85.105 and 85.110- (ED80-0013).
- U.S. Department of Agriculture's "Buy American", : Section 104(d) of the William F. Goodling Child Nutrition Reauthorization Act of 1998
- EPA Regulation, 40 CFR Part 15, which prohibits the use under non-exempt federal contracts, grants or loans of facilities included on the EPA list of violating facilities.
- Federal, state and local laws and regulations, including the Davis-Bacon Act, pertaining to wages, hours and conditions of employment and 2CFR 200.317 – 200.326, if applicable.
- Energy Policy and Conservation Act, 42 U.S.C. 6201.
- Funding Agreement (Rights to Inventions) 37 CFR Part 401.
- Recovered Materials Section 6002 of Environmental Protection Agency (EPA) at 40 CFR Part 247.



- Equal Employment Opportunity, 41 CFR Part 60.
- Anti-Discrimination, non-discrimination clause contained in Section 202, Executive Order 11246, as amended by Executive Order 11375 relative to equal employment opportunity for all persons without regard to race, color, religion, sex or national origin. The provisions of the ADA Act of 1990 pertaining to employment shall also be applicable.
- Verification of Employment (E-Verify), Pursuant to Section 448.095, Florida Statutes
- Copeland "Anti-Kickback" Act, 40 U.S.C. 3145, as supplemented by the Department of Labor Regulations (29 CFR Part 3, "Contractors and Subcontractors on Public Building or Public Work Financed in Whole or in Part by loans or grants from the United States".)
- Contract Work Hours and Safety Standards Act, 40 USC 3702 and 3704, as supplemented by Department of Labor Regulations (29 CFR Part 5), as applicable.
- Supplementary Conditions (Articles), Section IV of the Solicitation

12.2 Contractual Authority

By signing this Contract, the Contractor swears or affirms, under penalty of perjury, that this is a valid act of the Contractor, and that no later claim shall be made by the Contractor that the Contract is invalid or an *ultra vires* act, by reason of a failure to have the proper authority to execute the Contract. In the event that a court of competent jurisdiction later determines that the Contract is or would be null and void for failure of the signatory to have proper or complete authority, this Contract shall nonetheless be deemed valid under the theory of "apparent authority," or in the sole alternative of the District, shall be deemed to be the act of the signatory, as an individual, who shall be fully responsible for its complete performance.

12.3 Contract Amendment

The District of Stuart reserves the right to order, in writing, changes in the work within the scope of the contract. The Contractor has the right to request an equitable price adjustment in cases where modifications to the contract under the authority of this clause result in increased costs to the Contractor. This agreement may be modified upon the written and mutual consent of both parties, and approval by appropriate legal bodies in the Martin County School District.

No modification, amendment or alteration in the terms or conditions contained in this Contract shall be effective unless contained in a written documents executed with the same formality and of equal dignity herewith. This Contract constitutes the entire agreement between the parties, and no prior, or contemporaneous oral agreement shall be binding on either party. If either party fails to enforce a portion or all of this Contract, it shall not constitute a waiver of the same.

13. TERMINATION CLAUSES

13.1 Termination for Convenience

Either party upon a thirty (30) day written notice to the other party may terminate this Contract. In the event of any termination, Contractor shall be paid for all services rendered to the date of termination including all authorized reimbursable expenses.

13.2 Termination for Cause

This contract may be terminated without liability to the School Board in whole or in part when it is deemed to be in the best interest of the School Board to so act. Notification of termination must be in writing and issued by the Director of Facilities or designee. Further, at the discretion of the School Board, the contract may be terminated in a period of less than 30 days in the event of poor performance or violation of these terms. The Contractor shall have a period of time, as determined by the School Board, to remedy any noncompliance to offered terms and specifications. The School Board, upon termination, shall exercise its discretion to complete the balance of the contract consistent with the best interest of the School Board. The School Board delegates the authority to terminate the contract to the Superintendent or designee. At the discretion of the School Board, the Contractor may be removed from future solicitation opportunities for a period up to three (3) years.

If the Contractor should be adjudged bankrupt, or if he should make a general assignment for the benefit of his creditors, or if a receiver should be appointed on account of his insolvency, or if he should fail to provide



properly skilled personnel or proper service in the sole discretion of the District, then the District can, after giving the Contractor seven (7) days written notice, and without prejudice to any other right or remedy, terminate this Contract.

13.3 Default

Default may be declared by the School Board if the Contractor violates the terms of the agreement in any manner. Upon default of this agreement and/or any agreement resulting from this agreement, the School Board shall be entitled to pursue all remedies available at law and/or in equity, including, but not limited to, the recovery of damages equaling the difference of the submitted price and the price the School Board subsequently pays to secure performance from other sources. Damages may be assessed and deducted against any funds due and owing to the Contractor.

At the discretion of the School Board, any Contractor found in default of this agreement and/or any agreement resulting from this agreement, shall be removed from the Contractor list for a period of up to three (3) years from the date of said default. Default under this agreement and/or any other agreement(s) in which the School Board has contracted with the Contractor, may also, at the discretion of the School Board, result in termination of any other such agreement(s).

14. INSURANCE AND INDEMNIFICATION

14.1 Requirements

Contractor shall procure and maintain insurance, in the amounts noted in Section V of the Invitation to Bid and included in "**Exhibit D**" of this Contract, which names the Contractor, its officers, board members, employees and agents as additional insured on General Liability and Automobile Liability insurance policies. Such certificate must contain a provision for notification of the District 30 days in advance of any material change or cancellation. The District by and through its Risk Manager, reserves the right to review, modify, reject or accept any required policies of insurance, including limits coverages or endorsements, herein from time to time throughout the term of this contract. All insurance carriers must have an A.M. Best Rating of at least A:VII or better. When a self-insured retention or deductible exceeds \$5,000, the District reserves the right, but not the obligation, to review and request a copy of Contractor's most recent annual report or audited financial statement. All Contractors, including any independent Contractors and subcontractors utilized, must comply with the insurance requirements as set forth in the documents identified and listed in "**Exhibit D**" attached hereto.

14.2 Certificate of Insurance

Certificates of all insurance required from the Contractor shall be attached to this agreement and shall be subject to the District's approval for adequacy.

14.3 Indemnification

Contractor agrees to protect, defend, indemnify, and hold harmless the District, its employees, representatives, and elected officials from any and all claims and liabilities including all attorney's fees and court costs, including appeals, for which the District, its employees, representatives, and elected officials can or may be held liable as a result of injury (including death) to persons or damage to property occurring by reason of any negligence, recklessness, or intentional wrongful misconduct of the Contractor, its employees, or agents, arising out of or connected with this Agreement. The Contractor shall not be required to indemnify the District or its agents, employees, representatives, or elected officials when an occurrence results solely from the wrongful acts or omissions of the District, or its agents, employees or representatives.

Contractor, without exemption, shall indemnify and hold harmless, the District, its employees, representatives and elected officials from liability of any nature or kind, including cost and expenses for or on account of any copyrighted, service marked, trademarked patented or unpatented invention, process, or any other intellectual property right or item manufactured by the Contractor. Further, if such a claim is made, or is pending, the Contractor may, at its option and expense, procure for the District the right to use, replace, or modify the item to render it non-infringing. If none of the alternatives are reasonably available, the District agrees to return the article on request to the Contractor and receive reimbursement from the Contractor. If the Contractor used any design, device or materials covered by letters, patent or copyright, it is mutually agreed and understood, without



exception, that the Bid prices shall include all royalties or cost arising from the use of such design, device or materials in any way involved in the work. This article shall survive the termination of any contract with the School District.

The parties agree that Ten Dollars (\$10.00) of the total compensation paid to the Bidder for performance of this Agreement shall represent the specific consideration for the Bidder's indemnification of the Owner.

The District reserves the right to select its own legal counsel to conduct any defense in any such proceeding and all costs and fees associated therewith shall be the responsibility of Contractor under the indemnification agreement.

14.4 Claims

In any and all claims against the District or the Engineer of Record or any of their agents or employees, by any employee of the Contractor, any Subcontractor, anyone directly or indirectly employed by any of them or anyone for whose acts any of them may be liable, the indemnification obligation (Indemnification) shall not be limited in any way by any limitation on the amount or type of damages, compensation or benefits payable by or for the Contractor or any Subcontractor under worker's compensation acts, disability benefit acts or other employee benefit acts.

15. GENERAL CONDITIONS

15.1 Badge Policy

This work is to take place on an active campus with active buildings around the area of work. All personnel working onsite with this project must have & wear MCSD badge at all times on the site. The Contractor must comply and pay for all associated costs for each individual working on the project,

15.2 Venue

All contracts shall be governed by the laws of the State of Florida and venue shall be in Martin County, Florida. The venue of any legal action resulting from this Agreement shall be Martin County, Florida.

15.3 Severability

Indulgence by the District on any non-compliance by the Contractor does not constitute a waiver of any rights under this Agreement. If any term or provision of resulting Contract, or the application thereof to any person or circumstances shall, to any extent, be held invalid or unenforceable, the remainder of this Contract, or the application of such terms or provisions to persons or circumstances other than those as to which it is held invalid or unenforceable, shall not be affected, and every other term provision of this Bid/Contract shall be deemed valid and enforceable to the extent permitted by law.

15.4 Sovereign Immunity

No Waiver of Sovereign Immunity: Nothing contained herein is intended to serve as a waiver of sovereign immunity by any agency or political subdivision to which sovereign immunity may be applicable or as a waiver of limits to liability or rights existing under Section 768.28, Florida Statutes.

15.5 Assignment of Interest in Contract

This Contract and any interest or services associated with this Contract may not be assigned, sublet or transferred to another by either party without the prior written consent of the other party. Nothing contained herein shall be construed to prevent Contractor from employing such independent Contractors, associates and subcontractors as Contractor may deem appropriate to assist in the performance of the services hereunder.

15.6 Rights and Benefits

Nothing herein shall be construed to give any rights or benefits arising from this Contract to anyone other than Contractor and the District.



15.7 Parties to the Contract

The persons bound by this Contract are the Contractor and the District and their respective partners, successors, heirs, executors, administrators, assigns and other legal representative.

16. PUBLIC RECORDS

If the Contractor has questions regarding the application of chapter 119, Florida statutes, to the Contractor's duty to provide public records relating to this contract, contact the custodian of public records, staff attorney's office at 772. 219.1255, ext. 30241, 1939 SE Federal Highway, Stuart, Florida 34994 or click [here](#).

In compliance with F.S. 119.0701 the Contractor shall:

- Keep and maintain public records required by the public agency to perform the service.
- Upon request from the public agency's custodian of public records, provide the public agency with a copy of the requested records or allow the records to be inspected or copied within a reasonable time at a cost that does not exceed the cost provided in this chapter or as otherwise provided by law.
- Ensure that public records that are exempt or confidential and exempt from public records disclosure requirements are not disclosed except as authorized by law for the duration of the contract term and following completion of the contract if the Contractor does not transfer the records to the public agency.
- Upon completion of the contract, transfer, at no cost, to the public agency all public records in possession of the Contractor or keep and maintain public records required by the public agency to perform the service. If the Contractor transfers all public records to the public agency upon completion of the contract, the Contractor shall destroy any duplicate public records that are exempt or confidential and exempt from public records disclosure requirements. If the Contractor keeps and maintains public records upon completion of the contract, the Contractor shall meet all applicable requirements for retaining public records. All records stored electronically must be provided to the public agency, upon request from the public agency's custodian of public records, in a format that is compatible with the information technology systems of the public agency.
- A request to inspect or copy public records relating to a public agency's contract for services must be made directly to the public agency. If the public agency does not possess the requested records, the public agency shall immediately notify the Contractor of the request, and the Contractor must provide the records to the public agency or allow the records to be inspected or copied within a reasonable time.
- If a Contractor does not comply with the public agency's request for records, the public agency shall enforce the contract provisions in accordance with the contract.
- A Contractor who fails to provide the public records to the public agency within a reasonable time may be subject to penalties under F.S. 119.10.
- If a civil action is filed against a Contractor to compel production of public records relating to a public agency's contract for services, the court shall assess and award against the Contractor the reasonable costs of enforcement, including reasonable attorney fees, if:
 1. The court determines that the Contractor unlawfully refused to comply with the public records request within a reasonable time; and
 2. At least eight (8) business days before filing the action, the plaintiff provided written notice of the public records request, including a statement that the Contractor has not complied with the request, to the public agency and to the Contractor.



- A notice complies with subparagraph 2 above, if it is sent to the public agency's custodian of public records and to the Contractor at the Contractor's address listed on its contract with the public agency or to the Contractor's registered agent. Such notices must be sent by common carrier delivery service or by registered, Global Express Guaranteed, or certified mail, with postage or shipping paid by the sender and with evidence of delivery, which may be in an electronic format.
- A Contractor who complies with a public records request within eight (8) business days after the notice is sent is not liable for the reasonable costs of enforcement.

17. SCRUTINIZED COMPANIES LIST

Pursuant to Sections 287.135, 215.4725, and 215.473, of the Florida Statutes which prohibits agencies from contracting with any company, principals, or owners on the Scrutinized Companies with Activities in Sudan List, participation in the Boycott of Israel, the Scrutinized Companies with Activities in the Iran Petroleum Energy List, and is not engaged in business operations in Cuba or Syria are prohibited from contracting for goods or services in any amount under the terms of this contract, including renewals or extensions.

By signature of this agreement, Contractor certifies and attests that firm is not on any list, engaged in any business operations, or participates in activities as specified in this section. If firm is found negligent, contract shall be terminated; and submission of a false certification may subject firm to civil penalties, attorney's fees, and/or costs.

18. ELECTRONIC SIGNATURES

The School Board hereby authorizes the acceptance and distribution of electronic records and electronic signatures to and from District staff and other persons, as well as between District staff members as authorized in School Board Policy 6107.

19. EXHIBITS

The following Exhibits are attached to and made a part of this Contract:

- Exhibit A** Original Invitation to Bid (ITB) as issued by District, including all Addenda
- Exhibit B** Bid as Submitted by Contractor
- Exhibit C** Performance and Payment Bond
- Exhibit D** Insurance and Indemnification

[REMAINDER OF PAGE INTENTIONALLY LEFT BLANK]

Signatures Follow On Next Page



IN WITNESS WHEREOF, the parties hereto have accepted, made and executed this Agreement in counterparts each of which shall be treated as an original upon the terms and conditions above stated.

CONTRACTOR

Attest

Witnesses

NAME, TITLE

As to the DISTRICT on the ____ day of ____, ____.

MARTIN COUNTY SCHOOL DISTRICT

Attest

Witness

Marsha B. Powers, Board Chair

APPROVED AS TO FORM
AND CORRECTNESS

School Board Attorney

ALL DOCUMENT EXHIBITS SHALL BE ATTACHED HERE