

# PROJECT SPECIFICATIONS

## ARLINGTON COUNTY COURTHOUSE - COURTROOM 10B RENOVATION

ARLINGTON, VIRGINIA

**MOSELEY**ARCHITECTS

ARCHITECT/ENGINEER

RICHMOND, VIRGINIA

BID/PRICING SET

**March 18, 2022**

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Refer to Arlington County Procurement Requirements under separate cover.

Prebid Question Form: (Use on-line form. To access form go to [www.moseleyarchitects.com](http://www.moseleyarchitects.com), "Bidding", find applicable project and click the link "Submit a Question").

**SPECIFICATIONS**

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ARLINGTON COUNTY COURTHOUSE; COURTROOM 10B RENOVATION  
Arlington, Virginia  
Architect's Project No: 563005

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**SECTION 011000  
SUMMARY**

**PART 1 GENERAL**

**1.01 PROJECT**

- A. Project Name: Arlington County Courthouse; Courtroom 10B Renovation.
- B. Owner's Name: Arlington County, Virginia.
- C. Architect's Name: Moseley Architects of Richmond, VA.

**1.02 CONTRACT DESCRIPTION**

- A. Contract Type: A single prime contract based on a Stipulated Price as described in the standard form of agreement.

**1.03 PROFESSIONAL SEALS**

- A. Use of Professional Seals on Bidding, Procurement, and Contract Documents: For the purposes of this paragraph, the term "Regulant" refers to the individual who signs and seals parts of the Contract Documents (e.g. the Drawings and Specifications). Certain information has been excerpted verbatim from a source or sources (e.g., UL Assemblies, SMACNA details, IBC code text) which was considered or used by Regulant in preparing parts of the Contract Documents, as follows:
  - 1. The excerpted information was neither prepared under the direct control nor personal supervision nor created by the Regulant, as it was prepared by the source and owner of the excerpted information.
  - 2. For purposes of bidding, procuring, and performance of the Work, and in any event of conflicts or ambiguities between the excerpted information in the Contract Documents and the requirements of applicable codes and standards, provide the better quality or greater quantity of Work which, at a minimum, complies with the requirements of the applicable codes and standards.
  - 3. Advise Architect immediately upon becoming aware of requirements of the Work which are not consistent with the requirements of the excerpted information.
  - 4. Attribution is acknowledged for information obtained and included herein verbatim from other source or sources.
  - 5. Regulant has taken into consideration and used certain excerpted information from other sources which are applicable to the Contract Documents, and the Regulant indicates by its seal that it is assuming responsibility for its services in use and application of the excerpted information to the requirements of Work, but not for the excerpted information itself which was prepared by others. Regulant does not indicate by its seal that it is responsible for use or application of other information in such source or sources which was not included herein.

**1.04 OWNER OCCUPANCY**

- A. Owner intends to occupy the Project upon Substantial Completion.
- B. Cooperate with Owner to minimize conflict and to facilitate Owner's operations.
- C. Schedule the Work to accommodate Owner occupancy.
  - 1. Maintain routes of egress and life safety systems for Owner and occupants at all times.

**1.05 CONTRACTOR USE OF SITE AND PREMISES**

- A. Construction Operations: Limited to areas noted on Drawings.
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1. Locate and conduct construction activities in ways that will limit disturbance to site.
- B. Provide access to and from site as required by law and by Owner:
  1. Emergency Building Exits During Construction: Keep all exits required by code open during construction period; provide temporary exit signs if exit routes are temporarily altered.
  2. Do not obstruct roadways, sidewalks, or other public ways without permit.
- C. Time Restrictions:
  1. Comply with local regulations for hours of work, noise ordinances, and similar requirements.
- D. Utility Outages and Shutdown:
  1. Limit disruption of utility services to hours the building is unoccupied.
  2. Do not disrupt or shut down life safety systems, including but not limited to fire sprinklers and fire alarm system, without 7 days notice to Owner and authorities having jurisdiction.
  3. Prevent accidental disruption of utility services to other facilities.
- E. Controlled Substances: The use of alcohol and drugs is not permitted on the Project site. Provide a designated outdoor smoking area for construction personnel that is at least 25 feet away from the building.

#### **1.06 SPECIFICATION SECTIONS APPLICABLE TO ALL WORK**

- A. The provisions of the Owner/Contractor agreement, General Conditions of the Contract, Supplementary Conditions (if any), and all Division 01 sections shall apply to all sections of the Project Manual.

#### **1.07 SECURITY PROVISIONS**

- A. Background Check: The Owner requires that a background check be performed on all personnel working on the site. Comply with Owner's requirements for screening service to be used. Maintain a list of all accredited persons, submit a copy to Owner on request.
- B. Identification Badges: Provide identification badges to each person authorized to enter premises. Badge shall include personal photograph, name, employer, expiration date, and an assigned number. Have personnel return badges to Contractor after completion of their portion of the Work.

#### **PART 2 PRODUCTS - NOT USED**

#### **PART 3 EXECUTION - NOT USED**

#### **END OF SECTION**

**SECTION 012000  
PRICE AND PAYMENT PROCEDURES**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Procedures for preparation and submittal of applications for progress payments.

**1.02 SCHEDULE OF VALUES**

- A. Use Schedule of Values Form: AIA G703, unless otherwise agreed to by Owner in writing.
- B. Forms filled out by hand will not be accepted.
- C. Format: Utilize the Table of Contents of this Project Manual. Identify each line item with number and title of the specification section. Identify site mobilization.
- D. Include in each line item, the amount of Allowances specified in this section. For unit cost Allowances, identify quantities taken from Contract Documents multiplied by the unit cost to achieve the total for the item.
- E. Include separately from each line item, a direct proportional amount of Contractor's overhead and profit.
- F. Revise schedule to list approved Change Orders, with each Application For Payment.
  - 1. When a Change Order includes multiple PCOs, break down the total Change Order to include each PCO as an individual line item.

**1.03 APPLICATIONS FOR PROGRESS PAYMENTS**

- A. Payment Period: Submit at intervals stipulated in the Agreement.
- B. Use Form AIA G702 and Form AIA G703.
- C. Electronic media printout including equivalent information will be considered in lieu of standard form specified; submit sample to Architect for approval.
- D. Forms filled out by hand will not be accepted.
- E. For each item, provide a column for listing each of the following:
  - 1. Item Number.
  - 2. Description of work.
  - 3. Scheduled Values.
  - 4. Previous Applications.
  - 5. Work in Place and Stored Materials under this Application.
  - 6. Authorized Change Orders.
  - 7. Total Completed and Stored to Date of Application.
  - 8. Balance to Finish.
  - 9. Retainage.
- F. Execute certification by signature of authorized officer.
- G. Use data from approved Schedule of Values. Provide dollar value in each column for each line item for portion of work performed and for stored products.
- H. List each authorized Change Order as a separate line item, listing Change Order number and dollar amount as for an original item of work.
  - 1. When a Change Order includes multiple PCOs, break down the total Change Order to include each PCO as an individual line item.

- I. Submit one electronic and three hard-copies of each Application for Payment.
- J. Include the following with the application:
  - 1. Transmittal letter as specified for submittals in Section 013000.
  - 2. Construction progress schedule, revised and current as specified in Section 013000.
  - 3. Partial release of liens from major subcontractors and vendors.
  - 4. Affidavits attesting to off-site stored products.

#### **1.04 MODIFICATION PROCEDURES**

- A. For minor changes not involving an adjustment to the Contract Sum or Contract Time, Architect will issue instructions directly to Contractor on AIA Document G710 "Architect's Supplemental Instructions."
- B. For changes for which advance pricing is desired, Architect will issue a document that includes a detailed description of a proposed change with supplementary or revised drawings and specifications, a change in Contract Time for executing the change with a stipulation of any overtime work required and the period of time during which the requested price will be considered valid. Contractor shall prepare and submit a fixed price quotation within 14 days, unless otherwise indicated in Proposal Request.
- C. Contractor may propose a change by submitting a request for change to Architect, describing the proposed change and its full effect on the work, with a statement describing the reason for the change, and the effect on the Contract Sum and Contract Time with full documentation.
- D. For other required changes, Architect will issue a Construction Change Directive, on AIA Document G714, signed by Owner instructing Contractor to proceed with the change, for subsequent inclusion in a Change Order.
  - 1. The document will describe the required changes and will designate method of determining any change in Contract Sum or Contract Time.
  - 2. Promptly execute the change.
- E. Computation of Change in Contract Amount: As specified in the Agreement and Conditions of the Contract.
  - 1. For change requested by Architect for work falling under a fixed price contract, the amount will be based on Contractor's price quotation.
  - 2. For change requested by Contractor, the amount will be based on the Contractor's request for a Change Order as approved by Architect.
  - 3. For pre-determined unit prices and quantities, the amount will be based on the fixed unit prices.
- F. Substantiation of Costs: Provide full information required for evaluation.
  - 1. Provide the following data:
    - a. Quantities of products, labor, and equipment.
    - b. Taxes, insurance, and bonds.
    - c. Overhead and profit.
    - d. Justification for any change in Contract Time.
    - e. Credit for deletions from Contract, similarly documented.
  - 2. Support each claim for additional costs with additional information:
    - a. Origin and date of claim.
    - b. Dates and times work was performed, and by whom.
    - c. Time records and wage rates paid.
    - d. Invoices and receipts for products, equipment, and subcontracts, similarly documented.

- G. Execution of Change Orders: Architect will issue Change Orders on AIA Document G701 for signatures of parties as provided in the Conditions of the Contract.
- H. After execution of Change Order, promptly revise Schedule of Values and Application for Payment forms to record each authorized Change Order as a separate line item and adjust the Contract Sum.
- I. Promptly revise progress schedules to reflect any change in Contract Time, revise sub-schedules to adjust times for other items of work affected by the change, and resubmit.

**1.05 APPLICATION FOR FINAL PAYMENT**

- A. Prepare Application for Final Payment as specified for progress payments, identifying total adjusted Contract Sum, previous payments, and sum remaining due.
- B. Application for Final Payment will not be considered until the following have been accomplished:
  - 1. All closeout procedures specified in Section 017000.
- C. Provide evidence and supporting data for the following, as attachments to the Application for Final Payment:
  - 1. AIA G706, "Contractor's Affidavit of Payment of Debts and Claims."
  - 2. AIA G707, "Consent of Surety to Final Payment."
  - 3. Settlement of all debts and claims, including liquidated damages, taxes, and fees.
  - 4. Utility meter readings, fuel levels, and similar measurements, as of the date of turn over to the Owner.
  - 5. Certificates for insured products.

**PART 2 PRODUCTS - NOT USED**

**PART 3 EXECUTION - NOT USED**

**END OF SECTION**



**SECTION 012500  
SUBSTITUTION PROCEDURES**

**PART 1 GENERAL**

**1.01 DEFINITIONS**

- A. Substitutions: Changes from Contract Documents requirements proposed by Contractor to materials, products, assemblies, and equipment.
  - 1. Substitutions for Cause: Proposed due to changed Project circumstances beyond Contractor's control, such as unavailability, regulatory changes, or unobtainable warranty terms.
  - 2. Substitutions for Convenience: Proposed due to possibility of offering substantial advantage to the Project.

**PART 2 PRODUCTS - NOT USED**

**PART 3 EXECUTION**

**3.01 GENERAL REQUIREMENTS**

- A. A Substitution Request for products, assemblies, materials, and equipment constitutes a representation that the submitter:
  - 1. Has investigated proposed product and determined that it meets or exceeds the quality level of the specified product, equipment, assembly, or system.
  - 2. Agrees to provide the same warranty for the substitution as for the specified product.
  - 3. Agrees to provide same or equivalent maintenance service and source of replacement parts, as applicable.
  - 4. Agrees to coordinate installation and make changes to other work that may be required for the work to be complete, with no additional cost to Owner.
  - 5. Waives claims for additional costs or time extension that may subsequently become apparent.
  - 6. Agrees to reimburse Owner and Architect for review or redesign services associated with re-approval by authorities.
- B. Document each request with complete data substantiating compliance of proposed substitution with Contract Documents. Burden of proof is on proposer.
  - 1. Note explicitly any non-compliant characteristics.
- C. Content: Include information necessary for tracking the status of each Substitution Request, and information necessary to provide an actionable response.
  - 1. A copy of the Substitution Request Form that shall be used is included at the end of this Section for informational purposes. Request a Word or editable PDF version of the form from the Architect and complete the form digitally; do not complete the form by hand.
  - 2. Contractor's Substitution Request documentation must include the following:
    - a. Substitution Request Information:
      - 1) Indication of whether the substitution is for cause or convenience.
      - 2) Issue date.
      - 3) Reference to particular Contract Document(s) specification section number, title, and article/paragraph(s).
      - 4) Description of Substitution.
      - 5) Reason why the specified item cannot be provided.

- 6) Description of how proposed substitution affects other parts of work.
- b. Attached Comparative Data: Provide point-by-point, side-by-side comparison addressing essential attributes specified, as appropriate and relevant for the item:
  - 1) Physical characteristics.
  - 2) In-service performance.
  - 3) Expected durability.
  - 4) Visual effect.
  - 5) Sustainable design features.
  - 6) Warranties.
  - 7) Other salient features and requirements.
  - 8) Include, as appropriate or requested, the following types of documentation:
    - (a) Product Data:
    - (b) Samples.
    - (c) Certificates, test, reports or similar qualification data.
    - (d) Drawings, when required to show impact on adjacent construction elements.
- c. Impact of Substitution: Provide data indicating cost savings to Owner and change in Contract Time due to accepting substitution.
- D. Limit each request to a single proposed substitution item.
  - 1. Submit an electronic document, combining the request form with supporting data into single document.

### **3.02 SUBSTITUTION PROCEDURES DURING CONSTRUCTION**

- A. Architect will consider requests for substitutions for convenience only within 30 days after date of Agreement.
  - 1. Substitutions for convenience submitted after this time period may or may not be considered, at the Architect's discretion.
- B. Submit request for Substitution for Cause immediately upon discovery of need for substitution, but not later than 14 days prior to time required for review and approval by Architect, in order to stay on approved project schedule.
- C. Submit request for Substitution for Convenience immediately upon discovery of its potential advantage to the project, but not later than 14 days prior to time required for review and approval by Architect, in order to stay on approved project schedule.
  - 1. In addition to meeting general documentation requirements, document how the requested substitution benefits the Owner through cost savings, time savings, greater energy conservation, or in other specific ways.
  - 2. Document means of coordinating of substitution item with other portions of the work, including work by affected subcontractors.
  - 3. Bear the costs engendered by proposed substitution of:
    - a. Owner's compensation to the Architect for any required redesign, time spent processing and evaluating the request.
    - b. Other unanticipated project considerations.
- D. Substitutions will not be considered under one or more of the following circumstances:
  - 1. When they are indicated or implied on shop drawing or product data submittals, without having received prior approval.
  - 2. Without a separate written request.

**3.03 RESOLUTION**

- A. Architect may request additional information and documentation prior to rendering a decision. Provide this data in an expeditious manner.
- B. Architect will notify Contractor in writing of decision to accept or reject request.

**3.04 ACCEPTANCE**

- A. Accepted substitutions change the work of the Project. They will be documented and incorporated into work of the project by Change Order, Construction Change Directive, Architectural Supplementary Instructions, or similar instruments provided for in the Conditions of the Contract.

**3.05 CLOSEOUT ACTIVITIES**

- A. See Section 017800 - Closeout Submittals, for closeout submittals.

**END OF SECTION**

## Substitution Request Form – After Receipt of Bids

<p><b>All Substitution Requests shall be submitted by the Contractor only. Substitution Requests received from subcontractors, sub-subcontractors, manufacturers, vendors, etc., will be “rejected” without review.</b></p>				
<b>General Information</b>				
Project Name	Arlington County Courthouse - Courtroom 10B Renovation			
A/E Project Number	563005			
<b>Specified Product/Item Information</b>				
Specification Title				
Section				
Page				
Article / Paragraph				
Description				
<b>Proposed Substitution Information</b>				
Proposed Substitution				
Reason for not providing specified product/item				
Comparative Data	Attach a point-by-point comparative data list. Include all differences between the proposed substitution and the specified product/item. If not provided, this Request will be rejected.			
Manufacturer				
Manufacturer Address				
Manufacturer Phone				
Manufacturer Representative Email address				
Trade / Model Name				
Model Number				
Installer				
Installer Address				
Installer Phone				
History	<input type="checkbox"/> New product	<input type="checkbox"/> 2-5 years	<input type="checkbox"/> 5-10 yrs	<input type="checkbox"/> 10 yrs or longer
Proposed substitution affects other parts of the Work	<input type="checkbox"/> Yes		<input type="checkbox"/> No	
If yes, explain				
Savings to Owner for accepting proposed substitution	\$			
Proposed substitution affects Contract Time	<input type="checkbox"/> Yes		<input type="checkbox"/> No	

If yes	<input type="checkbox"/> Add	<input type="checkbox"/> Deduct
If yes, number of calendar days		
<b>Proposed Substitution Similar Installation</b>		
Have you (this Contractor) used this product/item on any other projects	<input type="checkbox"/> Yes	<input type="checkbox"/> No
Project		
Project Address		
Architect/Engineer		
A/E Phone		
Owner		
Owner Phone		
Date installed		
<b>Attached Supporting Data</b>		
<input type="checkbox"/> Drawings	<input type="checkbox"/> Product Data/Specs	<input type="checkbox"/> Samples
<input type="checkbox"/> Tests	<input type="checkbox"/> Reports	<input type="checkbox"/>

**Contractor certifies all of the following:**

- Contractor shall provide specified product/item in the event this Substitution request is rejected.
- Proposed substitution has been fully investigated and determined to be equal or superior in all respects to the specified product, except as may otherwise be specifically and clearly indicated herein.
- If applicable, proposed substitution shall not adversely affect LEED requirements nor shall it prevent achieving the relative number of applicable LEED point[s] the specified product would have received.
- Proposed substitution’s function, appearance, and quality are equal or superior in all respects to the specified product, except as may otherwise be specifically and clearly indicated herein.
- Same or superior warranty and/or guarantees shall be furnished for proposed substitution as is required for the specified product/item.
- Same maintenance service and source replacement parts, as applicable, are available; including local availability.
- Proposed substitution shall have no adverse effect on other trades.
- Cost data as stated herein is complete. Claims for additional costs related to the accepted proposed substitution which may subsequently become apparent shall be waived; including licenses, fees, and/or royalties.
- Proposed substitution shall not affect dimensions and functional clearances. If the proposed substitution does affect dimensions and/or functional clearances, Contractor shall adjust the Work as required and necessary to accommodate the proposed substitution at no additional cost to the Contract.
- Payment shall be made by the Contractor, via a deduct/credit Change Order, for changes to the building design, including A/E fees for the design and detailing, caused by the proposed substitution.
- Coordination, installation, and changes to the Work as necessary for the accepted proposed substitution shall be complete in all respects.

**Contractor Information**

Submitted by	
Signed By	
Date	
Email address of Signee above	
Company Name	
Address	
Phone	

<b>Architect / Engineer Review and Action</b>	
<p><b>Acceptance of this substitution request is an acceptance of only the manufacturer and product/item for general conformance with the design concept reflected in the Contract Documents. The A/E has made no attempt to verify specific performance data, or to check the details of the proposed substitution as to special features, capacities, physical dimensions, or code and/or regulatory compliance, all of which remain the responsibility of the Contractor.</b></p>	
<input type="checkbox"/>	Proposed Substitution is found to be acceptable for inclusion in Change Order, if approved by Owner – Provide submittals in accordance with Contract Document requirements.
<input type="checkbox"/>	Proposed Substitution is found to be acceptable as noted for inclusion in Change Order, if approved by Owner - Provide submittals in accordance with Contract Document requirements.
<input type="checkbox"/>	Proposed Substitution is rejected – Provide specified product/item.
<input type="checkbox"/>	Proposed Substitution submittal/form not in accordance with Contract Documents (not timely, incomplete)
Comments / Remarks	
Reviewed by	
Signed By	
Date	

**END OF SUBSTITUTION REQUEST FORM**

**SECTION 013000  
ADMINISTRATIVE REQUIREMENTS**

**PART 1 GENERAL**

**1.01 RELATED REQUIREMENTS**

- A. Section 016000 - Product Requirements: General product requirements.

**1.02 GENERAL ADMINISTRATIVE REQUIREMENTS**

- A. Comply with requirements of Section 017000 - Execution and Closeout Requirements for coordination of execution of administrative tasks with timing of construction activities.
- B. Electronic File Distribution: Upon request, Contractor may be provided electronic files for use in coordination of the Work and preparation of submittals. Contractor shall submit a signed Request Form for Electronic Files, provided by the Architect.
  - 1. Electronic files do not contain all of the information of the Bid Documents or Contract Documents for construction of the Project, and the Architect shall not be responsible for differences between electronic files, Bid Documents, and Contract Documents.

**1.03 SUBMITTALS**

- A. General Contractor Personnel: As soon as practical after award of Contract, provide a summary of General Contractor's on site personnel. Identify each individual, beginning with project superintendent. List project responsibilities, cell phone number, and email address.
- B. Subcontractors: As soon as practical after award of Contract, provide a summary of all companies and individuals engaged as subcontractors for any part of the Project. Include a contact name, company address, phone number, and email address, and identify what part of the Work shall be completed by each subcontractor.
- C. Coordination Drawings: Submit completed Coordination Drawings for Architect's information.

**PART 2 PRODUCTS - NOT USED**

**PART 3 EXECUTION**

**3.01 ELECTRONIC DOCUMENT SUBMITTAL SERVICE**

- A. All documents transmitted for purposes of administration of the contract are to be in electronic (PDF, MS Word, or MS Excel) format, as appropriate to the document, and transmitted via an Internet-based submittal service that receives, logs and stores documents, provides electronic stamping and signatures, and notifies addressees via email.
  - 1. Besides submittals for review, information, and closeout, this procedure applies to Requests for Interpretation (RFIs), progress documentation, contract modification documents (e.g. supplementary instructions, change proposals, change orders), applications for payment, field reports and meeting minutes, Contractor's correction punchlist, and any other document any participant wishes to make part of the project record.
  - 2. It is Contractor's responsibility to submit documents in allowable format.
  - 3. Subcontractors, suppliers, and Architect's consultants will be permitted to use the service at no extra charge.
  - 4. Paper document transmittals will not be reviewed unless previously approved; emailed electronic documents will not be reviewed.



5. All other specified submittal and document transmission procedures apply, except that electronic document requirements do not apply to samples or color selection charts.
- B. Submittal Service: Coordinate method for exchanging files no later than the Preconstruction Meeting. The Architect's "Newforma InfoExchange" website and procedures can be used at no charge. If the Contractor chooses to use a different platform and methodology:
  1. The Architect may reject the methodology or platform proposed and:
    - a. use the Architect's Newforma InfoExchange website, or
    - b. the project team will revert to traditional hard-copy exchange;
  2. or the Contractor shall bear the cost of software, licensing, training, etc, for the project team to participate.
- C. Project Closeout: Architect will determine when to terminate the service for the project and is responsible for obtaining archive/record copies of files for Owner. If the Project Team uses an alternate platform preferred by the Contractor, the Contractor shall be responsible for distributing archive/record copies of files to Owner and Architect.

### **3.02 PRECONSTRUCTION MEETING**

- A. Architect will schedule a meeting after Notice of Award.
- B. Attendance Required:
  1. Owner.
  2. Architect.
  3. Contractor.
  4. Major subcontractors, consultants, Owner's Commissioning Agent, and others as necessary and appropriate.
- C. Agenda:
  1. Execution of Owner-Contractor Agreement.
  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 to 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. Site mobilization and utilization.
  9. Other project-specific items on pre-distributed agenda.
- D. Architect shall record minutes and distribute digital copies to Owner, Contractor, and other attendees. Contractor shall be responsible for distribution to subcontractors and other personnel affected by decisions made.

### **3.03 INDOOR AIR QUALITY (IAQ) MANAGEMENT PLAN DEVELOPMENT SESSION**

- A. Architect will schedule a meeting after Notice of Award.
  - B. Attendance Required:
    1. Owner.
    2. Owner's Commissioning Agent.
    3. Architect.
    4. Mechanical engineer.
-

5. Contractor.
  6. HVAC subcontractor.
  7. Other major subcontractors, consultants, and others as necessary and appropriate.
- C. Agenda:
1. Protection of Materials: Discussion of how and where materials that could impact IAQ will be stored, including but not limited to, the following:
    - a. Insulation.
    - b. Gypsum board.
    - c. Flooring materials.
    - d. Ceiling panels.
    - e. Furnishings.
    - f. Odorous chemicals.
  2. Protection of HVAC: Discussion of how HVAC equipment will be stored installed, and operated during construction.
  3. Pathway Interruption: Discussion of how airflow between construction zones will be limited to prevent the spreading of pollutants from one part of the building to another.
  4. Housekeeping: Discussion of how the building will be kept clean and dry.
  5. Materials Installation Scheduling: Discussion of what wet (odor emitting) materials will be used on the project, in order to schedule their installation before fuzzy (odor absorbing) materials.

#### **3.04 PREINSTALLATION MEETINGS**

- A. When required in individual specification sections, convene a preinstallation meeting at the site prior to commencing work of the section. Do not allow installation of affected work to proceed until preinstallation meeting can be held.
- B. Require attendance of parties directly affecting, or affected by, work of the specific section.
- C. Notify Architect and Owner in advance of meeting date.
- D. Prepare agenda and preside at meeting:
  1. Review conditions of examination, 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.

#### **3.05 PROGRESS MEETINGS**

- A. Architect will make arrangements for meetings, prepare agenda with copies for participants, preside at meetings.
  - B. Attendance Required:
    1. Owner.
    2. Architect.
    3. Contractor's superintendent.
    4. Other subcontractors or consultants as required for the specific parts of the Work to be discussed.
  - C. Agenda:
    1. Review minutes of previous meetings.
    2. Review of work progress.
    3. Field observations, problems, and decisions.
-

4. Identification of problems that impede, or will impede, planned progress.
  5. Review of submittals schedule and status of submittals.
  6. Review of RFIs log and status of responses.
  7. Maintenance of progress schedule.
  8. Corrective measures to regain projected schedules.
  9. Planned progress during succeeding work period.
  10. Maintenance of quality and work standards.
  11. Effect of proposed changes on progress schedule and coordination.
  12. Other business relating to the work.
- D. Architect shall record minutes and distribute copies to the Owner, Contractor, and other consultants, Owner's representatives, or other third party attendees. The Contractor shall be responsible for distributing to any affected subcontractors and other personnel.

### **3.06 CLOSEOUT MEETING**

- A. Schedule and administer closeout meeting no later than 30 days before the scheduled Date of Substantial Completion.
  - B. Make arrangements for the meeting, prepare agenda with copies for participants, and preside at the meeting.
  - C. Attendance Required:
    1. Owner.
    2. Architect.
    3. Contractor's superintendent.
    4. Major subcontractors.
    5. Other subcontractors or consultants as required.
  - D. Agenda:
    1. Review closeout requirements and procedures in Division 1 Section "Execution and Closeout Requirements."
    2. Review startup, testing, and adjusting of all systems, including testing/adjusting/balancing and Commissioning,
    3. Coordination of inspections by local authorities having jurisdiction and third party Special Inspectors as required to obtain Certificate of Occupancy.
    4. Coordination of Owner's occupancy and changeover of utilities, insurance, and building keying/lock system.
    5. Procedures for Contractor's Correction Punch List, Architect's Substantial Completion inspection, and Final Correction Punch List.
    6. Delivery, turnover, and storage of maintenance materials, attic stock, special tools, and other non-installed materials.
    7. Coordination of closeout documentation, including demonstration and training materials and videos, as built/record documents, operation and maintenance binders, and warranty binders.
    8. Removal of temporary facilities, construction equipment, and tools.
    9. Final cleaning, touchup, restoration, and preventive maintenance.
    10. Coordination of final Applications for Payment.
  - 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.
-

### **3.07 DAILY CONSTRUCTION REPORTS**

- A. Include only factual information. Do not include personal remarks or opinions regarding operations and/or personnel.
- B. Prepare a daily construction report recording the following information concerning events at Project site and project progress:
  - 1. Date.
  - 2. High and low temperatures, and general weather conditions.
  - 3. List of subcontractors at Project site.
  - 4. Approximate count of personnel at Project site.
  - 5. Major equipment at Project site.
  - 6. Material deliveries.
  - 7. Safety, environmental, or industrial relations incidents.
  - 8. Meetings and significant decisions.
  - 9. Unusual events (submit a separate special report).
  - 10. Stoppages, delays, shortages, and losses. Include comparison between scheduled work activities (in Contractor's most recently updated and published schedule) and actual activities. Explain differences, if any. Note days or periods when no work was in progress and explain the reasons why.
  - 11. Directives and requests of Authority(s) Having Jurisdiction (AHJ).
  - 12. Testing and/or inspections performed.
  - 13. Signature of Contractor's authorized representative.

### **3.08 COORDINATION DRAWINGS AND COORDINATION CONFERENCE**

- A. Coordination Drawings: The Contractor shall prepare coordination drawings of all spaces where utilities, systems, and other components converge or intersect and efficient installation is required to accommodate all components.
  - 1. Prepare coordination drawings of the following spaces, at minimum. Supplement with additional spaces as required by project-specific conditions.
    - a. Above ceilings.
    - b. Vertical chases, shafts, and wall cavities.
    - c. Mechanical and electrical rooms, fire pump room, and other major utility spaces.
  - 2. Provide accurate overall dimensions of components (for example, outside diameters of pipe and conduit, or overall ductwork dimensions including insulation and enclosure thickness).
  - 3. Include accessory components of systems that could cause potential conflicts, such as bracing, slotted channel framing, hangers, and other supports, valve handles, flanges, fittings, cable/wire management trays, and other similar components.
  - 4. Include sequence of installation of all components, materials, and systems.
  - 5. Include means of access to each component, material, or system, for maintenance and repairs.
  - 6. Provide additional coordination drawings as required by individual specification sections.
  - 7. Prepare Coordination Drawings using project-specific information. Do not use photocopies or reproductions of Contract Documents, and do not use standard details or data from manufacturers, suppliers, or other outside parties.
  - 8. Drawing Files: The Contractor may develop coordination drawings using 2D CAD software or with 3D BIM software with clash-detection functionality.

- a. The Architect will furnish original 3D BIM model or 2D DWG files for Contractor's use upon receipt of Architect's "Request Form for Electronic Files". A copy of this form shall be provided to the Contractor upon request.
  - 1) The Architect makes no guarantee to the accuracy of components in electronic files. The Contractor shall coordinate electronic data with the Contract Documents in order to provide final Coordination Drawings.
  - 2) If using 2D files, the Contractor shall prepare drawings in multiple views (for example, RCP and section) to fully represent 3D space, for example plenum heights, wall assembly thicknesses, etc.
9. Submittal: Submit Coordination Drawings as a "Submittal for Information." Architect will not approve Coordination Drawings, but will keep on file for use in subsequent coordination and conflict resolution.
- B. Coordination Conference: Schedule and conduct a Coordination Conference prior to beginning construction or rough-in of affected work. Require attendance by all affected trades and installers.
  1. Identify the Coordination Conference as a "milestone" date on the Construction Progress Schedule.
  2. Advise the Architect of all potential conflicts identified in the Coordination Drawings and at the Coordination Conference.
  3. Do not proceed with construction or installation of components, materials, or systems until potential conflicts have been resolved and affected parties have agreed to a remedy.
  4. Remedies to address conflicts not identified in the Coordination Drawings, at the Coordination Conference, or otherwise addressed prior to construction or installation of affected components, materials, and systems, or discovery of a non-workable situation not identified or addressed, will not be considered as a basis for delay, time extension, or additional cost to the Contract.

### **3.09 REQUESTS FOR INFORMATION (RFI)**

- A. Definition: A request seeking one of the following:
    1. An interpretation, amplification, or clarification of some requirement of Contract Documents arising from inability to determine from them the exact material, process, or system to be installed; or when the elements of construction are required to occupy the same space (interference); or when an item of work is described differently at more than one place in Contract Documents.
    2. A resolution to an issue which has arisen due to field conditions and affects design intent.
  - B. Preparation: Prepare an RFI immediately upon discovery of a need for interpretation of Contract Documents. Failure to submit a RFI in a timely manner is not a legitimate cause for claiming additional costs or delays in execution of the work.
    1. Prepare a separate RFI for each specific item.
      - a. Review, coordinate, and comment on requests originating with subcontractors and/or materials suppliers.
      - b. Do not forward requests which solely require internal coordination between subcontractors.
    2. Prepare in a format and with content acceptable to Owner.
    3. Prepare using software provided by the Electronic Document Submittal Service.
    4. Combine RFI and its attachments into a single electronic file. PDF format is preferred.
  - C. Reason for the RFI: Prior to initiation of an RFI, carefully study all Contract Documents to confirm that information sufficient for their interpretation is not included.
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1. Include in each request Contractor's signature attesting to good faith effort to determine from Contract Documents information requiring interpretation.
  2. Unacceptable Uses for RFIs: Do not use RFIs to request the following:
    - a. Approval of submittals (use procedures specified elsewhere in this section).
    - b. Approval of substitutions (see Section - 016000 - Product Requirements)
    - c. Changes that entail change in Contract Time and Contract Sum (comply with provisions of the Conditions of the Contract).
    - d. Different methods of performing work than those indicated in the Contract Drawings and Specifications (comply with provisions of the Conditions of the Contract).
  3. Improper RFIs: Requests not prepared in compliance with requirements of this section, and/or missing key information required to render an actionable response. They will be returned without a response.
  4. Frivolous RFIs: Requests regarding information that is clearly indicated on, or reasonably inferable from, Contract Documents, with no additional input required to clarify the question. They will be returned without a response.
    - a. The Owner reserves the right to assess the Contractor for the costs (on time-and-materials basis) incurred by the Architect, and any of its consultants, due to processing of such RFIs.
- D. Content: Include identifiers necessary for tracking the status of each RFI, and information necessary to provide an actionable response.
1. Official Project name and number, and any additional required identifiers established in Contract Documents.
  2. Owner's, Architect's, and Contractor's names.
  3. Discrete and consecutive RFI number, and descriptive subject/title.
  4. Issue date and requested reply date.
  5. Reference to particular Contract Document(s) requiring additional information/interpretation. Identify pertinent drawing and detail number and/or specification section number, title, and paragraph(s).
  6. Annotations: Field dimensions and/or description of conditions which have engendered the request.
  7. Contractor's suggested resolution: A written and/or a graphic solution, to scale, is required in cases where clarification of coordination issues is involved, for example; routing, clearances, and/or specific locations of work shown diagrammatically in Contract Documents. If applicable, state the likely impact of the suggested resolution on Contract Time or the Contract Sum.
- E. Attachments: Include sketches, coordination drawings, descriptions, photos, submittals, and other information necessary to substantiate the reason for the request.
- F. RFI Log: Prepare and maintain a tabular log of RFIs for the duration of the project.
1. Indicate current status of every RFI. Update log promptly and on a regular basis.
  2. Note dates of when each request is made, and when a response is received.
- G. Review Time: Architect will respond and return RFIs to Contractor within seven calendar days of receipt. For the purpose of establishing the start of the mandated response period, RFIs received after 12:00 noon will be considered as having been received on the following regular working day.
1. Response period may be shortened or lengthened for specific items, subject to mutual agreement.
- H. Responses: Content of answered RFIs will not constitute in any manner a directive or authorization to perform extra work or delay the project. If in Contractor's belief it is likely to

lead to a change to Contract Sum or Contract Time, promptly issue a notice to this effect, and follow up with an appropriate Change Order request to Owner.

1. Response may include a request for additional information, in which case the original RFI will be deemed as having been answered, and an amended one is to be issued forthwith. Identify the amended RFI with an R suffix to the original number.
2. Do not extend applicability of a response to specific item to encompass other similar conditions, unless specifically so noted in the response.
3. Upon receipt of a response, promptly review and distribute it to all affected parties, and update the RFI Log.
4. Notify Architect within seven calendar days if an additional or corrected response is required by submitting an amended version of the original RFI, identified as specified above.

### **3.10 SUBMITTAL SCHEDULE**

- A. Submit to Architect for review a schedule for submittals in tabular format.
  1. Coordinate with Contractor's construction schedule and schedule of values.
  2. Format schedule to allow tracking of status of submittals throughout duration of construction.
  3. Arrange information to include scheduled date for initial submittal, specification number and title, submittal category (for review or for information), description of item of work covered, and role and name of subcontractor.
  4. Account for time required for preparation, review, manufacturing, fabrication and delivery when establishing submittal delivery and review deadline dates.
    - a. For assemblies, equipment, systems comprised of multiple components and/or requiring detailed coordination with other work, allow for additional time to make corrections or revisions to initial submittals, and time for their review.
    - b. Account for a reasonable duration of time to allow for final color selections, approvals, and preparation of final finish schedule. This period shall begin upon receipt of all submittals requiring color selection.

### **3.11 SUBMITTALS FOR REVIEW**

- A. When the following are specified in individual sections, submit them for review:
    1. Product data.
    2. Design data.
    3. Shop drawings.
    4. Samples for selection.
    5. Samples for verification.
  - B. Submit to Architect for review for the limited purpose of checking for compliance with information given and the design concept expressed in Contract Documents.
  - C. Samples will be reviewed for aesthetic, color, or finish selection.
  - D. Color Selection: In individual specification sections, specific items are identified which require color/finish selections to be made by the Architect from color chart or sample submittals. The Submittal Schedule, prepared according to "Submittal Schedule" paragraph above, shall identify these required color/finish submittals.
    1. Submittals requiring color selection must be submitted by Contractor and approved by Architect for conformance with Contract Documents prior to the start of the color selection process. When the submittals have been approved for conformance with Contract Documents, the process for color selection, presentation of color concepts, Owner approval, and Color Schedule preparation will begin.
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2. Interior Color Selections: The Architect will make coordinated selections of colors/finishes for the building interior, present the resulting color concepts to the Owner for approval, and prepare the actual Interior Color Schedule for the Work.
- E. After review, provide copies and distribute in accordance with SUBMITTAL PROCEDURES article below.

### **3.12 SUBMITTALS FOR INFORMATION**

- A. When the following are specified in individual sections, submit them for information:
1. Certificates.
  2. Test reports.
  3. Inspection reports.
  4. Manufacturer's instructions.
  5. Manufacturer's field reports.
  6. Other types indicated.
- B. Submit for Architect's knowledge as contract administrator or for Owner.

### **3.13 SUBMITTALS FOR PROJECT CLOSEOUT**

- A. Submit Correction Punch List for Substantial Completion.
- B. Submit Final Correction Punch List for Substantial Completion.
- C. When the following are specified in individual sections, submit them at project closeout in compliance with requirements of Section 017800 - Closeout Submittals:
1. Project record documents.
  2. Operation and maintenance data.
  3. Warranties.
  4. Bonds.
  5. Other types as indicated.

### **3.14 NUMBER OF COPIES OF SUBMITTALS**

- A. Electronic Documents: Submit one electronic copy in PDF format; an electronically-marked up file will be returned. Create PDFs at native size and right-side up; illegible files will be rejected.
- B. Selection Samples: Submit one set of manufacturer's charts indicating full range of available colors, textures, patterns, and other aesthetic qualities.
- C. Verification Samples: Submit three sets of physical samples. Two sets will be retained by Architect, the third will be returned to the Contractor. Maintain approved sample at the Project site for use in comparing to installed Work.
1. Where a full-size assembly of multiple components is required as a sample (for example, railing section or full-size cabinet), only one sample is required for those items.

### **3.15 SUBMITTAL PROCEDURES**

- A. General Requirements:
1. Use a single transmittal for all submittals required by each individual specification section, unless otherwise indicated.
    - a. Verification samples and large shop drawing submittals may be submitted under separate cover when approved by Architect.
  2. Transmit using AIA G810 or other approved form.
  3. Sequentially identify each item. For revised submittals use original number and a sequential numerical suffix.
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4. Identify: Project; Contractor; subcontractor or supplier; pertinent drawing and detail number; and specification section number and article/paragraph, as appropriate on each copy.
  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 is in accordance with the requirements of the work and Contract Documents.
    - a. Submittals from sources other than the Contractor, or without Contractor's stamp will not be acknowledged, reviewed, or returned.
  6. Deliver each submittal on date noted in submittal schedule, unless an earlier date has been agreed to by all affected parties, and is of the benefit to the project.
    - a. Upload submittals in electronic form to Electronic Document Submittal Service website.
  7. Schedule submittals to expedite the Project, and coordinate submission of related items.
    - a. Allow sufficient time for administrative processing, Architect's initial review, and potential resubmittals.
      - 1) Large submittals may require longer review durations. Large or multi-part submittals (such as structural steel or aluminum storefront and curtainwall) may be submitted by building area, building level, or otherwise subdivided "packages" with the approval of the Architect. Subdivided "packages" will be reviewed one at a time in the order received. If large submittals are submitted in their entirety as a single package, the Architect may elect to review and return portions of the submittal individually, and will coordinate the schedule for return of these partial reviews with the Contractor for sequencing in the Work.
    - b. Allow additional time for submittals requiring sequential reviews involving Architect's consultants, Owner, or another affected party.
    - c. Allow additional time for submittals requiring sequential reviews involving approval from authorities having jurisdiction (AHJ), in addition to Architect's approval.
    - d. No extensions to the project schedule shall be granted due to delays that can be attributed to submittal processing or failure to allow for sequential reviews or resubmittals.
  8. Identify variations from Contract Documents and product or system limitations that may be detrimental to successful performance of the completed work.
  9. When revised for resubmission, identify all changes made since previous submission.
  10. Distribute reviewed submittals. Instruct parties to promptly report inability to comply with requirements.
  11. Incomplete submittals may not be reviewed, unless they are partial submittals for distinct portion(s) of the work, and have received prior approval for their use.
  12. Submittals not requested will be recognized, and will be returned "Not Reviewed".
- B. Product Data Procedures:
1. Submit only information required by individual specification sections.
  2. Collect required information into a single submittal.
  3. Submit concurrently with related shop drawing submittal.
  4. Do not submit (Material) Safety Data Sheets for materials or products.
- C. Shop Drawing Procedures:
1. Prepare accurate, drawn-to-scale, original shop drawing documentation by interpreting Contract Documents and coordinating related work.
  2. Do not reproduce Contract Documents to create shop drawings.
  3. Generic, non-project-specific information submitted as shop drawings do not meet the requirements for shop drawings.

D. Samples Procedures:

1. Transmit related items together as single package.
2. Identify each item to allow review for applicability in relation to shop drawings showing installation locations.
3. Selection Samples: Provide color charts that accurately relay color, pattern, and texture information. Photographs or photocopies of color charts are unacceptable and subject to rejection.
4. Verification Samples: Provide physical samples of each color selected by Architect from Selection Samples. Verification samples shall be manufactured and prepared identically to the material that shall be used in the installed Work. Label each sample clearly with manufacturer, product name, and color, texture, and/or pattern name as applicable. Photographs of physical samples are unacceptable and subject to rejection.

**3.16 SUBMITTAL REVIEW**

- A. Submittals for Review: Architect will review each submittal, and approve, or take other appropriate action.
- B. Submittals for Information: Architect will acknowledge receipt, but will take no other action.
- C. Architect's actions will be reflected by marking each returned submittal using virtual stamp on electronic submittals.
  1. Notations may be made directly on submitted items and/or listed on appended Submittal Review cover sheet.
- D. Architect's actions on items submitted for review:
  1. Authorizing purchasing, fabrication, delivery, and installation:
    - a. "Approved as Noted":
      - 1) Where review notations indicate revisions are necessary, submit corrected item, with review notations acknowledged and incorporated.
  2. Not Authorizing fabrication, delivery, and installation:
    - a. "Revise and Resubmit":
      - 1) Resubmit revised item, with review notations acknowledged and incorporated.
    - b. "Rejected/Resubmit":
      - 1) New submittal required, with item complying with requirements of Contract Documents.
    - c. "Color Selection Required":
      - 1) Color selections for the entire project, or portion thereof, will be provided after receipt of all color charts and samples required for the Project.
    - d. "Not Submitted":
      - 1) Additional submittal items are required that were not provided in the original submittal.
- E. Architect's actions on items submitted for information:
  1. Items for which no action was taken:
    - a. "Not Reviewed": To notify the Contractor that the submittal has been received for record only.

**END OF SECTION**

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**SECTION 013216  
CONSTRUCTION PROGRESS SCHEDULE**

**PART 1 GENERAL**

**1.01 SUBMITTALS**

- A. Within 10 days after date of Agreement, submit preliminary schedule defining planned operations for the first 60 days of Work, with a general outline for remainder of Work.
- B. If preliminary schedule requires revision after review, submit revised schedule within 10 days.
- C. Within 20 days after review of preliminary schedule, submit draft of proposed complete schedule for review.
  - 1. Include written certification that major contractors have reviewed and accepted proposed schedule.
- D. Within 10 days after joint review, submit complete schedule.
- E. Submit updated schedule with each Application for Payment.
- F. Submit in PDF format.

**1.02 QUALITY ASSURANCE**

- A. Scheduler: Contractor's personnel or specialist Consultant specializing in CPM scheduling with experience in scheduling construction work of a complexity comparable to this Project, and having use of computer facilities capable of delivering a detailed graphic printout within 48 hours of request.

**1.03 SCHEDULE FORMAT**

- A. Listings: In chronological order according to the start date for each activity. Identify each activity with the applicable specification section number.

**PART 2 PRODUCTS - NOT USED**

**PART 3 EXECUTION**

**3.01 PRELIMINARY SCHEDULE**

- A. Prepare preliminary schedule in the form of a horizontal bar chart.

**3.02 CONTENT**

- A. Show complete sequence of construction by activity, with dates for beginning and completion of each element of construction.
- B. Identify work of separate phases and other logically grouped activities.
- C. Identify all major milestone dates, including, but not limited to, Notice to Proceed and Substantial and Final Completion dates.
- D. Identify duration of each activity, in maximum 15 day intervals.
- E. Incorporate work restrictions indicated in Division 1 Section "Summary," if any.
- F. Show accumulated percentage of completion of each item, and total percentage of Work completed, as of the first day of each month.
- G. Provide separate schedule of submittal dates for shop drawings, product data, and samples, owner-furnished products, products identified under Allowances, and dates reviewed submittals will be required from Architect. Indicate decision dates for selection of finishes.

- H. Indicate procurement duration and delivery dates for long-lead time items.
- I. Coordinate submittal approval process with procurement and delivery requirements. Submittals requiring resubmission or revision for approval will not be allowed as a basis for schedule impacts.
- J. Indicate delivery dates for owner-furnished products.
- K. Indicate the time period for color selection activity and approval by Owner and Architect, as required per Division 1 Section "Administrative Requirements."
- L. Indicate date of changeover from temporary to permanent utilities.
- M. Indicate time periods for Commissioning activities, equipment startup, and testing and balancing.
- N. Provide a reasonable time period prior to the date of Substantial Completion for administrative activities and procedures.
- O. Provide legend for symbols and abbreviations used.

### **3.03 BAR CHARTS**

- A. Include a separate bar for each major portion of Work or operation.
- B. Identify critical path activities.
- C. Identify the first work day of each week.

### **3.04 REVIEW AND EVALUATION OF SCHEDULE**

- A. Participate in joint review and evaluation of schedule with Architect at each submittal.
- B. Evaluate project status to determine work behind schedule and work ahead of schedule.
- C. After review, revise as necessary as result of review, and resubmit within 10 days.

### **3.05 UPDATING SCHEDULE**

- A. Maintain schedules to record actual start and finish dates of completed activities.
- B. Indicate progress of each activity to date of revision, with projected completion date of each activity.
- C. Annotate diagrams to graphically depict current status of Work.
- D. Identify activities modified since previous submittal, major changes in Work, and other identifiable changes.
- E. Indicate changes required to maintain Date of Substantial Completion.
- F. Schedule revisions shall not modify any Contract Dates or the Contract Sum, unless specifically approved and documented via Change Order.
- G. Submit reports required to support recommended changes.
- H. Provide narrative report to define problem areas, anticipated delays, and impact on the schedule. Report corrective action taken or proposed and its effect.
- I. Recovery Schedule: If the Contractor is 14 or more days behind schedule, in the opinion of the Owner, the Contractor shall prepare a Recovery Schedule, incorporating a reasonable, mutually agreed upon length of time to return the Work to the approved Schedule. The Recovery Schedule shall be prepared to the same level of detail as the original construction progress schedule. Submit the recovery schedule for Owner review; do not proceed until the Owner has approved.
  - 1. At the end of the recovery period, Owner shall reevaluate construction progress and determine if the Recovery Schedule has been successfully completed. If completed,

Owner shall direct the Contractor to proceed with the latest approved Construction Schedule.

- a. If the Contractor is still behind schedule at the end of the recovery period, the Owner shall direct the Contractor to provide additional schedule revisions to complete the recovery, or may at its option pursue other means of resolution as provided for by the Contract Documents.
2. Need for and preparation of a Recovery Plan shall not be the basis of additional cost to the Owner or extension of Project Schedule, unless the Contractor can demonstrate that the reason for being behind schedule is no fault of their own.

### **3.06 DISTRIBUTION OF SCHEDULE**

- A. Distribute copies of updated schedules to Contractor's project site file, to subcontractors, suppliers, Architect, Owner, and other concerned parties.
- B. Instruct recipients to promptly report, in writing, problems anticipated by projections indicated in schedules.

**END OF SECTION**

**SECTION 014000  
QUALITY REQUIREMENTS**

**PART 1 GENERAL**

**1.01 RELATED REQUIREMENTS**

- A. Section 014200 - Definitions and Reference Standards.

**1.02 DEFINITIONS**

- A. Contractor's Quality Control Plan: Contractor's management plan for executing the Contract for Construction.
- B. Contractor's Professional Design Services/Delegated Design: Design of some aspect or portion of the project by party other than the design professional of record. Provide these services as part of the Contract for Construction.
  - 1. Design Services Types Required:
    - a. Construction-Related: Services Contractor needs to provide in order to carry out the Contractor's sole responsibilities for construction means, methods, techniques, sequences, and procedures.
    - b. Design-Related: Design services explicitly required to be performed by another design professional due to highly-technical and/or specialized nature of a portion of the project. Services primarily involve engineering analysis, calculations, and design, and are not intended to alter the aesthetic aspects of the design.
- C. Design Data: Design-related, signed and sealed drawings, calculations, specifications, certifications, shop drawings and other submittals provided by Contractor, and prepared directly by, or under direct supervision of, appropriately licensed design professional.

**1.03 CONTRACTOR'S CONSTRUCTION-RELATED PROFESSIONAL DESIGN SERVICES**

- A. Coordination: Contractor's professional design services are subject to requirements of project's Conditions for Construction Contract.
- B. Provide such engineering design services as may be necessary to plan and safely conduct certain construction operations, pertaining to, but not limited to the following:
  - 1. Temporary sheeting, shoring, or supports.
  - 2. Temporary scaffolding.
  - 3. Temporary bracing.
  - 4. Temporary falsework for support of spanning or arched structures.
  - 5. Temporary foundation underpinning.
  - 6. Temporary stairs or steps required for construction access only.
  - 7. Temporary hoist(s) and rigging.
  - 8. Investigation of soil conditions and design of temporary foundations to support construction equipment.
  - 9. Additional temporary controls as required.

**1.04 CONTRACTOR'S DESIGN-RELATED PROFESSIONAL DESIGN SERVICES**

- A. Coordination: Contractor's professional design services are subject to requirements of project's Conditions for Construction Contract.
- B. Base design on performance and/or design criteria indicated in individual specification sections.
  - 1. Submit a Request for Information to Architect if the criteria indicated are not sufficient to perform required design services.

- C. Scope of Design Services/Delegated Design: As required by individual specification sections.

**1.05 SUBMITTALS**

- A. See Section 013000 - Administrative Requirements, for submittal procedures.
- B. Designer's Qualification Statement: Submit for Architect's knowledge as contract administrator, or for Owner's information.
1. Include information for each individual professional responsible for producing, or supervising production of, design-related professional services provided by Contractor.
    - a. Full name.
    - b. Professional licensure information.
    - c. Statement addressing extent and depth of experience specifically relevant to design of items assigned to Contractor.
- C. Design Data: Submit for Architect's knowledge as contract administrator for the limited purpose of assessing compliance with information given and the design concept expressed in the Contract Documents, or for Owner's information.
1. Include calculations that have been used to demonstrate compliance to performance and regulatory criteria provided, and to determine design solutions.
  2. Include required product data and shop drawings.
  3. Include a statement or certification attesting that design data complies with criteria indicated, such as building codes, loads, functional, and similar engineering requirements.
  4. Include signature and seal of design professional responsible for allocated design services on calculations and drawings.
- D. Test Reports: After each test/inspection, require testing agency to promptly distribute digital copy of report to Architect, Owner, Contractor, and others as required.
1. Include:
    - a. Date issued.
    - b. Project title and number.
    - c. Name of inspector.
    - d. Date and time of sampling or inspection.
    - e. Identification of product and specifications section.
    - f. Location in the Project.
    - g. Type of test/inspection.
    - h. Date of test/inspection.
    - i. Results of test/inspection.
    - j. Compliance with Contract Documents.
    - k. When requested by Architect, provide interpretation of results.
- E. Certificates: When specified in individual specification sections, submit certification by the manufacturer and Contractor to Architect, in quantities specified for Product Data.
1. Indicate material or product complies with or exceeds specified requirements. Submit supporting reference data, affidavits, and certifications as appropriate.
  2. Certificates may be recent or previous test results on material or product, but must be acceptable to Architect.
- F. Manufacturer's Instructions: When specified in individual specification sections, submit printed instructions for delivery, storage, assembly, installation, start-up, adjusting, and finishing, for the Owner's information. Indicate special procedures, perimeter conditions requiring special attention, and special environmental criteria required for application or installation.

G. Manufacturer's Field Reports:

1. Submit report promptly to Architect for information.
2. Submit for information for the limited purpose of assessing compliance with information given and the design concept expressed in the Contract Documents.

**1.06 QUALITY ASSURANCE**

A. Testing Agency Qualifications:

1. Submit copy of report of laboratory facilities inspection made by NIST Construction Materials Reference Laboratory during most recent inspection, with memorandum of remedies of any deficiencies reported by the inspection.
2. Qualification Statement: Provide documentation showing testing laboratory is accredited under OSHA's Nationally Recognized Testing Laboratory (NRTL) program or through the National Institute of Standards and Technology's (NIST's) National Voluntary Laboratory Accreditation Program (NVLAP).

B. Designer Qualifications: Where professional engineering design services and design data submittals are specifically required of Contractor by Contract Documents, provide services of a Professional Engineer experienced in design of this type of work and licensed in the State in which the Project is located.

C. Contractor's Quality Control (CQC) Plan:

1. Prior to start of work, submit a comprehensive plan describing how contract deliverables will be produced. Tailor CQC plan to specific requirements of the project. Include the following information:
  - a. Management Structure: Identify personnel responsible for quality. Include a chart showing lines of authority.
    - 1) Include qualifications (in resume form), duties, responsibilities of each person assigned to CQC function.
  - b. Management Approach: Define, describe, and include in the plan specific methodologies used in executing the work.
    - 1) Management and control of documents and records relating to quality.
    - 2) Communications.
    - 3) Coordination procedures.
    - 4) Resource management.
    - 5) Process control.
    - 6) Inspection and testing procedures and scheduling, including inspections by authorities having jurisdiction and special inspections.
    - 7) Control of noncomplying work.
    - 8) Tracking deficiencies from identification, through acceptable corrective action, and verification.
    - 9) Control of testing and measuring equipment.
    - 10) Project materials certification.
    - 11) Managerial continuity and flexibility.
  - c. Acceptance of the plan is required prior to start of construction activities not including mobilization work. Owner's acceptance of the plan will be conditional and predicated on continuing satisfactory adherence to the plan. Owner reserves the right to require Contractor to make changes to the plan and operations, including removal of personnel, as necessary, to obtain specified quality of work results.



### **1.07 REFERENCES AND STANDARDS**

- A. For products and workmanship specified by reference to a document or documents not included in the Project Manual, also referred to as reference standards, comply with requirements of the standard, except when more rigid requirements are specified or are required by applicable codes.
- B. Comply with reference standard of date of issue current on date of Contract Documents, except where a specific date is established by applicable code.
- C. Obtain copies of standards where required by product specification sections.
- D. Maintain copy at project site during submittals, planning, and progress of the specific work, until Substantial Completion.
- E. Should specified reference standards conflict with Contract Documents, comply with the higher quality or quantity, and provide documentation of the conflict to the Architect.
- F. Neither the contractual relationships, duties, or responsibilities of the parties in Contract nor those of Architect shall be altered from Contract Documents by mention or inference otherwise in any reference document.

### **1.08 TESTING AND INSPECTION AGENCIES AND SERVICES**

- A. Owner will employ and pay for services of an independent testing agency to perform Special Inspections and other specified testing indicated in individual specification sections.
- B. Where indicated in individual specification sections, Contractor shall employ and pay for services of an independent testing agency to perform other specified testing.
- C. Employment of agency in no way relieves Contractor of obligation to perform Work in accordance with requirements of Contract Documents.
- D. Contractor Employed Agency: Testing agency shall comply with requirements of ASTM E 329, and shall be certified through OSHA's Nationally Recognized Testing Laboratory (NRTL) program or through the National Institute of Standards and Technology's (NIST's) National Voluntary Laboratory Accreditation Program (NVLAP).
  - 1. Testing Equipment: Calibrated at reasonable intervals either by NIST or using an NIST established Measurement Assurance Program, under a laboratory measurement quality assurance program.

## **PART 2 PRODUCTS - NOT USED**

## **PART 3 EXECUTION**

### **3.01 CONTROL OF INSTALLATION**

- A. Monitor quality control over suppliers, manufacturers, products, services, site conditions, and workmanship, to produce work of specified quality.
- B. Comply with manufacturers' instructions, including each step in sequence.
- C. Should manufacturers' instructions conflict with Contract Documents, request clarification from Architect before proceeding.
- D. Comply with specified standards as minimum quality for the work except where more stringent tolerances, codes, or specified requirements indicate higher standards or more precise workmanship.
- E. Have work performed by persons qualified to produce required and specified quality.

- F. Verify that field measurements are as indicated on shop drawings or as instructed by the manufacturer.
- G. Secure products in place with positive anchorage devices designed and sized to withstand stresses, vibration, physical distortion, and disfigurement.

### **3.02 MOCK-UPS**

- A. Before installing portions of the Work where mock-ups are required, construct mock-ups in location and size indicated for each form of construction and finish required to comply with the following requirements, using materials indicated for the completed Work. The purpose of mock-up is to demonstrate the proposed range of aesthetic effects and workmanship.
- B. Accepted mock-ups establish the standard of quality the Architect will use to judge the Work.
- C. Tests shall be performed under provisions identified in this section and identified in the respective product specification sections.
- D. Assemble and erect specified items with specified attachment and anchorage devices, flashings, seals, and finishes.
- E. Obtain Architect's approval of mock-ups before starting work, fabrication, or construction.
  - 1. Architect will issue written comments within seven (7) working days of initial review and each subsequent follow up review of each mock-up.
  - 2. Make corrections as necessary until Architect's approval is issued.
- F. Architect will use accepted mock-ups as a comparison standard for the remaining Work.
- G. Where mock-up has been accepted by Architect and is specified in product specification sections to be removed, protect mock-up throughout construction, remove mock-up and clear area when directed to do so by Architect.

### **3.03 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, request clarification from Architect before proceeding.
- C. Adjust products to appropriate dimensions; position before securing products in place.

### **3.04 TESTING AND INSPECTION**

- A. See individual specification sections for testing and inspection required.
  - B. Testing Agency Duties for Contractor-employed Testing and Inspection Agencies:
    - 1. Test samples of mixes submitted by Contractor.
    - 2. Provide qualified personnel at site. Cooperate with Architect and Contractor in performance of services.
    - 3. Perform specified sampling and testing of products in accordance with specified standards.
    - 4. Ascertain compliance of materials and mixes with requirements of Contract Documents.
    - 5. Promptly notify Architect and Contractor of observed irregularities or non-compliance of Work or products.
    - 6. Perform additional tests and inspections required by Architect.
    - 7. Attend preconstruction meetings and progress meetings.
    - 8. Submit reports of all tests/inspections specified.
  - C. Limits on Testing/Inspection Agency Authority:
-

1. Agency may not release, revoke, alter, or enlarge on requirements of Contract Documents.
  2. Agency may not approve or accept any portion of the Work.
  3. Agency may not assume any duties of Contractor.
  4. Agency has no authority to stop the Work.
- D. Contractor Responsibilities:
1. Deliver to agency at designated location, adequate samples of materials proposed to be used that require testing, along with proposed mix designs.
  2. Cooperate with laboratory personnel, and provide access to the Work and to manufacturers' facilities.
  3. Provide incidental labor and facilities:
    - a. To provide access to Work to be tested/inspected.
    - b. To obtain and handle samples at the site or at source of Products to be tested/inspected.
    - c. To facilitate tests/inspections.
    - d. To provide storage and curing of test samples.
  4. Notify Architect and laboratory 24 hours prior to expected time for operations requiring testing/inspection services.
  5. Employ services of an independent qualified testing laboratory and pay for additional samples, tests, and inspections required by Contractor beyond specified requirements.
  6. Arrange with Owner's agency and pay for additional samples, tests, and inspections required by Contractor beyond specified requirements.
  7. Coordinate repairs where testing and inspection has damaged the Work.
- E. Re-testing and/or re-inspections required because of non-compliance with specified requirements shall be performed by the same agency. Do not proceed with construction activities that would conceal or cover work needing re-testing or re-inspection.
- F. Re-testing and/or re-inspections required because of non-compliance with specified requirements shall be paid for by Contractor.

### **3.05 MANUFACTURERS' FIELD SERVICES**

- A. 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, and field quality control requirements as applicable, and to initiate instructions when necessary.
- B. Provide a written report of observations and site decisions or instructions given to applicators or installers that are supplemental or contrary to manufacturers' written instructions or Contract Documents. Obtain Owner's approval prior to proceeding with any modifications.

### **3.06 DEFECT ASSESSMENT**

- A. Replace Work or portions of the Work not complying with specified requirements.
- B. Contractor may request to restore defective Work or portions of the Work to comply with specified requirements in lieu of replacement. Obtain Owner's approval prior to proceeding with restoration.
- C. If, in the opinion of Owner, it is not practical to restore or remove and replace the work, Owner will direct an appropriate remedy or adjust payment.

### **END OF SECTION**

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**SECTION 014200**  
**DEFINITIONS AND REFERENCE STANDARDS**

**PART 1 GENERAL**

**1.01 SUMMARY**

- A. The definitions include in this section supplement, but do not replace, the definitions contained in the General Conditions. In the event of duplication, the General Conditions shall govern.
- B. Other definitions are included in individual specification sections.

**1.02 DEFINITIONS**

- A. Furnish: To supply, deliver, unload, and inspect for damage.
- B. Install: To unpack, assemble, erect, apply, place, finish, cure, protect, clean, start up, and make ready for use.
- C. Product: Material, machinery, components, equipment, fixtures, and systems forming the work result. Not materials or equipment used for preparation, fabrication, conveying, or erection and not incorporated into the work result. Products may be new, never before used, or re-used materials or equipment.
- D. Provide: To furnish and install.
- E. Supply: Same as Furnish.
- F. Installer: A Contractor or other entity engaged by Contractor, as an employee, subcontractor, or contractor of lower tier, to perform a particular construction operation, including installation, erection, application, and similar operations.
  - 1. Using a term such as "carpentry" does not imply that certain construction activities must be performed by accredited or unionized individuals of a corresponding generic name, such as "carpenter." It also does not imply that specified requirements apply exclusively to tradespeople of the corresponding generic name.
- G. Experienced: When used with the term "Installer," this term means having successfully completed previous work similar in size and scope to this Project; being familiar with the special requirements indicated; and having complied with the requirements of local authorities having jurisdiction.
- H. Replace: Provide an acceptable like product or material in place of a missing or unacceptable (rejected) product or material. To "replace" an unacceptable product or material includes its removal and disposal.
- I. Punch List: A written list of unfinished Work and defective Work resulting from inspection and testing to determine whether Substantial Completion has been accomplished. The unfinished Work and defective Work must be finished and corrected to obtain Substantial or Final Completion, in accordance with the General Conditions.
- J. Written or Printed: When used in conjunction with manufacturer's product data or installation requirements, either of these terms may be used to require compliance with manufacturer's current printed and published information.

**1.03 REFERENCE STANDARDS**

- A. For products or workmanship specified by reference to a document or documents not included in the Project Manual, also referred to as reference standards, comply with requirements of the standard, except when more rigid requirements are specified, or are required by applicable codes or local authorities having jurisdiction.

- B. Should specified reference standards conflict with Contract Documents, request clarification from the Architect before proceeding.
- C. Neither the contractual relationships, duties, or responsibilities of the parties in Contract nor those of the Architect shall be altered by Contract Documents by mention or inference otherwise in any reference document.

**PART 2 PRODUCTS - NOT USED**

**PART 3 EXECUTION - NOT USED**

**END OF SECTION**

**SECTION 015000**  
**TEMPORARY FACILITIES AND CONTROLS**

**PART 1 GENERAL**

**1.01 REFERENCE STANDARDS**

- A. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials 2021a.

**1.02 TEMPORARY UTILITIES**

- A. Owner will provide the following:
  - 1. Electrical power, consisting of connection to existing facilities.
  - 2. Water supply, consisting of connection to existing facilities.
- B. Existing facilities may be used.
- C. Temporary Lighting: Provide supplemental temporary lighting as required to produce lighting levels necessary for proper installation of the Work.
- D. Temporary Heating, Cooling, and Ventilation: Supplement building HVAC systems with temporary measures and equipment as required for curing, drying, and humidity control. Comply with manufacturer's installation instructions for specific product requirements.
  - 1. Provide measures and equipment to meet warranty requirements of interior woodwork specified in Division 6 and/or Division 12 sections.

**1.03 TELECOMMUNICATIONS SERVICES**

- A. Provide, maintain, and pay for telecommunications services to field office at time of project mobilization.
- B. Telecommunications services shall include:
  - 1. Telephone Service: Contractor shall ensure that all of its forces, including on-site managers/supervisors of each Subcontractor, have mobile devices and adequate voice and data coverage for on-site operations
  - 2. Internet Connections: Minimum of one; DSL modem or faster.
  - 3. Video Conferencing and Video Site Visit/Walkthrough Infrastructure: Maintain personal computer/laptop with large format display screen and video conferencing software in the common-use field office.
    - a. Maintain equipment in common-use field office for site visits and walkthroughs, including a portable, high quality digital video camera, audio headset with microphone for walkthrough commentary/narration, and accessories including connection cables and battery packs.

**1.04 TEMPORARY SANITARY FACILITIES**

- A. Use of existing facilities is permitted.
- B. Maintain daily in clean and sanitary condition.
- C. At end of construction, return facilities to same or better condition as originally found.

**1.05 BARRIERS**

- A. Provide barriers to prevent unauthorized entry to construction areas, to prevent access to areas that could be hazardous to workers or the public, to allow for owner's use of site and to protect existing facilities and adjacent properties from damage from construction operations and demolition.

- B. Protect vehicular traffic, stored materials, site, and structures from damage.

#### **1.06 FENCING**

- A. Construction: Commercial grade chain link fence.
  - 1. Contractor may provide either fixed or portable fencing to suit conditions. For portable fencing, provide concrete or galvanized steel bases for supporting posts. Bases for portable fencing shall not obstruct sidewalks or other pathways used by pedestrians.
- B. Unless otherwise indicated, provide chain link fencing to enclose Contractor's laydown/storage areas.

#### **1.07 EXTERIOR ENCLOSURES**

- A. Provide temporary weather tight closure of exterior openings to accommodate acceptable working conditions and protection for Products, to allow for temporary heating and maintenance of required ambient temperatures identified in individual specification sections, and to prevent entry of unauthorized persons. Provide access doors with self-closing hardware and locks.

#### **1.08 INTERIOR ENCLOSURES**

- A. Provide temporary partitions to separate work areas from completed areas, to prevent penetration of dust and moisture, and to prevent damage to installed materials and equipment.
- B. Construction: Framing and gypsum board sheet materials with closed joints and sealed edges at intersections with existing surfaces.
  - 1. Maximum flame spread rating of 75 in accordance with ASTM E84.

#### **1.09 SECURITY**

- A. Provide security and facilities to protect Work, and Owner's operations from unauthorized entry, vandalism, or theft.
- B. Coordinate with Owner's security program.
- C. Environmental Protection: Comply with EPA, OSHA and other regulatory requirements to prevent contamination of site, air, and public sewer/runoff.
  - 1. Provide additional work restrictions and protective measures as indicated on Civil/Site Drawings and as specified in Division 01 Section "Summary."

#### **1.10 VEHICULAR ACCESS AND PARKING**

- A. Comply with regulations relating to use of streets and sidewalks, access to emergency facilities, and access for emergency vehicles.
- B. Coordinate access and haul routes with governing authorities and Owner.
- C. Provide and maintain access to fire hydrants, free of obstructions.
- D. Provide means of removing mud from vehicle wheels before entering streets.
- E. Designated existing on-site roads may be used for construction traffic.
- F. Existing parking areas may be used for construction parking. Coordinate with Owner to determine acceptable locations and number of parking spaces available.

#### **1.11 WASTE REMOVAL**

- A. Provide waste removal facilities and services as required to maintain the site in clean and orderly condition.
- B. Provide containers with lids. Remove trash from site periodically.

- C. If materials to be recycled or re-used on the project must be stored on-site, provide suitable non-combustible containers; locate containers holding flammable material outside the structure unless otherwise approved by the authorities having jurisdiction.
- D. Open free-fall chutes are not permitted. Terminate closed chutes into appropriate containers with lids.

#### **1.12 PROJECT IDENTIFICATION**

- A. Provide project identification sign of design and construction indicated on drawings.
  - 1. Obtain and pay for any permits required for temporary signage by local authority having jurisdiction.
- B. Erect on site at location(s) established by Architect.
- C. Provide temporary directional signage as directed to facilitate site access for visitors and other construction personnel.
- D. No other signs are allowed without Owner permission except those required by law.

#### **1.13 REMOVAL OF UTILITIES, FACILITIES, AND CONTROLS**

- A. Remove temporary utilities, equipment, facilities, materials, prior to Date of Substantial Completion inspection.
- B. Remove temporary underground installations.
- C. Clean and repair damage caused by installation or use of temporary work.
- D. Restore new permanent facilities used during construction to specified condition.

### **PART 2 PRODUCTS**

#### **2.01 MATERIALS**

- A. Rough Carpentry: 2x lumber, in length and depth required for floor to ceiling partitions. Partitions shall not be fastened to installed ceiling or flooring finishes. Provide additional bracing and concealed attachments to building structure.
- B. Gypsum Board: 1/2-inch gypsum wallboard; ASTM C 1396.
- C. Insulation: Mineral-wool fiber blankets; with maximum flame-spread and smoke-developed ratings of 25 and 50 when tested per ASTM E 84.
- D. Polyethylene Sheet: Minimum 10 mil reinforced sheeting; achieving a passing rating when tested per NFPA 701, and a maximum flame-spread rating of 15 when tested per ASTM E 84.
- E. Walk-Off Mats: Dust-, dirt- and silica-control walk-off mats at each entrance into the enclosed construction area and each entrance through temporary partitions.
- F. Hardware: Provide temporary hinges, latch, and lock at doors in temporary partitions. Where doors in temporary partitions are also indicated to serve as egress, provide ADA-compliant exit device and closer.

#### **2.02 EQUIPMENT**

- A. Fire Extinguishers: Provide portable UL rated extinguishers. Provide extinguisher types rated for potential classes of fire expected for construction work indicated.



## **PART 3 EXECUTION**

### **3.01 ELEVATOR AND STAIR USAGE**

- A. Use of existing elevator(s) is permitted, with the following conditions:
  - 1. Owner shall designate one elevator for construction use.
  - 2. Contractor shall comply with all regulations of local authority having jurisdiction and obtain written approval from building official.
  - 3. Contractor shall provide for personnel to operate elevator during construction hours. Operation by non-authorized staff is prohibited.
  - 4. Do not overload elevators.
  - 5. Provide protective coverings over all exposed surfaces. Contractor shall be responsible for restoration of all damaged surfaces.
  - 6. Elevators shall be cleaned and maintained in condition acceptable to Owner. Contractor shall provide maintenance service and inspection at Substantial Completion and shall be responsible for replacement of operating parts or finishes that are worn beyond service life.
  - 7. Owner reserves the right to revoke permission for elevator use if the conditions are not met.
- B. Use of existing stairs is permitted. Cover existing finishes and maintain stairs without damage. Clean and restore stairs to Owner's approval at Substantial Completion.

### **3.02 PEST CONTROL**

- A. Provide pest-control services at regular intervals, performed in compliance with regulations of state regulations, and by a pest-control firm licensed in the state where the project is located. Any chemicals and pesticides used shall be approved by EPA and local authority having jurisdiction. Contractor's pest control plan shall ensure the facility is free of termites, roaches, rodents, and other pests at time of Substantial Completion.
  - 1. Coordinate with Owner's Integrated Pest Management (IPM) plan where applicable.
  - 2. Provide Owner with a minimum 72 hours pre-notification for pest-control treatments.

### **3.03 TEMPORARY FIRE PROTECTION**

- A. Comply with International Fire Code, Chapter 33 "Fire Safety During Construction and Demolition" for preventing damage to structures under construction.
  - 1. Comply with NFPA 241 "Standard for Safeguarding Construction, Alteration, and Demolition Operations" for additional provisions and conditions that are not covered by Chapter 33 of the International Fire Code.
- B. Provide a fire-prevention program, review with all personnel on site, and post fire-prevention information in clearly visible area. Coordinate fire-prevention program with local fire department.
- C. Provide clearly labeled portable fire extinguishers.
- D. Provide fire watch in compliance with OSHA requirements during and after use of all potential ignition sources, including but not limited to, welders, grinders, cutting torches, heating and electrical equipment, and lighting.
- E. Do not allow smoking in areas under construction.

### **3.04 MOISTURE CONTROL**

- A. Prevent the absorption of moisture and humidity by:
  - 1. Delivery and storage of such materials in fully sealed moisture-impermeable packaging.

2. Provide sufficient ventilation for drying within reasonable time frame.
- B. Provide temporary mechanical ventilation for humidity and moisture control. Do not store or install material in the building unless ambient temperature and humidity is within manufacturer's acceptable range. Do not install wet materials, and ensure that substrates are fully dry prior to installing other materials over them.
- C. Provide continuous monitoring of installed materials. Remove gypsum board, wood products, and other mold-supporting products, if they become and remain wet for 48 hours. Remove and replace any materials showing visible signs of mold or mildew.

### **3.05 TEMPORARY FACILITY USAGE AND REMOVAL**

- A. Maintenance and Usage: Keep temporary facilities clean and in well-maintained condition for the duration of the Project. Prevent misuse of or damage to facilities by construction personnel. Make repairs to temporary facilities or replace facilities as required to keep them in good operating condition and in compliance with applicable OSHA, local permitting, and other applicable regulations.
- B. Changeover: Coordinate changeover from temporary facilities to permanent facilities at Substantial Completion, unless an alternate arrangement for changeover has been agreed upon in writing by Owner.
  1. Contractor shall be responsible for repair, restoration, and cleaning of permanent facilities that are used for construction purposes after changeover.
- C. Removal: Unless otherwise indicated, temporary facilities and controls are the property of the Contractor, and shall be removed upon Architect's approval when Contractor can demonstrate that they are no longer needed.
  1. Comply with construction waste management and recycling requirements for temporary facilities and materials that are not able to be reused.
  2. After removal of temporary facilities and controls, complete all permanent construction that was not accessible due to the presence of temporary facilities.
  3. Remove materials that have become soiled or contaminated due to construction vehicle traffic, parking, temporary field offices, oil or other chemical spillage, and other temporary usage, and replace with clean material. Complete grading, landscaping, paving, and other site improvements, and repair or restore all damage to existing or previously completed site improvements.

**END OF SECTION**

**SECTION 016000  
PRODUCT REQUIREMENTS**

**PART 1 GENERAL**

**1.01 RELATED REQUIREMENTS**

- A. Section 011000 - Summary: Identification of Owner-supplied products.
- B. Section 012500 - Substitution Procedures: Substitutions made during procurement and/or construction phases.
- C. Section 014000 - Quality Requirements: Product quality monitoring.

**1.02 DEFINITIONS**

- A. Comparable Product: An unnamed product that is similar in quality and performance to named product(s).
- B. Basis-of-Design Product: A specific product selected by the Architect for use in the design process; based on certain performance characteristics, physical qualities or details, a specialized finish type, pattern, or color, or other indicated characteristics.

**1.03 WARRANTIES**

- A. Product warranties shall be provided in addition to and run concurrently to Contractor's general warranty/guarantee.
  - 1. Unless otherwise indicated, all warranty terms shall start on the date of Substantial Completion.
- B. Manufacturer's Warranty: A standard warranty issued by the product manufacturer, covering production and material defects.
- C. Special Warranties: Warranties in addition to standard manufacturer's warranty, covering fabrication, installation, or specific performance items such as weathertightness
- D. Warranty Form: Warranty shall be provided on either manufacturer's standard form or on specified form. When a sample warranty form is not included in the Project Manual, the warranty shall be on mutually agreed form.

**PART 2 PRODUCTS**

**2.01 EXISTING PRODUCTS**

- A. Do not use materials and equipment removed from existing premises unless specifically required or permitted by Contract Documents.
- B. Unforeseen historic items encountered remain the property of the Owner; notify Owner promptly upon discovery; protect, remove, handle, and store as directed by Owner.
- C. Existing materials and equipment indicated to be removed, but not to be re-used, relocated, reinstalled, delivered to the Owner, or otherwise indicated as to remain the property of the Owner, become the property of the Contractor; remove from site.

**2.02 NEW PRODUCTS**

- A. Provide new products unless specifically required or permitted by Contract Documents.
- B. See Section 014000 - Quality Requirements, for additional source quality control requirements.
- C. Use of products having any of the following characteristics is not permitted:
  - 1. Made using or containing CFC's or HCFC's.

2. Containing lead, cadmium, or asbestos.

### **2.03 PRODUCT OPTIONS**

- A. Products Specified with a Single Named Product: Where required by Owner due to facility standards, provide the named product; no options or substitutions allowed.
- B. Products Specified by Reference Standards or by Description Only: Use any product meeting those standards or description.
- C. Products Specified by Naming One or More Manufacturers: Use a product of one of the manufacturers named and meeting specifications, no options or substitutions allowed.
- D. Products Specified by Naming One or More Manufacturers with a Provision for Substitutions: Submit a request for substitution for any manufacturer not named.
- E. Products Specified by Naming One or More Manufacturers with a Provision for Comparable Products: Unnamed comparable product may be submitted after award of Contract. Comply with requirements in "Comparable Products" article below.

### **2.04 BASIS-OF-DESIGN PRODUCTS**

- A. Where a product is specified by naming a Basis-of-Design, comply with the following:
  1. Where a list of additional manufacturers is provided, provide the Basis-of-Design product or a comparable product by one of the listed manufacturers, in compliance with "Comparable Products" article below.
  2. Where a list of additional manufacturers is not provided, provide the Basis-of-Design product, or submit a substitution request in compliance with Section 012500 - Substitution Procedures.
  3. Basis-of-Design characteristics shall include requirements in the Specifications and on the Drawings.
  4. Where the Basis-of-Design lists a specific finish, manufacturers wishing to submit as a Comparable Product or as a substitution shall certify that they are able to provide an exact match to the specified finish, or that they will provide a custom finish to match.

### **2.05 COMPARABLE PRODUCTS**

- A. Where a product is specified with a provision for comparable products, Contractors submitting a Comparable Product shall comply with the following:
  1. The submitted product shall not require changes to the Work, unless specifically approved by Architect. If changes are required, the Contractor shall resubmit the product as a substitution request, and the Contractor shall bear the cost of the changes, coordinate with other impacted contractors, and provide appropriate notations on record documents.
  2. Contractor shall provide, with the submittal, a detailed breakdown comparing the submitted product to at least one of the other listed products; list specified performance qualities, test results, dimensions, finish, and other critical properties.
  3. Contractor shall provide warranty data indicating that submitted Comparable Product complies with indicated warranty term(s).
- B. Comparable product submittals are subject to Architect's final approval. If a proposed product is found to be unacceptable, Contractor shall revert to one of the named products.

### **2.06 COLOR/FINISH OPTIONS**

- A. Preselected Color/Finish: Where a specific manufacturer's premium or custom finish or color is indicated as the basis-of-design, other listed manufacturers shall certify that they can provide an exact match, or that they will provide pricing under the assumption that a custom finish or color will be required.

- B. Color/Finish Selection: Unless specifically indicated to either be a custom color or to be selected from manufacturer's standard range, color and finish selections shall be made from manufacturer's full range of options, including premiums, metallics, wood grains, etc.

**2.07 MAINTENANCE MATERIALS**

- A. Furnish extra materials, spare parts, tools, and software of types and in quantities specified in individual specification sections.
- B. Deliver to location designated by Owner; obtain receipt prior to final payment.

**PART 3 EXECUTION**

**3.01 SUBSTITUTION LIMITATIONS**

- A. See Section 012500 - Substitution Procedures.

**3.02 OWNER-SUPPLIED PRODUCTS**

- A. See Section 011000 - Summary for identification of Owner-supplied products.
- B. Owner's Responsibilities:
  - 1. Arrange for and deliver Owner reviewed shop drawings, product data, and samples, to Contractor.
  - 2. Arrange and pay for product delivery to site.
  - 3. On delivery, inspect products jointly with Contractor.
  - 4. Submit claims for transportation damage and replace damaged, defective, or deficient items.
  - 5. Arrange for manufacturers' warranties, inspections, and service.
- C. Contractor's Responsibilities:
  - 1. Review Owner reviewed shop drawings, product data, and samples.
  - 2. Receive and unload products at site; inspect for completeness or damage jointly with Owner.
  - 3. Handle, store, install and finish products.
  - 4. Repair or replace items damaged after receipt.

**3.03 TRANSPORTATION AND HANDLING**

- A. Package products for shipment in manner to prevent damage; for equipment, package to avoid loss of factory calibration.
- B. If special precautions are required, attach instructions prominently and legibly on outside of packaging.
- C. Coordinate schedule of product delivery to designated prepared areas in order to minimize site storage time and potential damage to stored materials.
- D. Transport and handle products in accordance with manufacturer's instructions.
- E. Transport materials in covered trucks to prevent contamination of product and littering of surrounding areas.
- F. Promptly inspect shipments to ensure that products comply with requirements, quantities are correct, and products are undamaged.
- G. Provide equipment and personnel to handle products by methods to prevent soiling, disfigurement, or damage, and to minimize handling.
- H. Arrange for the return of packing materials, such as wood pallets, where economically feasible.

### **3.04 STORAGE AND PROTECTION**

- A. Provide protection of stored materials and products against theft, casualty, or deterioration.
- B. Designate receiving/storage areas for incoming products so that they are delivered according to installation schedule and placed convenient to work area in order to minimize waste due to excessive materials handling and misapplication.
  - 1. Structural Loading Limitations: Handle and store products and materials so as not to exceed static and dynamic load-bearing capacities of project floor and roof areas.
- C. Store and protect products in accordance with manufacturers' instructions.
- D. Store with seals and labels intact and legible.
- E. Arrange storage of materials and products to allow for visual inspection for the purpose of determination of quantities, amounts, and unit counts.
- F. Store sensitive products in weathertight, climate-controlled enclosures in an environment favorable to product.
- G. For exterior storage of fabricated products, place on sloped supports above ground.
- H. Provide off-site storage and protection when site does not permit on-site storage or protection.
- I. Protect products from damage or deterioration due to construction operations, weather, precipitation, humidity, temperature, sunlight and ultraviolet light, dirt, dust, and other contaminants.
- J. Comply with manufacturer's warranty conditions, if any.
- K. Do not store products directly on the ground.
- L. Cover products subject to deterioration with impervious sheet covering. Provide ventilation to prevent condensation and degradation of products.
- M. Prevent contact with material that may cause corrosion, discoloration, or staining.
- N. Provide equipment and personnel to store products by methods to prevent soiling, disfigurement, or damage.
- O. Arrange storage of products to permit access for inspection. Periodically inspect to verify products are undamaged and are maintained in acceptable condition.

**END OF SECTION**

**SECTION 017000  
EXECUTION AND CLOSEOUT REQUIREMENTS**

**PART 1 GENERAL**

**1.01 SUBMITTALS**

- A. See Section 013000 - Administrative Requirements, for submittal procedures.
- B. Project Record Documents: Accurately record actual locations of capped and active utilities.

**1.02 PROJECT CONDITIONS**

- A. Ventilate enclosed areas to assist cure of materials, to dissipate humidity, and to prevent accumulation of dust, fumes, vapors, or gases.
- B. Dust and Silica Control: Execute work by methods to minimize raising dust and silica from construction operations. Provide positive means to prevent air-borne dust and silica from dispersing into atmosphere and over adjacent property.
  - 1. Provide dust-proof enclosures to prevent entry of dust and silica that is generated outdoors.
  - 2. Provide dust-proof barriers between construction areas and areas continuing to be occupied by Owner.
- C. Noise Control: Provide methods, means, and facilities to minimize noise produced by construction operations.
  - 1. At All Times: Excessively noisy tools and operations will not be tolerated inside the building at any time of day. If unavoidable, coordinate with Owner for acceptable times.
- D. Pest and Rodent Control: Provide methods, means, and facilities to prevent pests and insects from damaging the work.
- E. Pollution Control: Provide methods, means, and facilities to prevent contamination of soil, water, and atmosphere from discharge of noxious, toxic substances, and pollutants produced by construction operations. Comply with federal, state, and local regulations.
- F. Hazardous Materials: Do not use materials or products that contain hazardous substances, for permanently installed products and materials, installation materials, or for cleaning or other construction use.

**1.03 COORDINATION**

- A. See Section 011000 for occupancy-related requirements.
- B. Coordinate scheduling, submittals, and work of the various sections of the Project Manual to ensure efficient and orderly sequence of installation of interdependent construction elements, with provisions for accommodating items installed later.
- C. Notify affected utility companies and comply with their requirements.
- D. Verify that utility requirements and characteristics of new 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.
- E. Coordinate space requirements, supports, and installation of mechanical and electrical work that are indicated diagrammatically on drawings. Follow routing indicated for pipes, ducts, and conduit, as closely as practicable; place runs parallel with lines of building. Utilize spaces efficiently to maximize accessibility for other installations, for maintenance, and for repairs.
- F. In finished areas except as otherwise indicated, conceal pipes, ducts, and wiring within the construction. Coordinate locations of fixtures and outlets with finish elements.

- G. Coordinate completion and clean-up of work of separate sections.
- H. 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.
- I. After Substantial Completion, coordinate access to site for correction of defective work and work not in accordance with Contract Documents, to minimize disruption of Owner's activities.

## **PART 2 PRODUCTS**

### **2.01 PATCHING MATERIALS**

- A. New Materials: As specified in product sections; match in-place products and work for patching and extending work.
- B. Type and Quality of Existing Products: Determine by inspecting and testing products where necessary, referring to in-place, approved work as a standard.
- C. Product Substitution: For any proposed change in materials, submit request for substitution described in Section 016000 - Product Requirements.

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Verify that existing conditions and substrate surfaces are acceptable for subsequent work. Start of work means acceptance of existing conditions.
- B. Verify that in-place substrate is capable of structural support or attachment of new work being applied or attached.
- C. Examine and verify specific conditions described in individual specification sections.
- D. Take field measurements before confirming product orders or beginning fabrication, to minimize waste due to over-ordering or misfabrication.
- E. Verify that utility services are available, of the correct characteristics, and in the correct locations.
- F. Prior to Cutting: Examine existing conditions prior to commencing work, including elements subject to damage or movement during cutting and patching. After uncovering existing work, assess conditions affecting performance of work. Beginning of cutting or patching means acceptance of existing conditions.

### **3.02 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.
- C. Apply manufacturer required or recommended substrate primer, sealer, or conditioner prior to applying any new material or substance in contact or bond.

### **3.03 GENERAL INSTALLATION REQUIREMENTS**

- A. Fire Safety: Comply with provisions of 2018 International Fire Code, Chapter 33; "Fire Safety During Construction and Demolition" for preventing damage to structures under construction.
  - 1. In addition to compliance with regulatory requirements, conduct construction operations in compliance with NFPA 241, including applicable recommendations in Appendix A.
- B. Install products as specified in individual sections, in accordance with manufacturer's instructions and recommendations, and so as to avoid waste due to necessity for replacement.



- C. Make vertical elements plumb and horizontal elements level, unless otherwise indicated.
- D. Install equipment and fittings plumb and level, neatly aligned with adjacent vertical and horizontal lines, unless otherwise indicated.
- E. Make consistent texture on surfaces, with seamless transitions, unless otherwise indicated.
- F. Make neat transitions between different surfaces, maintaining texture and appearance.

### **3.04 ALTERATIONS**

- A. Drawings showing existing construction and utilities are based on casual field observation and existing record documents only.
    - 1. Verify that construction and utility arrangements are as indicated.
    - 2. Report discrepancies to Architect before disturbing existing installation.
    - 3. Beginning of alterations work constitutes acceptance of existing conditions.
  - B. Keep areas in which alterations are being conducted separated from other areas that are still occupied.
    - 1. Provide, erect, and maintain temporary dustproof partitions of construction specified in Section 015000.
  - C. Remove existing work as indicated and as required to accomplish new work.
    - 1. Remove items indicated on drawings.
    - 2. Relocate items indicated on drawings.
    - 3. Where new surface finishes are to be applied to existing work, perform removals, patch, and prepare existing surfaces as required to receive new finish; prepare substrate per manufacturer's requirements for successful application of new finish.
    - 4. Where new surface finishes are not specified or indicated, patch holes and damaged surfaces to match adjacent finished surfaces.
  - D. Services (Including but not limited to HVAC, Plumbing, Fire Protection, Electrical, and Telecommunications): Remove, relocate, and extend existing systems to accommodate new construction.
    - 1. Maintain existing active systems that are to remain in operation; maintain access to equipment and operational components; if necessary, modify installation to allow access or provide access panel.
    - 2. Where existing active systems serve occupied facilities but are to be replaced with new services, maintain existing systems in service until new systems are complete and ready for service.
      - a. Disable existing systems only to make switchovers and connections; minimize duration of outages.
      - b. See Section 011000 for other limitations on outages and required notifications.
      - c. Provide temporary connections as required to maintain existing systems in service.
    - 3. Remove abandoned pipe, ducts, conduits, and equipment, including those above accessible ceilings; remove back to source of supply where possible, otherwise cap stub and tag with identification; patch holes left by removal using materials specified for new construction.
  - E. Protect existing work to remain.
    - 1. Prevent movement of structure; provide shoring and bracing if necessary.
    - 2. Perform cutting to accomplish removals neatly and as specified for cutting new work.
    - 3. Repair adjacent construction and finishes damaged during removal work.
  - F. Adapt existing work to fit new work: Make as neat and smooth transition as possible.
-

1. When existing finished surfaces are cut so that a smooth transition with new work is not possible, terminate existing surface along a straight line at a natural line of division and make recommendation to Architect.
  2. Where removal of partitions or walls results in adjacent spaces becoming one, rework floors, walls, and ceilings to a smooth plane without breaks, steps, or bulkheads.
- G. Patching: Where the existing surface is not indicated to be refinished, patch to match the surface finish that existed prior to cutting. Where the surface is indicated to be refinished, patch so that the substrate is ready for the new finish.
- H. Refinish existing surfaces as indicated:
1. Where rooms or spaces are indicated to be refinished, refinish all visible existing surfaces to remain to the specified condition for each material, with a neat transition to adjacent finishes.
- I. Clean existing systems and equipment in all spaces impacted by alteration work.
- J. Remove demolition debris and abandoned items from alterations areas and dispose of off-site; do not burn or bury.
- K. Do not begin new construction in alterations areas before demolition is complete.

### **3.05 CUTTING AND PATCHING**

- A. Perform cutting and patching to:
1. Complete the work.
  2. Fit products together to integrate with other work.
  3. Provide openings for penetration of mechanical, electrical, and other services.
  4. Match work that has been cut to adjacent work.
  5. Repair areas adjacent to cuts to required condition.
  6. Repair new work damaged by subsequent work.
  7. Remove samples of installed work for testing when requested.
  8. Remove and replace defective and non-complying work.
- B. Execute work by methods that avoid damage to other work and that will provide appropriate surfaces to receive patching and finishing. In existing work, minimize damage and restore to specified condition.
- C. Employ skilled and experienced installer to perform cutting and patching.
- D. Restore work with new products in accordance with requirements of Contract Documents.
- E. Fit work to pipes, sleeves, ducts, conduit, and other penetrations through surfaces.
- F. At penetrations of fire rated walls, partitions, ceiling, or floor construction, completely seal voids with fire rated material to maintain existing fire ratings, to full thickness of the penetrated element.
- G. Patching:
1. Finish patched surfaces to match finish that existed prior to patching. On continuous surfaces, refinish to nearest intersection or natural break. For an assembly, refinish entire unit.
  2. Match color, texture, and appearance.
  3. Repair patched surfaces that are damaged, lifted, discolored, or showing other imperfections due to patching work. If defects are due to condition of substrate, repair substrate prior to repairing finish.

### **3.06 PROGRESS CLEANING**

- A. Maintain areas free of waste materials, debris, and rubbish. Maintain site in a clean and orderly condition.
- B. Remove debris and rubbish from pipe chases, plenums, attics, crawl spaces, and other closed or remote spaces, prior to enclosing the space.
- C. Broom and vacuum clean interior areas prior to start of surface finishing, and continue cleaning to eliminate dust and silica.
- D. Collect and remove waste materials, debris, and trash/rubbish from site periodically and dispose off-site; do not burn or bury.

### **3.07 PROTECTION OF INSTALLED WORK**

- A. Protect installed work from damage by construction operations.
- B. Provide special protection where specified in individual specification sections.
- C. Provide temporary and removable protection for installed products. Control activity in immediate work area to prevent damage.
- D. Provide protective coverings at walls, projections, jambs, sills, and soffits of openings.
- E. Protect finished floors, stairs, and other surfaces from traffic, dirt, wear, damage, or movement of heavy objects, by protecting with durable sheet materials.
- F. Protect work from spilled liquids. If work is exposed to spilled liquids, immediately remove protective coverings, dry out work, and replace protective coverings.
- G. Prohibit traffic or storage upon waterproofed or roofed surfaces. If traffic or activity is necessary, obtain recommendations for protection from waterproofing or roofing material manufacturer.
- H. Prohibit traffic from landscaped areas.
- I. Remove protective coverings when no longer needed; reuse or recycle coverings if possible.

### **3.08 DEMONSTRATION AND INSTRUCTION**

- A. See Section 017900 - Demonstration and Training.

### **3.09 FINAL CLEANING**

- A. Execute final cleaning prior to Substantial Completion.
  - 1. Clean areas to be occupied by Owner prior to final completion before Owner occupancy.
- B. Use cleaning materials that are nonhazardous.
- C. Clean glass, surfaces exposed to view; remove temporary labels, stains and foreign substances, polish transparent and glossy surfaces, vacuum carpeted and soft surfaces.
- D. Remove all labels that are not permanent. Do not paint or otherwise cover fire test labels or nameplates on mechanical and electrical equipment.
- E. Clean equipment and fixtures to a sanitary condition with cleaning materials appropriate to the surface and material being cleaned.
- F. Replace filters of operating equipment.
- G. Clean site; sweep paved areas, rake clean landscaped surfaces.
- H. Remove waste, surplus materials, trash/rubbish, and construction facilities from the site; dispose of in legal manner; do not burn or bury.

### 3.10 CLOSEOUT PROCEDURES

- A. Prior to Substantial Completion, complete the following:
  - 1. Provide all inspections required by local authorities having jurisdiction to obtain Certificate of Occupancy, and provide written certification of completion of Special Inspections.
  - 2. Provide preventive maintenance services for all equipment used prior to Substantial Completion, and provide initial maintenance servicing for all products and equipment that will be subject to ongoing maintenance/service contracts.
  - 3. Provide final cleaning of all products, materials, and equipment, and provide touch up and restoration of exposed materials and finishes.
  - 4. Provide fresh batteries in all battery-powered products and equipment.
  - 5. Provide demonstration and training for Owner's personnel on all required systems and equipment.
  - 6. Coordinate a walkthrough with the Owner and the local fire department and other emergency services.
  - 7. To the maximum extent possible, remove temporary facilities and controls, construction equipment and tools, and similar items that are not part of the finished Work.
  - 8. Coordinate changeover with the Owner of permanent utilities, insurance requirements, and building's permanent keying and lock system.
- B. Notify Architect when work is considered ready for Architect's Substantial Completion inspection.
- C. Submit written certification containing Contractor's Correction Punch List, that Contract Documents have been reviewed, work has been inspected, and that work is complete in accordance with Contract Documents and ready for Architect's Substantial Completion inspection.
- D. Owner will occupy the building after Substantial Completion as specified in Section 011000.
- E. Conduct Substantial Completion inspection and create Final Correction Punch List containing Architect's and Contractor's comprehensive list of items identified to be completed or corrected and submit to Architect.
- F. Correct items of work listed in Final Correction Punch List and comply with requirements for access to Owner-occupied areas.
- G. Notify Architect when work is considered finally complete and ready for Architect's Substantial Completion final inspection.
- H. Prior to final completion, complete the following:
  - 1. Complete items of work determined by Architect listed in executed Certificate of Substantial Completion.
  - 2. Provide final pest and rodent control treatments and inspections.
  - 3. Remove any remaining construction equipment, tools, and materials; perform additional cleaning required due to construction activities following Substantial Completion, and leave the site prepared for Owner occupancy.
  - 4. Submit final demonstration and training materials and videos, as built/record documents, operation and maintenance binders, and warranty binders.
  - 5. Submit final application for payment.

### 3.11 MAINTENANCE

- A. Provide service and maintenance of components indicated in specification sections.
    - 1. Contractor's maintenance responsibility shall be through Substantial Completion, unless a longer term is required by individual specification section.
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- B. Maintenance service shall not be assigned or transferred to any agent or third party without prior written consent of the Owner.

**END OF SECTION**

**SECTION 017800  
CLOSEOUT SUBMITTALS**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Project record documents.
- B. Operation and maintenance data.
- C. Warranties and bonds.

**1.02 RELATED REQUIREMENTS**

- A. Section 013000 - Administrative Requirements: Submittal procedures, shop drawings, product data, and samples.
- B. Individual Product Sections: Specific requirements for operation and maintenance data.
- C. Individual Product Sections: Warranties required for specific products or Work.

**1.03 SUBMITTALS**

- A. Project Record Documents: Submit documents to Architect within 15 days after the date of Substantial Completion.
- B. Operation and Maintenance Data:
  - 1. For equipment, or component parts of equipment put into service during construction and operated by Owner, submit completed documents within 15 days after acceptance.
  - 2. Submit one PDF draft copy of completed documents within 15 days after the Closeout Conference. This copy will be reviewed and returned, with Architect comments. Revise content of all document sets as required prior to final submission.
  - 3. After revisions are complete, submit one bound hard copy and PDF electronic file of revised final documents in final form within 15 days after Substantial Completion.
- C. Warranties and Bonds:
  - 1. For equipment or component parts of equipment put into service during construction with Owner's permission, submit documents within 15 days after acceptance.
  - 2. Make other submittals within 15 days after Date of Substantial Completion, prior to final Application for Payment.
  - 3. For items of Work for which acceptance is delayed beyond Date of Substantial Completion, submit within 15 days after acceptance, listing the date of acceptance as the beginning of the warranty period.

**PART 2 PRODUCTS - NOT USED**

**PART 3 EXECUTION**

**3.01 PROJECT RECORD DOCUMENTS**

- A. Maintain on site one set of the following record documents; record actual revisions to the Work:
    - 1. Drawings.
    - 2. Addenda.
    - 3. Change Orders and other modifications to the Contract.
    - 4. Miscellaneous record submittals.
  - B. Ensure entries are complete and accurate, enabling future reference by Owner.
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1. Include revised Drawings reissued during Bidding and Construction.
- C. Store record documents separate from documents used for construction.
  1. Keep record documents in a location accessible to Architect for periodic review and reference.
  2. Maintain in legible condition. If record document set becomes damaged or excessively dirty, transfer comments to clean set prior to submittal to Architect.
- D. Record information concurrent with construction progress.
- E. Record Drawings: Legibly mark each item to record actual construction including:
  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 detail.
  5. Details not on original Contract drawings.
- F. Miscellaneous Record Submittals: Where other specification sections require completion certifications, or closeout or record submittals, submit in a single binder organized by specification section.

### **3.02 ASSEMBLY OF RECORD DOCUMENTS**

- A. Submittal for Architect's Review:
  1. Submit PDF scanned copy of marked up prints.
  2. Architect shall review and provide comment on completeness
- B. Submittal for Distribution to Owner:
  1. After Architect has approved for content and completeness, submit PDF scanned copy of final marked up prints, and submit hard copy originals.
  2. Submit full set of Drawings, regardless of whether any modification or markings are on each sheet.

### **3.03 OPERATION AND MAINTENANCE DATA**

- A. Product Data: Mark each sheet to clearly identify specific products and component parts, and data applicable to installation. Delete inapplicable information.
- B. Drawings: Supplement product data to illustrate relations of component parts of equipment and systems, to show control and flow diagrams. Do not use Project Record Documents as maintenance drawings.
- C. Typed Text: As required to supplement product data. Provide logical sequence of instructions for each procedure, incorporating manufacturer's instructions.

### **3.04 OPERATION AND MAINTENANCE DATA FOR MATERIALS AND FINISHES**

- A. For Each Product, Applied Material, and Finish:
  1. Product data, with catalog number, size, composition, and color and texture designations.
  2. Information for re-ordering custom manufactured products.
- B. Instructions for Care and Maintenance: Manufacturer's recommendations for cleaning agents and methods, precautions against detrimental cleaning agents and methods, and recommended schedule for cleaning and maintenance.
- C. Moisture protection and weather-exposed products: Include product data listing applicable reference standards, chemical composition, and details of installation. Provide

recommendations for inspections, maintenance, and repair.

- D. Additional information as specified in individual product specification sections.
- E. Where additional instructions are required, beyond the manufacturer's standard printed instructions, have instructions prepared by personnel experienced in the operation and maintenance of the specific products.

### **3.05 OPERATION AND MAINTENANCE DATA FOR EQUIPMENT AND SYSTEMS**

- A. For Each Item of Equipment and Each System:
  - 1. Description of unit or system, and component parts.
  - 2. Identify function, normal operating characteristics, and limiting conditions.
  - 3. Include performance curves, with engineering data and tests.
  - 4. Complete nomenclature and model number of replaceable parts.
- B. Where additional instructions are required, beyond the manufacturer's standard printed instructions, have instructions prepared by personnel experienced in the operation and maintenance of the specific products.
- C. Panelboard Circuit Directories: Provide electrical service characteristics, controls, and communications; typed.
- D. Include color coded wiring diagrams as installed.
- E. Operating Procedures: Include start-up, break-in, and routine normal operating instructions and sequences. Include regulation, control, stopping, shut-down, and emergency instructions. Include summer, winter, and any special operating instructions.
- F. Maintenance Requirements: Include routine procedures and guide for preventative maintenance and troubleshooting; disassembly, repair, and reassembly instructions; and alignment, adjusting, balancing, and checking instructions.
- G. Provide servicing and lubrication schedule, and list of lubricants required.
- H. Include manufacturer's printed operation and maintenance instructions.
- I. Include sequence of operation by controls manufacturer.
- J. Provide original manufacturer's parts list, illustrations, assembly drawings, and diagrams required for maintenance.
- K. Provide control diagrams by controls manufacturer as installed.
- L. Provide Contractor's coordination drawings, with color coded piping diagrams as installed.
- M. Provide charts of valve tag numbers, with location and function of each valve, keyed to flow and control diagrams.
- N. Provide list of original manufacturer's spare parts, current prices, and recommended quantities to be maintained in storage.
- O. Include test and balancing reports.
- P. Additional Requirements: As specified in individual product specification sections.

### **3.06 ASSEMBLY OF OPERATION AND MAINTENANCE MANUALS**

- A. Assemble operation and maintenance data into durable manuals for Owner's personnel use, with data arranged in the same sequence as, and identified by, the specification sections.
  - B. Where systems involve more than one specification section, provide separate tabbed divider for each system.
  - C. Binders: Commercial quality, 8-1/2 by 11 inch three D side ring binders with durable plastic covers; 2 inch maximum ring size. When multiple binders are used, correlate data into related
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consistent groupings.

- D. Cover: Identify each binder on front and spine with typed or printed title OPERATION AND MAINTENANCE INSTRUCTIONS; identify title of Project; identify subject matter of contents.
- E. Project Directory: Title and address of Project; names, addresses, and telephone numbers of Architect, Consultants, Contractor and subcontractors, with names of responsible parties.
- F. Tables of Contents: List every item separated by a divider, using the same identification as on the divider tab; where multiple volumes are required, include all volumes Tables of Contents in each volume, with the current volume clearly identified.
- G. Dividers: Provide tabbed dividers for each separate product and system; identify the contents on the divider tab; immediately following the divider tab include a description of product and major component parts of equipment.
- H. Text: Manufacturer's printed data, or typewritten data on 20 pound paper.
- I. Drawings: Provide with reinforced punched binder tab. Bind in with text; fold larger drawings to size of text pages.
- J. Arrangement of Contents: Organize each volume in parts as follows:
  - 1. Project Directory.
  - 2. Table of Contents, of all volumes, and of this volume.
  - 3. Operation and Maintenance Data: Arranged by system, then by product category.
    - a. Source data.
    - b. Product data.
    - c. Operation and maintenance data.
    - d. Field quality control data.
    - e. Photocopies of warranties and bonds.

### **3.07 WARRANTIES AND BONDS**

- A. Obtain warranties and bonds, executed in duplicate by responsible Subcontractors, suppliers, and manufacturers, within 15 days after completion of the applicable item of work. Except for items put into use with Owner's permission, leave date of beginning of time of warranty until Date of Substantial completion is determined.
- B. Verify that documents are in proper form, contain full information, and are notarized.
- C. Retain warranties and bonds until time specified for submittal.
- D. Manual: Bind in commercial quality 8-1/2 by 11 inch three D side ring binders with durable plastic covers.
- E. Cover: Identify each binder on front and spine with typed or printed title WARRANTIES AND BONDS, with title of Project; name, address and telephone number of Contractor and equipment supplier; and name of responsible company principal.
- F. Table of Contents: Neatly typed, in the sequence of the Table of Contents of the Project Manual, with each item identified with the number and title of the specification section in which specified, and the name of product or work item.
- G. Separate each warranty or bond with index tab sheets keyed to the Table of Contents listing. Provide full information, using separate typed sheets as necessary. List Subcontractor, supplier, and manufacturer, with name, address, and telephone number of responsible principal.

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- H. Provide photocopy of each warranty in operation and maintenance manuals; locate each warranty with applicable O&M data for product or equipment.

**END OF SECTION**

**SECTION 017900  
DEMONSTRATION AND TRAINING**

**PART 1 GENERAL**

**1.01 SUMMARY**

- A. Demonstration of products, systems, equipment, and other items where indicated in specific specification sections.
- B. Training of Owner personnel in operation and maintenance of products, systems, equipment, and as otherwise indicated in specific specification sections.

**1.02 SUBMITTALS**

- A. See Section 013000 - Administrative Requirements, for submittal procedures.
- B. Draft Training Plans: Owner will designate personnel to be trained; tailor training to needs and skill-level of attendees.
  - 1. Submit not less than four weeks prior to start of training.
  - 2. Revise and resubmit until acceptable.
  - 3. Provide an overall schedule showing all training sessions.
  - 4. Include at least the following for each training session:
    - a. Identification, date, time, and duration.
    - b. Description of products and/or systems to be covered.
    - c. Name of firm and person conducting training; include qualifications.
    - d. Intended audience, such as job description.
    - e. Objectives of training and suggested methods of ensuring adequate training.
    - f. Methods to be used, such as classroom lecture, live demonstrations, hands-on, etc.
    - g. Media to be used, such as slides, hand-outs, etc.
    - h. Training equipment required, such as projector, projection screen, etc., to be provided by Contractor.
- C. Training Manuals: Provide training manual for each attendee.
  - 1. Include applicable portion of O&M manuals.
  - 2. Include copies of all hand-outs, slides, overheads, video presentations, etc., that are not included in O&M manuals.
  - 3. Provide one extra copy of each training manual to be included with operation and maintenance data.
- D. Training Reports:
  - 1. Identification of each training session, date, time, and duration.
  - 2. Sign-in sheet showing names and job titles of attendees.
  - 3. List of attendee questions and written answers given, including copies of and references to supporting documentation required for clarification; include answers to questions that could not be answered in original training session.
- E. Video Recordings: Submit digital video recording of each demonstration and training session for Owner's subsequent use.
  - 1. Format: DVD Disc.
  - 2. Label each disc and container with session identification and date.
  - 3. Where available, provide manufacturer's pre-produced training videos in conjunction with live demonstration and training video.

### **1.03 QUALITY ASSURANCE**

- A. Instructor Qualifications: Familiar with design, operation, maintenance and troubleshooting of the relevant products and systems.
  - 1. Instructor shall be certified by the manufacturer or fabricator of system.
  - 2. Where a single person is not familiar with all aspects, provide specialists with necessary qualifications.

### **PART 2 PRODUCTS - NOT USED**

### **PART 3 EXECUTION**

#### **3.01 DEMONSTRATION - GENERAL**

- A. Demonstrations conducted during system start-up do not qualify as demonstrations for the purposes of this section, unless approved in advance by Owner.
- B. Demonstrations conducted during Functional Testing need not be repeated unless Owner personnel training is specified.
- C. Demonstration may be combined with Owner personnel training if applicable, and if acceptable to Owner.
- D. Operating Equipment and Systems: Demonstrate operation in all modes, including start-up, shut-down, seasonal changeover, emergency conditions, and troubleshooting, and maintenance procedures, including scheduled and preventive maintenance.
  - 1. Complete demonstrations within two weeks after the date of Substantial Completion.
  - 2. For equipment or systems requiring seasonal operation, perform demonstration for other season within six months.
- E. Non-Operating Products: Demonstrate cleaning, scheduled and preventive maintenance, and repair procedures.
  - 1. Complete demonstrations within two weeks after the date of Substantial Completion.

#### **3.02 TRAINING - GENERAL**

- A. Conduct training on-site, utilizing installed products and equipment, unless otherwise indicated.
- B. Provide training in minimum two hour segments.
- C. Training schedule will be subject to availability of Owner's personnel to be trained; re-schedule training sessions as required by Owner; once schedule has been approved by Owner failure to conduct sessions according to schedule will be cause for Owner to charge Contractor for personnel "show-up" time.
- D. Review of Facility Policy on Operation and Maintenance Data: During training discuss:
  - 1. Typical contents and organization of all manuals, including explanatory information, system narratives, and product specific information.
  - 2. Typical uses of the O&M manuals.
- E. Product- and System-Specific Training:
  - 1. Review the applicable O&M manuals.
  - 2. For systems, provide an overview of system operation, design parameters and constraints, and operational strategies.
  - 3. Review instructions for proper operation in all modes, including start-up, shut-down, seasonal changeover and emergency procedures, and for maintenance, including preventative maintenance.

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4. Discuss cleaning products and procedures, including recommended cleaning products and products that are detrimental to equipment operation or finishes.
  5. Provide hands-on training on all operational modes possible and preventive maintenance.
  6. Emphasize safe and proper operating requirements; discuss relevant health and safety issues, warning or error indications, and emergency procedures and shutdown.
  7. Discuss common troubleshooting problems and solutions. Include minor adjustments for resolving noise, vibration, and improving system efficiency.
  8. Discuss any peculiarities of equipment installation or operation.
  9. Discuss warranties and guarantees, including procedures necessary to avoid voiding coverage. Include discussion of continuing maintenance agreements and procedures.
  10. Review recommended tools and spare parts inventory suggestions of manufacturers.
  11. Review spare parts and tools required to be furnished by Contractor.
  12. Review spare parts suppliers and sources and procurement procedures.
- F. Be prepared to answer questions raised by training attendees; if unable to answer during training session, provide written response within three days.

**END OF SECTION**

**SECTION 018119  
INDOOR AIR QUALITY REQUIREMENTS**

**PART 1 GENERAL**

**1.01 SUMMARY**

- A. Provide Indoor Air Quality (IAQ) Management Plan to remain in force during the construction period.
- B. Chapter 3 of the Sheet Metal and Air Conditioning National Contractors' Association (SMACNA) IAQ Guideline for Occupied Buildings Under Construction, 2nd Edition 2007, available from SMACNA (703-803-2980 or [www.smacna.org](http://www.smacna.org)).

**1.02 SUBMITTAL**

- A. Construction Indoor Air Quality Management Plan (CIAQM Plan).

**PART 2 OBJECTIVES DURING CONSTRUCTION**

**2.01 PROTECTION**

- A. Store all materials and equipment in a protected area (inside warehouse or storage trailer). Protect materials and equipment that are too large or heavy to store in a trailer from water and dirt/dust/debris.
  - 1. OPTION: When stored outside, provide two layers of minimum 8-mil poly on the ground and elevate equipment or material a minimum of 4 inches to allow water to run off. Secure top and sides with two layers of 8-mil poly to prevent water penetration and dust/dirt accumulation.
- B. Protect HVAC equipment from dust and odors. Do not store equipment in areas near painting, pressure washing, or excavation. Do not operate equipment during cutting or grinding of masonry or concrete.
  - 1. Replace all existing filtration media immediately prior to Substantial Completion.
    - a. Filtration media installed in air-handling units shall have a Minimum Efficiency Reporting Value (MERV) of 8.

**2.02 SOURCE CONTROL**

- A. Minimize IAQ contaminants introduced by construction materials.
- B. Store waste construction materials a minimum of 30 feet away from the building.
- C. Do not smoke within 30 feet of the exterior building perimeter.

**2.03 PATHWAY INTERRUPTION**

- A. Provide barriers to contain construction areas to allow a portion of the building to be cleaned and then operate the HVAC system in that cleaned area. Acceptable barriers include dust curtains and temporary walls.
  - 1. Protect areas of the building in which HVAC is operational by physical barriers from areas of the building not acceptable for operation of the HVAC system.
- B. Maintain areas within 30 feet of outdoor air intakes free of dust, dirt, debris, and volatile materials while the HVAC system is in operation.

**2.04 HOUSEKEEPING**

- A. As dust accumulates at the Site, it can become airborne when disturbed by nearby activity. Similarly, spills or excess applications of products containing solvents will increase odors at the

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Site. Leaving the Site wet or damp for more than a day could result in the growth of mold and bacteria. Therefore, Site cleanup and maintenance is important to maintaining good IAQ during construction.

- B. Perform the following to control contaminants at the Site:
1. Suppress dust with wetting agents or sweeping compounds
  2. Provide an efficient dust collection method (e.g. a damp rag, wet mop, or vacuum equipped with a high efficiency particulate arrester (HEPA) filter or wet scrubber).
  3. Remove spills or excess applications of solvent-containing products immediately. Provide low-VOC emitting spot removers and cleaning agents near occupied areas.
  4. Remove accumulated water and keep work areas as dry as possible, including the use of dehumidification, if necessary.
  5. Vacuum with HEPA filtered vacuum cleaners to prevent settled dust from becoming airborne again.
  6. Protect porous materials from exposure to moisture. Replace items that remain damp for more than four hours.

**END OF SECTION**

**SECTION 024100  
DEMOLITION**

**PART 1 GENERAL**

**1.01 SUBMITTALS**

- A. See Section 013000 - Administrative Requirements, for submittal procedures.
- B. Site Plan: Showing:
  - 1. Areas for temporary construction and field offices.
- C. Project Record Documents: Accurately record actual locations of capped and active utilities and subsurface construction.

**PART 2 PRODUCTS -- NOT USED**

**PART 3 EXECUTION**

**3.01 GENERAL PROCEDURES AND PROJECT CONDITIONS**

- A. All demolition work shall be considered unclassified. Barring discovery of hazardous materials or undocumented structural components, where elements are indicated to be demolished, the bid price shall be for complete demolition of the element, regardless of the individual component makeup of that element.
- B. Comply with applicable codes and regulations for demolition operations and safety of adjacent structures and the public.
  - 1. Obtain required permits.
  - 2. Fire Safety: Comply with applicable requirements of the International Fire Code; Chapter 33, and with NFPA 241.
    - a. Use of explosives is not permitted.
    - b. Hot Work: Remove all combustibles from areas where hot work is required, including use of cutting torches, welding, or heating equipment. Maintain fire watch for entire duration of hot work and for a minimum 30 minutes after completion of hot work.
      - 1) Keep portable fire extinguishers within 30 feet of locations where hot work is being performed for entire duration.
    - c. Maintain egress routes and emergency access routes at all times; do not allow demolished materials to accumulate and block routes.
    - d. Remove combustible demolished materials from the building by the end of each work day. Temporarily store combustible materials in noncombustible containers with self-closing lids until they can be removed from the building.
    - e. Do not burn demolished material on site.
  - 3. Take precautions to prevent catastrophic or uncontrolled collapse of structures to be removed; do not allow worker or public access within range of potential collapse of unstable structures.
  - 4. Provide, erect, and maintain temporary barriers and security devices.
  - 5. Conduct operations to minimize effects on and interference with adjacent structures and occupants.
  - 6. Do not close or obstruct roadways or sidewalks without permit.
  - 7. Conduct operations to minimize obstruction of public and private entrances and exits; do not obstruct required exits at any time; protect persons using entrances and exits from removal operations.



8. Obtain written permission from owners of adjacent properties when demolition equipment will traverse, infringe upon or limit access to their property.
- C. Do not begin removal until receipt of notification to proceed from Owner.
- D. Do not begin removal until built elements to be salvaged or relocated have been removed.
- E. Protect existing structures and other elements that are not to be removed.
  1. Provide bracing and shoring.
  2. Prevent movement or settlement of adjacent structures.
  3. Stop work immediately if adjacent structures appear to be in danger.

### **3.02 EXISTING UTILITIES**

- A. Coordinate work with utility companies; notify before starting work and comply with their requirements; obtain required permits.
- B. Protect existing utilities to remain from damage.
- C. Do not disrupt public utilities without permit from authority having jurisdiction.
- D. Do not close, shut off, or disrupt existing life safety systems that are in use without at least 7 days prior written notification to Owner.
- E. Do not close, shut off, or disrupt existing utility branches or take-offs that are in use without at least 3 days prior written notification to Owner.
- F. Locate and mark utilities to remain; mark using highly visible tags or flags, with identification of utility type; protect from damage due to subsequent construction, using substantial barricades if necessary.
- G. Remove exposed piping, valves, meters, equipment, supports, and foundations of disconnected and abandoned utilities.

### **3.03 SELECTIVE DEMOLITION FOR ALTERATIONS**

- A. Drawings showing existing construction and utilities are based on casual field observation and existing record documents only.
    1. Verify that construction and utility arrangements are as indicated.
    2. Report discrepancies to Architect before disturbing existing installation.
    3. Beginning of demolition work constitutes acceptance of existing conditions that would be apparent upon examination prior to starting demolition.
  - B. Separate areas in which demolition is being conducted from other areas that are still occupied.
    1. Provide, erect, and maintain temporary dustproof partitions of construction specified in Section 015000 in locations indicated on drawings.
  - C. Maintain weatherproof exterior building enclosure except for interruptions required for replacement or modifications; take care to prevent water and humidity damage.
  - D. Remove existing work as indicated and as required to accomplish new work.
    1. Remove items indicated on drawings.
  - E. Services (Including but not limited to HVAC, Plumbing, Fire Protection, Electrical, and Telecommunications): Remove existing systems and equipment as indicated.
    1. Maintain existing active systems that are to remain in operation; maintain access to equipment and operational components.
    2. Where existing active systems serve occupied facilities but are to be replaced with new services, maintain existing systems in service until new systems are complete and ready for service.
    3. Verify that abandoned services serve only abandoned facilities before removal.
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4. Remove abandoned pipe, ducts, conduits, and equipment, including those above accessible ceilings; remove back to source of supply where possible, otherwise cap stub and tag with identification.
- F. Floor Finishes: After removal of existing floor finishes including backings, underlayments, and thick set mortar beds, remove all residual adhesives and glue. Provide grinding, sanding, or shot-blasting of existing concrete floor slab to achieve the proper surface to receive new indicated floor finish. Coordinate slab surface preparations required for each new indicated floor finish with appropriate subcontractor.
- G. Existing Surfaces to Receive Finishes: Remove miscellaneous hangers, exposed nails not serving as fasteners, and similar protrusions; remove adhesive residue and tape; fill anchorage holes; and otherwise patch and restore surface to be a uniform substrate suitable for applied finishes.
- H. Protect existing work to remain.
  1. Prevent movement of structure; provide shoring and bracing if necessary.
  2. Perform cutting to accomplish removals neatly and as specified for cutting new work.
  3. Repair adjacent construction and finishes damaged during removal work.
  4. Patch as specified for patching new work.

#### **3.04 DEBRIS AND WASTE REMOVAL**

- A. Remove debris, junk, and trash from site.
- B. Leave site in clean condition, ready for subsequent work.
- C. Clean up spillage and wind-blown debris from public and private lands.

**END OF SECTION**

**SECTION 033000  
CAST-IN-PLACE CONCRETE**

**PART 1 GENERAL**

**1.01 RELATED REQUIREMENTS**

- A. Section 079200 - Joint Sealants: Products and installation for sealants and joint fillers for saw cut joints and isolation joints in slabs.

**1.02 REFERENCE STANDARDS**

- A. ACI 117 - Specification for Tolerances for Concrete Construction and Materials 2010 (Reapproved 2015).
- B. ACI 211.2 - Standard Practice for Selecting Proportions for Structural Lightweight Concrete 1998 (Reapproved 2004).
- C. ACI 301 - Specifications for Concrete Construction 2020.
- D. ACI 302.1R - Guide to Concrete Floor and Slab Construction 2015.
- E. ACI 304R - Guide for Measuring, Mixing, Transporting, and Placing Concrete 2000 (Reapproved 2009).
- F. ACI 308R - Guide to External Curing of Concrete 2016.
- G. ACI 318 - Building Code Requirements for Structural Concrete 2019, with Errata (2021).
- H. ACI 347R - Guide to Formwork for Concrete 2014, with Errata (2017).
- I. ASTM A1064/A1064M - Standard Specification for Carbon-Steel Wire and Welded Wire Reinforcement, Plain and Deformed, for Concrete 2018a.
- J. ASTM C39/C39M - Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens 2021.
- K. ASTM C309 - Standard Specification for Liquid Membrane-Forming Compounds for Curing Concrete 2019.
- L. ASTM C330/C330M - Standard Specification for Lightweight Aggregates for Structural Concrete 2017a.
- M. ASTM C618 - Standard Specification for Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use in Concrete 2019.
- N. ASTM C881/C881M - Standard Specification for Epoxy-Resin-Base Bonding Systems for Concrete 2020a.
- O. ASTM C1202 - Standard Test Method for Electrical Indication of Concrete's Ability to Resist Chloride Ion Penetration 2019.
- P. ASTM C1315 - Standard Specification for Liquid Membrane-Forming Compounds Having Special Properties for Curing and Sealing Concrete 2019.
- Q. ASTM C1602/C1602M - Standard Specification for Mixing Water Used in the Production of Hydraulic Cement Concrete 2018.
- R. ASTM E1643 - Standard Practice for Selection, Design, Installation and Inspection of Water Vapor Retarders Used in Contact with Earth or Granular Fill Under Concrete Slabs 2018a.

**1.03 SUBMITTALS**

- A. See Section 013000 - Administrative Requirements for submittal procedures.

- B. Product Data: Submit manufacturers' data on manufactured products showing compliance with specified requirements and installation instructions.
  - 1. For curing compounds, provide data on method of removal in the event of incompatibility with floor covering adhesives.
- C. Mix Design: Submit proposed concrete mix design.
- D. Test Reports: Submit report for each test or series of tests specified.
- E. Sustainable Design Submittal: If any fly ash, ground granulated blast furnace slag, silica fume, rice hull ash, or other waste material is used in mix designs to replace Portland cement, submit the total volume of concrete cast in place, mix design(s) used showing the quantity of portland cement replaced, reports showing successful cylinder testing, and temperature on day of pour if cold weather mix is used.

#### **1.04 QUALITY ASSURANCE**

- A. Perform work of this section in accordance with ACI 301 and ACI 318.

### **PART 2 PRODUCTS**

#### **2.01 FORMWORK**

- A. Formwork Design and Construction: Comply with guidelines of ACI 347R to provide formwork that will produce concrete complying with tolerances of ACI 117.
- B. Form Materials: Contractor's choice of standard products with sufficient strength to withstand hydrostatic head without distortion in excess of permitted tolerances.

#### **2.02 REINFORCEMENT MATERIALS**

- A. Steel Welded Wire Reinforcement (WWR): Galvanized, plain type, ASTM A1064/A1064M.
- B. Reinforcement Accessories:
  - 1. Tie Wire: Annealed, minimum 16 gauge, 0.0508 inch.
  - 2. Chairs, Bolsters, Bar Supports, Spacers: Sized and shaped for adequate support of reinforcement during concrete placement.

#### **2.03 CONCRETE MATERIALS**

- A. Cement: ASTM C150/C150M, Type I - Normal Portland type.
- B. Lightweight Aggregate: ASTM C330/C330M.
- C. Fly Ash: ASTM C618, Class C or F.
- D. Water: ASTM C1602/C1602M; clean, potable, and not detrimental to concrete.
- E. Hydraulic Cement Underlayment: For adjacent ramp applications requiring a feather edge transition to existing slab, provide hydraulic cement underlayment; refer to Division 3 Section "Cast Underlayment".

#### **2.04 BONDING AND JOINTING PRODUCTS**

- A. Epoxy Bonding System:
  - 1. Complying with ASTM C881/C881M and of Type required for specific application.
- B. Slab Isolation Joint Filler: 1/4 inch thick, height equal to slab thickness, with removable top section that will form sealant pocket after removal.
- C. Slab Construction Joint Devices: Combination keyed joint form and screed, galvanized steel, with rectangular or round knockout holes for conduit or rebar to pass through joint form at 6

inches on center; ribbed steel stakes for setting.

## **2.05 CURING MATERIALS**

- A. Curing and Sealing Compound, Moisture Emission-Reducing, Penetrating: Clear, water-based, non-film-forming curing agent; capable of providing adequate bond for flooring adhesives, initially and over the long term; with sufficient moisture vapor impermeability to prevent deterioration of flooring adhesives due to moisture emission, moisture vapor emission, and alkalinity.
  - 1. Use this product to cure and seal all slabs to receive adhesively applied flooring.
  - 2. Compressive Strength of Treated Concrete: Equal to or greater than strength after 28-day water cure when tested according to ASTM C39/C39M.
  - 3. Chloride Ion Resistance of Treated Concrete: Equal to or greater than strength after 28-day water cure when tested according to ASTM C1202.
  - 4. Comply with ASTM C309 and ASTM C1315 Type I Class A.

## **2.06 CONCRETE MIX DESIGN**

- A. Proportioning Structural Lightweight Concrete: Comply with ACI 211.2 recommendations.
  - 1. Replace as much Portland cement as possible with fly ash, ground granulated blast furnace slag, silica fume, or rice hull ash as is consistent with ACI recommendations.
- B. Concrete Strength: Establish required average strength for each type of concrete on the basis of field experience or trial mixtures, as specified in ACI 301.
  - 1. For trial mixtures method, employ independent testing agency acceptable to Architect for preparing and reporting proposed mix designs.
- C. Structural Lightweight Concrete:
  - 1. Compressive Strength, when tested in accordance with ASTM C39/C39M at 28 days: 3,000 pounds per square inch.

## **2.07 MIXING**

- A. Adding Water: If concrete arrives on-site with slump less than suitable for placement, do not add water that exceeds the maximum water-cement ratio or exceeds the maximum permissible slump.

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Verify lines, levels, and dimensions before proceeding with work of this section.

### **3.02 PREPARATION**

- A. Formwork: Comply with requirements of ACI 301. Design and fabricate forms to support all applied loads until concrete is cured, and for easy removal without damage to concrete.
- B. Where new concrete is to be bonded to previously placed concrete, prepare existing surface by cleaning and applying bonding agent in according to bonding agent manufacturer's instructions.
  - 1. Use epoxy bonding system for bonding to damp surfaces, for structural load-bearing applications, and where curing under humid conditions is required.
- C. Interior Slabs on Grade: Install vapor retarder under interior slabs on grade. Comply with ASTM E1643. Lap joints minimum 6 inches. Seal joints, seams and penetrations watertight with manufacturer's recommended products and follow manufacturer's written instructions. Repair damaged vapor retarder before covering.

### **3.03 INSTALLING REINFORCEMENT AND OTHER EMBEDDED ITEMS**

- A. Comply with requirements of ACI 301. Clean reinforcement of loose rust and mill scale, and accurately position, support, and secure in place to achieve not less than minimum concrete coverage required for protection.
- B. Install welded wire reinforcement in maximum possible lengths, and offset end laps in both directions. Splice laps with tie wire.
- C. Verify that anchors, seats, plates, reinforcement and other items to be cast into concrete are accurately placed, positioned securely, and will not interfere with concrete placement.

### **3.04 PLACING CONCRETE**

- A. Place concrete in accordance with ACI 304R.
- B. Place concrete for floor slabs in accordance with ACI 302.1R.
- C. Maintain records of concrete placement. Record date, location, quantity, air temperature, and test samples taken.
- D. Ensure reinforcement, inserts, and formed construction joint devices will not be disturbed during concrete placement.
- E. Finish floors level and flat, unless otherwise indicated, within the tolerances specified below.

### **3.05 SLAB JOINTING**

- A. Locate joints as indicated.
  - 1. Provide joints as required to continue joints in existing concrete slab vertically through new slab.
- B. Anchor joint fillers and devices to prevent movement during concrete placement.
- C. Isolation Joints: Use preformed joint filler with removable top section for joint sealant, total height equal to thickness of slab, set flush with top of slab.
  - 1. Install wherever necessary to separate slab from other building members, including columns, walls, equipment foundations, footings, stairs, manholes, sumps, and drains.
- D. Saw Cut Contraction Joints: Saw cut joints before concrete begins to cool, within 4 to 12 hours after placing; use 3/16 inch thick blade and cut at least 1 inch deep but not less than one quarter (1/4) the depth of the slab.
- E. Construction Joints: Where not otherwise indicated, use metal combination screed and key form, with removable top section for joint sealant.

### **3.06 FLOOR FLATNESS AND LEVELNESS TOLERANCES**

- A. Maximum Variation of Surface Flatness:
  - 1. Exposed Concrete Floors: 1/4 inch in 10 feet.
  - 2. Under Seamless Resilient Flooring: 1/4 inch in 10 feet.
  - 3. Under Carpeting: 1/4 inch in 10 feet.
- B. Correct the slab surface if tolerances are less than specified.
- C. Correct defects by grinding or by removal and replacement of the defective work. Areas requiring corrective work will be identified. Re-measure corrected areas by the same process.

### **3.07 CONCRETE FINISHING**

- A. Concrete Slabs: Finish to requirements of ACI 302.1R, and as follows:

1. Surfaces to Receive Thin Floor Coverings: "Steel trowel" as described in ACI 302.1R; thin floor coverings include carpeting and resilient flooring.
2. Other Surfaces to Be Left Exposed: Trowel as described in ACI 302.1R, minimizing burnish marks and other appearance defects.

### **3.08 CURING AND PROTECTION**

- A. Comply with requirements of ACI 308R. Immediately after placement, protect concrete from premature drying, excessively hot or cold temperatures, and mechanical injury.
- B. Maintain concrete with minimal moisture loss at relatively constant temperature for period necessary for hydration of cement and hardening of concrete.
- C. Surfaces Not in Contact with Forms:
  1. Initial Curing: Start as soon as free water has disappeared and before surface is dry. Keep continuously moist for not less than three days by water-saturated sand or saturated burlap.
  2. Final Curing: Begin after initial curing but before surface is dry.
    - a. Curing Compound: Apply in two coats at right angles, using application rate recommended by manufacturer.

### **3.09 DEFECTIVE CONCRETE**

- A. Defective Concrete: Repair or replace concrete not complying with required lines, details, dimensions, tolerances or specified requirements.

### **3.10 PROTECTION**

- A. Do not permit traffic over unprotected concrete floor surface until fully cured.

### **END OF SECTION**

**SECTION 035400  
CAST UNDERLAYMENT**

**PART 1 GENERAL**

**1.01 REFERENCE STANDARDS**

- A. ASTM C109/C109M - Standard Test Method for Compressive Strength of Hydraulic Cement Mortars (Using 2-in. or [50 mm] Cube Specimens) 2021.
- B. ASTM C1602/C1602M - Standard Specification for Mixing Water Used in the Production of Hydraulic Cement Concrete 2018.
- C. ASTM C348 - Standard Test Method for Flexural Strength of Hydraulic-Cement Mortars 2021.
- D. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials 2021a.

**1.02 SUBMITTALS**

- A. See Section 013000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide manufacturer's data sheets documenting physical characteristics and product limitations of underlayment materials. Include information on surface preparation, environmental limitations, and installation instructions.
- C. Manufacturer's Instructions.

**1.03 QUALITY ASSURANCE**

- A. Applicator Qualifications: Company specializing in performing the work of this section, and approved by manufacturer.

**1.04 DELIVERY, STORAGE, AND HANDLING**

- A. Store products in manufacturer's unopened packaging until ready for installation.
- B. Keep dry and protect from direct sun exposure, freezing, and ambient temperature greater than 105 degrees F.

**1.05 FIELD CONDITIONS**

- A. Do not install underlayment until floor penetrations and peripheral work are complete.
- B. Maintain minimum ambient temperatures of 50 degrees F 24 hours before, during and 72 hours after installation of underlayment.
- C. During the curing process, ventilate spaces to remove excess moisture.

**PART 2 PRODUCTS**

**2.01 MANUFACTURERS**

- A. Cementitious Underlayment:
  - 1. ARDEX Engineered Cements; ARDEX K 15.
  - 2. Custom Building Products; CL-150 Self-Leveling Underlayment.
  - 3. Dayton Superior Corporation; EconoLevel.
  - 4. Dependable Chemical Co., Inc; Skimflow ES.
  - 5. Euclid Chemical Company; TAMMS SLU.
  - 6. Lambert Corporation; Lambco L-16 Self-Level.
  - 7. LATICRETE International, Inc; Supercap SC500.



8. MAPEI Corporation; Ultraplan 1 Plus.
9. Substitutions: See Section 016000 - Product Requirements.

## **2.02 MATERIALS**

- A. Cementitious Underlayment: Blended cement mix, that when mixed with water in accordance with manufacturer's directions will produce self-leveling underlayment with the following properties:
  1. Compressive Strength: Minimum 4000 pounds per square inch after 28 days, tested per ASTM C109/C109M.
  2. Flexural Strength: Minimum 1000 psi after 28 days, tested per ASTM C348.
  3. Density: 125 pounds per cubic foot, nominal.
  4. Final Set Time: 1-1/2 to 2 hours, maximum.
  5. Thickness: Capable of thicknesses from feather edge to maximum 3-1/2 inch.
  6. Surface Burning Characteristics: Flame spread/Smoke developed index of 0/0 in accordance with ASTM E84.
- B. Aggregate: Dry, well graded, washed silica aggregate, approximately 1/8 inch in size and acceptable to underlayment manufacturer.
- C. Water: ASTM C1602/C1602M; clean, potable, and not detrimental to underlayment mix materials.
- D. Primer: Manufacturer's recommended type.
- E. Joint and Crack Filler: Latex based filler, as recommended by manufacturer.

## **2.03 MIXING**

- A. Site mix materials in accordance with manufacturer's instructions.
- B. Add aggregate for areas where thickness will exceed 1/2 inch. Mix underlayment and water for at least two minutes before adding aggregate, and continue mixing to assure that aggregate has been thoroughly coated.
- C. Mix to self-leveling consistency without over-watering.

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Verify that substrate surfaces are clean, dry, unfrozen, do not contain petroleum byproducts, or other compounds detrimental to underlayment material bond to substrate.

### **3.02 PREPARATION**

- A. Concrete: Mechanically prepare steel troweled concrete to create a textured surface necessary to achieve the best bond; acceptable methods include bead blasting and scarifying. Do not use acid etching.
- B. Remove substrate surface irregularities. Fill voids and deck joints with filler. Finish smooth.
- C. Vacuum clean surfaces.
- D. Prime substrate in accordance with manufacturer's instructions. Allow to dry.
- E. Close floor openings.

### **3.03 APPLICATION**

- A. Install underlayment in accordance with manufacturer's instructions.

- B. Pump or pour material onto substrate. Do not retemper or add water.
  - 1. Pump, move, and screed while the material is still highly flowable.
  - 2. Be careful not to create cold joints.
  - 3. Wear spiked shoes while working in the wet material to avoid leaving marks.
- C. Place to indicated thickness, with top surface level to 1/8 inch in 10 ft.
- D. For final thickness over 1-1/2 inches, place underlayment in layers. Allow initial layer to harden to the point where the material has lost its evaporative moisture. Immediately prime and begin application of the subsequent layer within 24 hours.
- E. Where additional aggregate has been used in the mix, add a top layer of neat mix (without aggregate), if needed to level and smooth the surface.
- F. Where feathered edge is required, steel trowel the edge after initial set, but before it is completely hard.

#### **3.04 CURING**

- A. Once underlayment starts to set, prohibit foot traffic until final set has been reached.
- B. Air cure in accordance with manufacturer's instructions.

#### **3.05 PROTECTION**

- A. Protect against direct sunlight, heat, and wind; prevent rapid drying to avoid shrinkage and cracking.
- B. Do not permit traffic over unprotected floor underlayment surfaces.

#### **END OF SECTION**

**SECTION 055000  
METAL FABRICATIONS**

**PART 1 GENERAL**

**1.01 SUBMITTALS**

- A. See Section 013000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide product data for factory fabricated products and accessory materials, including the following:
- C. Shop Drawings: Indicate profiles, sizes, connection attachments, reinforcing, anchorage, size and type of fasteners, and accessories. Include erection drawings, elevations, and details where applicable.
- D. Welders' Qualification Statement: Welders' certificates in accordance with AWS B2.1/B2.1M and dated no more than 12 months before start of scheduled welding work.

**1.02 QUALITY ASSURANCE**

- A. Welder Qualifications: Welding processes and welding operators qualified in accordance with AWS D1.1/D1.1M and AWS D1.2/D1.2M and dated no more than 12 months before start of scheduled welding work.

**PART 2 PRODUCTS**

**2.01 MATERIALS - STEEL**

- A. Steel Sections: ASTM A36/A36M.
- B. Steel Tubing: ASTM A501/A501M hot-formed structural tubing.
- C. Plates: ASTM A283/A283M.
- D. Pipe: ASTM A53/A53M, Grade B Schedule 40, black finish.
- E. Mechanical Fasteners: Same material as or compatible with materials being fastened; type consistent with design and specified quality level.
  - 1. Provide stainless steel fasteners for all exterior construction and for fastening aluminum and stainless steel fabrications.
  - 2. Provide stainless steel fasteners at areas subject to moisture or steam, including mechanical rooms, janitor/custodial rooms with floor sinks, and similar spaces.
  - 3. Provide zinc-plated fasteners for interior construction except where stainless steel is indicated.
- F. Bolts, Nuts, and Washers: ASTM A307, Grade A, plain.
- G. Shop and Touch-Up Primer: MPI # 79/SSPC-Paint 15, universal shop primer; complying with VOC limitations of authorities having jurisdiction.
- H. Grout: ASTM C1107, non-shrink construction type grout.

**2.02 FABRICATION**

- A. Fit and shop assemble items in largest practical sections, for delivery to site.
- B. Fabricate items with joints tightly fitted and secured.
- C. Grind exposed joints flush and smooth with adjacent finish surface. Make exposed joints butt tight, flush, and hairline. Ease exposed edges to small uniform radius.

- D. Supply components required for anchorage of fabrications. Fabricate anchors and related components of same material and finish as fabrication, except where specifically noted otherwise.

### **2.03 FABRICATED ITEMS**

- A. Plates and Tubes and Other Miscellaneous Steel Shapes Not Attached to Structural Framing: As indicated on Drawings.

### **2.04 FINISHES - STEEL**

- A. Prime paint steel items.
- B. Prepare interior items to be primed in accordance with SSPC-SP3 Power Tool Cleaning.
- C. Clean surfaces of rust, scale, grease, and foreign matter prior to finishing.
- D. Prime Painting: One coat.

### **2.05 FABRICATION TOLERANCES**

- A. Squareness: 1/8 inch maximum difference in diagonal measurements.
- B. Maximum Offset Between Faces: 1/16 inch.
- C. Maximum Misalignment of Adjacent Members: 1/16 inch.
- D. Maximum Bow: 1/8 inch in 48 inches.
- E. Maximum Deviation From Plane: 1/16 inch in 48 inches.

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Verify that field conditions are acceptable and are ready to receive work.

### **3.02 PREPARATION**

- A. Clean and strip primed steel items to bare metal where site welding is required.
- B. Supply setting templates to the appropriate entities for steel items required to be cast into concrete or embedded in masonry.

### **3.03 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. Perform field welding in accordance with AWS D1.1/D1.1M.
- D. Obtain approval prior to site cutting or making adjustments not scheduled.
- E. After erection, prime welds, abrasions, and surfaces not shop primed, except surfaces to be in contact with concrete.

### **3.04 TOLERANCES**

- A. Maximum Variation From Plumb: 1/4 inch per story, non-cumulative.
- B. Maximum Offset From True Alignment: 1/4 inch.

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C. Maximum Out-of-Position: 1/4 inch.

**END OF SECTION**

**SECTION 055213  
PIPE AND TUBE RAILINGS**

**PART 1 GENERAL**

**1.01 SUBMITTALS**

- A. See Section 013000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide manufacturer's product data for pipe and tube railings.
- C. Shop Drawings: Indicate profiles, sizes, connection attachments, anchorage, size and type of fasteners, and accessories.
  - 1. Indicate welded connections using standard AWS A2.4 welding symbols. Indicate net weld lengths.
- D. Welders' Qualification Statement: Welders' certificates in accordance with AWS B2.1/B2.1M and dated within the previous 12 months.

**1.02 QUALITY ASSURANCE**

- A. Structural Designer Qualifications: Professional Structural Engineer experienced in design of this work and licensed in the State in which the Project is located, or personnel under direct supervision of such an engineer.
- B. Welder Qualifications: Welding processes and welding operators qualified within previous 12 months.

**PART 2 PRODUCTS**

**2.01 RAILINGS - GENERAL REQUIREMENTS**

- A. Design, fabricate, and test railing assemblies in accordance with the most stringent requirements of applicable local code.
  - B. Distributed Loads: Design railing assembly, wall rails, and attachments to resist distributed force of 75 pounds per linear foot applied to the top of the assembly and in any direction, without damage or permanent set. Test in accordance with ASTM E935
  - C. Concentrated Loads: Design railing assembly, wall rails, and attachments to resist a concentrated force of 200 pounds applied at any point on the top of the assembly and in any direction, without damage or permanent set. Test in accordance with ASTM E935
  - D. Allow for expansion and contraction of members and building movement without damage to connections or members.
  - E. Dimensions: See drawings for configurations and heights.
    - 1. Top Rails and Wall Rails: 1-1/4 inches diameter, round.
  - F. Provide anchors and other components as required to attach to structure, made of same materials as railing components unless otherwise indicated; where exposed fasteners are unavoidable provide flush countersunk fasteners.
    - 1. For anchorage to stud walls, provide backing plates, for bolting anchors.
  - G. Provide welding fittings to join lengths, seal open ends, and conceal exposed mounting bolts and nuts, including but not limited to elbows, T-shapes, splice connectors, flanges, escutcheons, and wall brackets.
  - H. Welded Joints: Make visible joints butt tight, flush, and hairline; use methods that avoid discoloration and damage of finish; grind smooth, polish, and restore to required finish.
    - 1. Ease exposed edges to a small uniform radius.
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2. Welded Joints:
  - a. Stainless Steel: Perform welding in accordance with AWS D1.6/D1.6M.

## **2.02 STAINLESS-STEEL RAILING**

- A. Stainless-Steel Tube: ASTM A 276, Type 304 round pipe.
- B. Welding Fittings: Factory- or shop-welded from matching pipe or tube; seams continuously welded; joints and seams ground smooth.
- C. Exposed Fasteners: No exposed bolts or screws. Provide stainless steel flange covers to conceal mounting brackets.
- D. Stainless Steel Finish: No. 4, brushed finish.

## **2.03 FABRICATION**

- A. Accurately form components to suit specific project conditions and for proper connection to building structure.
- B. Fit and shop assemble components in largest practical sizes for delivery to site.
- C. Fabricate components with joints tightly fitted and secured.
- D. Welded Joints:
  1. Interior Components: Continuously seal joined pieces by intermittent welds and plastic filler.
  2. Grind exposed joints flush and smooth with adjacent finish surface. Make exposed joints butt tight, flush, and hairline. Ease exposed edges to small uniform radius.

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Verify that field conditions are acceptable and are ready to receive work.

### **3.02 INSTALLATION**

- A. Install in accordance with manufacturer's instructions.
- B. Install components plumb and level, accurately fitted, free from distortion or defects, with tight joints.
- C. Install railings in compliance with ADA Standards for accessible design at applicable locations.
- D. Anchor railings securely to structure.
- E. Conceal anchor bolts and screws whenever possible.

### **3.03 TOLERANCES**

- A. Maximum Variation From Plumb: 1/4 inch per floor level, non-cumulative.
- B. Maximum Offset From True Alignment: 1/4 inch.
- C. Maximum Out-of-Position: 1/4 inch.

## **END OF SECTION**

**SECTION 061000  
ROUGH CARPENTRY**

**PART 1 GENERAL**

**1.01 REFERENCE STANDARDS**

- A. ASTM C557 - Standard Specification for Adhesives for Fastening Gypsum Wallboard to Wood Framing 2003 (Reapproved 2017).
- B. ASTM D3498 - Standard Specification for Adhesives for Field-Gluing Wood Structural Panels (Plywood or Oriented Strand Board) to Wood Based Floor System Framing 2019a.
- C. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials 2021a.
- D. AWC (WFCM) - Wood Frame Construction Manual for One- and Two-Family Dwellings 2018.
- E. AWPA U1 - Use Category System: User Specification for Treated Wood 2021.
- F. PS 2 - Performance Standard for Wood Structural Panels 2018.
- G. PS 20 - American Softwood Lumber Standard 2020.
- H. SPIB (GR) - Grading Rules 2014.

**1.02 SUBMITTALS**

- A. See Section 013000 - Administrative Requirements for submittal procedures.
- B. Product Data: Provide technical data on fire-retardant materials, wood preservative materials and application instructions.

**1.03 DELIVERY, STORAGE, AND HANDLING**

- A. General: Cover wood products to protect against moisture. Support stacked products to prevent deformation and to allow air circulation.
- B. Fire Retardant Treated Wood: Prevent exposure to precipitation during shipping, storage, and installation.

**PART 2 PRODUCTS**

**2.01 GENERAL REQUIREMENTS**

- A. Dimension Lumber: Comply with PS 20 and requirements of specified grading agencies.
  - 1. If no species is specified, provide species graded by the agency specified; if no grading agency is specified, provide lumber graded by grading agency meeting the specified requirements.
  - 2. Grading Agency: Grading agency whose rules are approved by the Board of Review, American Lumber Standard Committee at [www.alsc.org](http://www.alsc.org) and who provides grading service for the species and grade specified; provide lumber stamped with grade mark unless otherwise indicated.

**2.02 DIMENSION LUMBER FOR CONCEALED APPLICATIONS**

- A. Grading Agency: Southern Pine Inspection Bureau, Inc; SPIB (GR).
- B. Sizes: Nominal sizes as indicated on drawings, S4S.
- C. Moisture Content: Kiln-dry or MC15.
- D. Stud Framing (2 by 2 through 2 by 6 ):



1. Species: Southern Pine.
  2. Grade: No. 2.
- E. Miscellaneous Framing, Blocking, Nailers, Grounds, and Furring:
1. Lumber: S4S, No. 2 or Standard Grade.
  2. Boards: Standard or No. 3.
- F. Provide fire-retardant-treated (FRT) lumber at all framing, blocking and other miscellaneous lumber for raised platform construction (judge/clerk/witness bench).

### **2.03 CONSTRUCTION PANELS**

- A. Subflooring: PS 2 type, rated Sheathing.
1. Bond Classification: Exposure 1.
  2. Performance Category: 3/4 PERF CAT.
  3. Provide fire-retardant-treated (FRT) at subflooring of all raised platform (judge/clerk/witness bench) applications.

### **2.04 ACOUSTIC SUBFLOORING ASSEMBLY**

- A. Cellulose Based Fiber Board Subflooring: ASTM C 209 sound-deadening board composed of recycled paper and wood fibers in a binding medium. Provide 5/8-inch thick units unless indicated otherwise.
1. Density: Not less than 26 pcf per ASTM C 209.
  2. Tensile Strength: Not less than 450 psi per ASTM C 209.
  3. Hardness: 230 lbs when tested in accordance with ASTM D1037.
  4. Water Absorption by Volume: 5% maximum in a 2-hour immersion.
  5. Expansion Due to Humidity: 0.25% at 50 to 90% relative humidity per ASTM C 209
  6. NRC: 0.20.
  7. Flame Spread and Smoke Developed: 200 and 400 (Class C) per ASTM E 84.
- B. Acoustic Underlayment: Acoustic underlayment material designed to acoustically decouple flooring from subflooring.
1. Products:
    - a. Acoustical Surfaces, Inc.; Acoustik.
    - b. All Noise Control; Footfall.
    - c. KN Rubber; QuietDown.
    - d. Sound Seal; Sound Shark.
  2. Material: Acoustic recycled rubber sheet.
  3. Thickness: 1/4 inch.
  4. Flame Spread and Smoke Developed: Maximum 84 and 400, per ASTM E 84.
  5. Method of Installation: Adhesive; as recommended by manufacturer.

### **2.05 ACCESSORIES**

- A. Fasteners and Anchors:
1. Metal and Finish: Provide hot-dipped galvanized steel complying with ASTM A 153 or stainless steel at exterior, high humidity, and preservative-treated wood locations.
    - a. Fasteners at interior FRT shall be per FRT treatment manufacturer's recommendations.
  2. Drywall Screws: Bugle head, hardened steel, power driven type, length three times thickness of sheathing.
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- B. Sill Gasket: 1/4 inch thick, plate width, glass fiber strip or closed cell plastic foam from continuous rolls.
- C. Subfloor Adhesives: Waterproof, air cure type, cartridge dispensed; adhesives designed for subfloor applications and complying with either ASTM C557 or ASTM D3498.

## **2.06 FACTORY WOOD TREATMENT**

- A. Treated Lumber and Plywood: Comply with requirements of AWPA U1 - Use Category System for wood treatments determined by use categories, expected service conditions, and specific applications.
  - 1. Fire-Retardant Treated Wood: Provide FRT lumber and plywood stamped with name and mark of qualified testing agency, fire-retardant treatment product and manufacturer, wood species and drying method, testing standards, and flame spread and smoke development indices.
    - a. For exterior FRT and FRT that will be exposed to moisture, include accelerated weathering test language, with the words "No increase in the listed classification when subjected to Standard Rain Test ASTM D 2898".
  - 2. Preservative-Treated Wood: Provide lumber and plywood marked or stamped by an ALSC-accredited testing agency, certifying level and type of treatment in accordance with AWPA standards.
- B. Fire Retardant Treatment:
  - 1. Interior Type A: AWPA U1, Use Category UCFA, Commodity Specification H, low temperature (low hygroscopic) type, chemically treated and pressure impregnated; capable of providing a maximum flame spread index of 25 and maximum smoke developed index of 450, when tested in accordance with ASTM E84, with no evidence of significant combustion when test is extended for an additional 20 minutes.
    - a. Kiln dry wood after treatment to a maximum moisture content of 19 percent for lumber and 15 percent for plywood.
    - b. Treat interior concealed blocking, plywood backing panels, and other rough carpentry items as indicated.
    - c. Do not use treated wood in applications exposed to weather or where the wood may become wet.
  - 2. Strength Adjustments (Structural Panels/Plywood): Test FRT structural panels/plywood per ASTM D 5516 and develop strength adjustment factors per ASTM D 6305.
  - 3. Strength Adjustments (Lumber): Test FRT lumber per ASTM D 5664 and develop strength adjustment factors per ASTM D 6841.
- C. Preservative Treatment:
  - 1. Restrictions: Do not use lumber or plywood treated with chromated copper arsenate (CCA). Do not use lumber or plywood treated with inorganic boron (SBX) for applications exposed to water, ground/soil contact, or interior floor slabs/concrete. Comply with additional treatment restrictions as required by local authorities having jurisdiction.
  - 2. Preservative Pressure Treatment of Lumber & Plywood Above Grade: AWPA U1, Use Category UC3B, Commodity Specification A using waterborne preservative.
    - a. Use Category UC2 is acceptable for interior lumber and plywood above grade (not in contact with floor slab).
    - b. Kiln dry lumber after treatment to maximum moisture content of 19 percent.
    - c. Treat lumber in contact with concrete.
    - d. Treat lumber in other locations as indicated.

## **PART 3 EXECUTION**

### **3.01 PREPARATION**

- A. Install sill gasket under sill plate of framed walls bearing directly on concrete; puncture gasket cleanly to fit tightly around protruding anchor bolts.
- B. Coordinate installation of rough carpentry members specified in other sections.

### **3.02 INSTALLATION - GENERAL**

- A. Select material sizes to minimize waste.
- B. Reuse scrap to the greatest extent possible; clearly separate scrap for use on site as accessory components, including: shims, bracing, and blocking.
- C. Where treated wood is used on interior, provide temporary ventilation during and immediately after installation sufficient to remove indoor air contaminants.

### **3.03 FRAMING INSTALLATION**

- A. Set framing members level, plumb, and true to line. Discard pieces with defects that would lower required strength.
- B. Make provisions for temporary construction loads, and provide temporary bracing sufficient to maintain structure in true alignment and safe condition until completion of erection and installation of permanent bracing.
- C. Install framing members full length without splices.
- D. Comply with member sizes, spacing, and configurations indicated, and fastener size and spacing indicated, but not less than required by applicable codes and AWC (WFCM) Wood Frame Construction Manual.
- E. Frame wall openings with two or more studs at each jamb; support headers on cripple studs.

### **3.04 BLOCKING, NAILERS, AND SUPPORTS**

- A. Provide framing and blocking members as indicated or as required to support finishes, fixtures, specialty items, and trim.
- B. In metal-framed walls, provide continuous FRT blocking around door and window openings for anchorage of frames, securely attached to stud framing.
- C. In metal-framed walls, provide FRT blocking attached to studs as backing and support for wall-mounted items, unless item can be securely fastened to two or more studs or other method of support is explicitly indicated.

### **3.05 INSTALLATION OF CONSTRUCTION PANELS**

- A. Subflooring: Glue and nail to framing; staples are not permitted.
- B. Acoustic Underlayment: Secure to subflooring per manufacturer's instructions.

### **3.06 TOLERANCES**

- A. Framing Members: 1/4 inch from true position, maximum.
- B. Variation from Plane, Other than Floors: 1/4 inch in 10 feet maximum, and 1/4 inch in 30 feet maximum.

### **3.07 CLEANING**

- A. Waste Disposal:
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1. Comply with applicable regulations.
  2. Do not burn scrap on project site.
  3. Do not burn scraps that have been pressure treated.
  4. Do not send materials treated with pentachlorophenol, CCA, or ACA to co-generation facilities or "waste-to-energy" facilities.
- B. Do not leave wood, shavings, sawdust, etc. on the ground or buried in fill.
- C. Prevent sawdust and wood shavings from entering the storm drainage system.

**END OF SECTION**

**SECTION 062000  
FINISH CARPENTRY**

**PART 1 GENERAL**

**1.01 REFERENCE STANDARDS**

- A. AWI (QCP) - Quality Certification Program Current Edition.
- B. AWI/AWMAC/WI (AWS) - Architectural Woodwork Standards, 2nd Edition 2014, with Errata (2016).
- C. AWMAC/WI (NAAWS) - North American Architectural Woodwork Standards 2021, with Errata.

**1.02 SUBMITTALS**

- A. See Section 013000 - Administrative Requirements for submittal procedures.
- B. Product Data:
  - 1. Provide manufacturer's product data, storage and handling instructions for factory-fabricated units.
- C. Shop Drawings: Indicate materials, component profiles, fastening methods, jointing details, and accessories.
  - 1. Provide the information required by AWI/AWMAC/WI (AWS) or AWMAC/WI (NAAWS).
  - 2. Include certification program label.

**1.03 QUALITY ASSURANCE**

- A. Fabricator Qualifications: Company specializing in fabricating the products specified in this section with minimum five years of documented experience.
  - 1. Accredited participant in the specified certification program prior to the commencement of fabrication and throughout the duration of the project.
  - 2. Single Source Responsibility: Provide and install this work from single fabricator.
- B. Quality Certification:
  - 1. Comply with AWI (QCP) woodwork association quality certification service/program in accordance with requirements for work specified in this section: [www.awiqcp.org/#sle](http://www.awiqcp.org/#sle).
  - 2. Provide labels or certificates indicating that the work complies with AWI/AWMAC/WI (AWS) requirements for grade or grades specified.
  - 3. Provide designated labels on shop drawings as required by certification program.
  - 4. Provide designated labels on installed products as required by certification program.
  - 5. Submit certifications upon completion of installation that verifies this work is in compliance with specified requirements.

**1.04 DELIVERY, STORAGE, AND HANDLING**

- A. Store finish carpentry items under cover, elevated above grade, and in a dry, well-ventilated area not exposed to heat or sunlight.
- B. Protect from moisture damage.
- C. Handle materials and products to prevent damage to edges, ends, or surfaces.

## **PART 2 PRODUCTS**

### **2.01 FINISH CARPENTRY ITEMS**

- A. Quality Standard: Custom Grade, in accordance with AWI/AWMAC/WI (AWS), unless noted otherwise.
- B. Surface Burning Characteristics: Provide materials having fire and smoke properties as required by applicable code.

### **2.02 LUMBER MATERIALS**

- A. Hardwood Lumber (for Transparent Finish): Red oak, plain sawn, maximum moisture content of 6 percent, of quality suitable for transparent finish.
- B. Hardwood Lumber (for Opaque Finish): Closed-grain species, plain sawn, maximum moisture content of 6 percent , paint grade.

### **2.03 FASTENINGS**

- A. Adhesive for Purposes Other Than Laminate Installation: Suitable for the purpose; not containing formaldehyde or other volatile organic compounds.
- B. Fasteners: Of size and type to suit application; zinc-coated steel finish.

### **2.04 ACCESSORIES**

- A. Adhesive: Type recommended by fabricator to suit application.
- B. Wood Filler: Solvent base, tinted to match surface finish color.

### **2.05 SITE FINISHING MATERIALS**

- A. Stain, Shellac, Varnish, and Finishing Materials: In compliance with AWI/AWMAC/WI (AWS), unless noted otherwise.
- B. Finishing: Field painted opaque finish, as specified in Section 099100 "Painting".

### **2.06 FABRICATION**

- A. Shop assemble work for delivery to site, permitting passage through building openings.
- B. Shop prepare and identify components for book match grain matching during site erection.
- C. When necessary to cut and fit on site, provide materials with ample allowance for cutting. Provide trim for scribing and site cutting.

### **2.07 SHOP FINISHING**

- A. Sand work smooth and set exposed nails and screws.
- B. Apply wood filler in exposed nail and screw indentations.
- C. On items to receive transparent finishes, use wood filler that matches surrounding surfaces and is of type recommended for the applicable finish.
- D. Finish work in accordance with AWI/AWMAC/WI (AWS), Section 5 - Finishing for grade specified and as follows:
  - 1. Transparent:
    - a. System - 3, Lacquer, Postcatalyzed; or System - 5 ,Conversion Varnish.
    - b. Stain: As selected by Architect.
    - c. Sheen: Satin.

2. Opaque: Refer to Division 9 "Painting".

### **PART 3 EXECUTION**

#### **3.01 EXAMINATION**

- A. Verify adequacy of backing and support framing.

#### **3.02 INSTALLATION**

- A. Install custom fabrications in accordance with AWI/AWMAC/WI (AWS) requirements for grade indicated.
- B. Install factory-fabricated units in accordance with manufacturer's printed installation instructions.
- C. Set and secure materials and components in place, plumb and level.
- D. Carefully scribe work abutting other components, with maximum gaps of 1/32 inch. Do not use additional overlay trim to conceal larger gaps.

### **END OF SECTION**

**SECTION 064400  
CUSTOM COURTROOM WOODWORK AND CASEWORK**

**PART 1 GENERAL**

**1.01 REFERENCE STANDARDS**

- A. AWI (QCP) - Quality Certification Program Current Edition.
- B. AWI/AWMAC/WI (AWS) - Architectural Woodwork Standards, 2nd Edition 2014, with Errata (2016).
- C. HPVA HP-1 - American National Standard for Hardwood and Decorative Plywood 2016.

**1.02 ADMINISTRATIVE REQUIREMENTS**

- A. Scope: This section covers courtroom-specific, custom woodwork requirements fabricated to AWS "Premium" grade.
- B. Preinstallation Meeting: Convene a preinstallation meeting not less than one week before starting work of this section; require attendance by all affected installers.

**1.03 SUBMITTALS**

- A. See Section 013000 - Administrative Requirements for submittal procedures.
- B. Product Data: Provide data indicating materials and finishes, woodwork profiles, panel construction, hardware, and accessories.
- C. Shop Drawings: Indicate materials, component profiles, fastening methods, jointing details, and accessories.
  - 1. Include field measurements, and indicate where field measurements differ from documents.
- D. Samples: Submit actual samples of architectural woodwork profiles and paneling, minimum 12 inches square, illustrating proposed shapes, sizes, and finishes of panels, moldings, and other profiles.

**1.04 QUALITY ASSURANCE**

- A. Fabricator Qualifications: Company specializing in fabricating the products specified in this section with documented experience.
  - 1. Fabricator shall be an accredited participant in the specified certification program prior to the commencement of fabrication and throughout the duration of the project.
  - 2. Single Source Responsibility: Provide and install this work from single fabricator.
- B. Quality Certification:
  - 1. Comply with AWI (QCP) woodwork association quality certification service/program in accordance with requirements for work specified in this section: [www.awiqcp.org/#sle](http://www.awiqcp.org/#sle).
  - 2. Provide third-party final inspection of installed woodwork by AWI (QCP). AWI program of self-certification by fabricator in lieu of third-party inspection is not acceptable.
  - 3. Provide labels or certificates indicating that the installed work complies with AWI/AWMAC/WI (AWS) requirements for grade or grades specified.
  - 4. Provide designated labels on shop drawings as required by certification program.
  - 5. Provide designated labels on installed products as required by certification program.
  - 6. Submit certifications upon completion of installation that verifies this work is in compliance with specified requirements.
  - 7. Replace, repair, or rework all work for which certification is refused.



### **1.05 DELIVERY, STORAGE, HANDLING, AND FIELD CONDITIONS**

- A. Comply with Section 2 of the Architectural Woodwork Standards: "Care & Storage".
- B. Deliver woodwork after finishes are complete, including painting, and HVAC is operating at occupancy conditions in all spaces where woodwork will be installed.
- C. Protect units from moisture damage.
- D. During and after installation of woodwork, maintain temperature and humidity conditions in building spaces at same levels planned for occupancy.

## **PART 2 PRODUCTS**

### **2.01 CUSTOM COURTROOM CASEWORK AND WOODWORK**

- A. Quality Standard: Premium Grade, in accordance with AWI/AWMAC/WI (AWS), unless noted otherwise.
- B. Existing Courtroom Woodwork: There is existing woodwork to remain in the courtroom. The woodworker shall visit and become familiar with the construction, wood species and finish, profiles, accessories, and other components of the existing woodwork prior to fabrication of new woodwork; and new construction shall match existing to the greatest extent possible. Dimensions, properties and characteristics of existing casework that are being matched shall be indicated on shop drawings. For bid purposes, provide per the below requirements.
- C. General: Provide assemblies fabricated to dimensions, profiles, & general details indicated and coordinated with related work provided under other sections of these specifications. Coordinate indicated work with construction of stepped platform as indicated on Drawings and specified in Division 6 Section "Rough Carpentry."
  - 1. Internal construction and extent of prefabrication of complete assemblies shall be in accordance with final shop drawings. Drawing indications of 2x lumber internal framing are intended to represent "generic" internal construction. Particleboard material is generally preferred for case type pieces, lumber or particleboard for "paneling" type applications as determined by woodworker to be most beneficial for the specific woodwork item. Similarly, joinery details indicated depict options conforming to "Premium" grade criteria specified.
  - 2. Maintain smooth curves and radii for exposed surfaces. Provide bending grade panel material and utilize laminated multiple layers as determined by woodworker to attain required curved surfaces. Fabricate radiused top edge trim in accordance with "Premium" grade criteria of AWI Section 6 "Radius Moldings."
  - 3. Provide for electrical wiring, cabling, etc., as required for complete installation. Coordinate all electrical device outlet locations with Division 26 work and electrical Drawings. Such devices include, but are not limited to, microphones, audio mute, audio priority, data, telephone, video, speakers, and receptacles.
  - 4. Coordinate with pneumatic tube stations (work of Division 14) to provide woodwork trim where stations are indicated in locations with woodwork.
  - 5. Provide flush panel fronts (panel materials with reveals) as indicated in the drawings for indicated assemblies. Provide panel material that can successfully be routed, filled, and sanded sufficiently smooth for paint finish. Edge band exposed panel edges. Construct and support vertical reveals in "bow-front" panel applications to avoid stressed delamination of radiused panel material. (Provide edge banded panels and solid lumber reveal in lieu of routed reveal if panels are over stressed by radius).
- D. Quality Standards: Comply with AWS Sections and standards as follows:
  - 1. AWS Section 10 for "Premium" grade wood cabinets for transparent finish.
    - a. AWI Type of Cabinet Construction: Flush overlay.

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- b. Wood Species for Exposed Surfaces: Cherry, plain sawn. Run and match grain vertically for veneered panel product material for doors, drawer fronts, and fixed panels.
    - c. Wood Species for Semi-Exposed Surfaces: Match species and cut for exposed surfaces.
  2. AWS Section 10 for "Premium" grade wood cabinets for opaque (painted) finish. (Painted finish is specified in Division 9 Section "Painting")
    - a. AWI Type of Cabinet Construction: Flush overlay.
    - b. Wood Species for Exposed Surfaces: MDO panel product and closed grain hardwood lumber per AWI standard.
    - c. Wood Species for Semi-Exposed Surfaces: Match species and cut for exposed surfaces.
  3. AWS Section 11 for "Premium" grade for panel product countertops.
    - a. Type of Top: Panel product for transparent finish (wood veneer laminated over various cores).
    - b. Veneer Species: Cherry, plain sawn.
    - c. Edge Treatment: Lumber matching wood veneer face for species and cut.
  4. AWS Section 11 for "Premium" grade for linoleum countertops.
    - a. Type of Top: Linoleum for writing surface tops (conform to AWS Section 11 for HPDL construction). Provide 0.10-inch thickness "desk grade" linoleum in solid black color for bench top finish.
    - b. Edge Treatment: Cherry, plain sawn, lumber edge with profiles as detailed.
  5. AWS Section 8 "Wall Surfacing" (paneling) for "Premium" grade as applies to flush panelized fronts of judge's bench assembly and spectator rail elements.
    - a. Flat Panel, Transparent Finish: Panel product for transparent finish (wood veneer laminated over various cores). Provide sequenced, book-matched veneers, balance and center matched - i.e. 'blueprint-matched' panels and components per AWS Section 4 for use in continuous front pieces. Provide horizontal grain for bow-fronts only; vertical grain for planar surfaces.
    - b. Veneer Species for Exposed Surfaces, Transparent Finish: Cherry, plain sawn.
    - c. Reveal and Trim Lumber: Lumber matching wood veneer face for species and cut.
  6. AWS Section 8 "Wall Surfacing" (paneling) for "Premium" grade as applies to stile and rail panelized fronts of judge's bench assembly and spectator rail elements.
    - a. Raised Panel: Panel product with mitered, splined, lumber rim, for painted finish.
    - b. Flat Panel, Paint Finish: Panel product (wood veneer laminated over various cores) for paint finish. (Paint finish specified in Division 9 Section "Painting")
    - c. Veneer Species for Exposed Surfaces, Painted Finish: MDO panel product and closed grain hardwood lumber per AWI standard.
    - d. Flat Panel, Transparent Finish: Panel product for transparent finish (wood veneer laminated over various cores). Provide sequenced, book-matched veneers, balance and center matched - i.e. 'blueprint-matched' panels and components per AWS Section 4 for use in continuous front pieces. Provide horizontal grain for bow-fronts only; vertical grain for planar surfaces.
    - e. Veneer Species for Exposed Surfaces, Transparent Finish: Cherry, plain sawn.
    - f. Stiles and Rails: Lumber matching wood veneer face for species and cut.
  7. AWS Section 6 "Millwork" and "Ornamental Woodwork" for "Custom" grade as applies to pilasters, pediments, entablatures, and other ornamental trim at backdrops of judges' benches, door surrounds, crown, chair, and base moldings, and other locations around perimeter of courtroom, as detailed.

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- a. Where wall paneling is indicated, match construction and finish of paneling above.
  - b. For crown, chair, and base molding profiles, final profile shall be selected from woodworker's stock profiles of indicated size.
- E. Fabrication of Individual Courtroom Elements:
1. Judge's Bench/Clerk Desk/Probation Officer Desk: Provide assembly as indicated, composed of shop and field constructed elements to best accomplish high quality, close tolerance work as indicated and required. Include "cubicle" components in general composite assembly.
    - a. Provide counter/casework assembly indicated, featuring painted panel and solid lumber components.
    - b. Provide linoleum desk top; cherry veneer on panel product at other tops. Provide cherry lumber edge for transparent finish matching wood species on casework surfaces.
    - c. Provide fiberglass armor protective front construction indicated; sequence construction to maintain the continuity of this protective barrier. Provide back-up strips of armor behind outlet locations, securely fastened to solid blocking as indicated.
    - d. Provide computer monitor carriages, keyboard tray, and countertop vision glazing at Judge and Clerk stations.
    - e. Provide specified routed pulls, and specified slides for pencil and keyboard drawers.
    - f. Provide ventilation area in indicated cabinet doors by means of four horizontal 1/2-inch by 8-inch-long routed slots with rounded ends, spaced at 1-1/4 inches o.c. Confirm ventilation area location in doors and acceptability of any proposed modifications to slotting pattern on shop drawings prior to fabrication. Fill and sand routed surfaces and paint flat black.
    - g. Coordinate work with construction of stepped platform.
  2. Lecterns (Podiums): Conform to details and dimensions indicated.
  3. Witness Box and Podium: Conform to details and dimensions indicated.
  4. Spectator Rails: Conform to details and dimensions indicated. Secure railing assemblies to concrete floor with fabricated steel channels as indicated; sequence construction to permit installation. Coordinate with edge of raised flooring (platform/access flooring), and with concrete slab depressions.
  5. Tables and other freestanding custom casework items: Conform to details and dimensions indicated.

## 2.02 ACCESSORIES AND HARDWARE

- A. Hardware: BHMA A156.9, types as required for AWS "Premium" grade as specified.
  - B. Accessories: Provide accessories as detailed on Drawings and as required by this section.
    1. Provide Standard Accessories, including, but not limited to, pulls, slides, hinges, adhesives, adjustable shelf standards, grommets and wire management systems, countertop brackets and supports, as necessary.
  - C. Fixed Standard Shelf, Countertop, and Workstation Brackets: Install at 16 inches o.c. for full length of countertop/shelf.
    1. Material: Steel.
    2. Load Capacity: 500 lbs minimum per pair of brackets, installed at 16 inches o.c.
    3. Size: 21 inches high by 28 inches deep for standard 30 inch deep countertops. Provide additional sizes as required for other applications.
    4. Finish: Manufacturer's standard, factory-applied powder coat.
    5. Color: Selected by Architect from manufacturer's standard range.
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6. Products:
  - a. A&M Hardware, Inc; Standard Brackets.
  - b. Best Brackets; ADA Workstation Support Standard Steel Bracket.
  - c. FastCap; SpeedBrace.
  - d. Lyman Associates; Counter Top Supports.
  - e. Substitutions: See Section 016000 - Product Requirements.
- D. Linoleum Desktop Writing Surface: "Desk grade" linoleum sheet conforming to ASTM F 2034, solid color, in 0.10-inch thickness. Provide black color unless otherwise indicated.
  1. Available Products:
    - a. Armstrong World Industries, Inc.; Uni Walton.
    - b. Forbo Industries, Inc.; Marmoleum.
    - c. Johnsonite, a Tarkett Company; Etrusco xf<sup>2</sup>.
- E. Wire Management:
  1. Counter Mounted: Rectangular channel shape aluminum inserted into countertop cutout, with "hinged" front panel that snaps open and shut to insert and retain data cables. Black finish.
  2. Undercounter: 3-inch by 3-inch rectangular, bulk wire manager with open top channel.

### **2.03 FABRICATION**

- A. Assembly: Shop assemble casework and woodwork for delivery to site in units easily handled and to permit passage through building openings.
- B. Edging: Fit shelves, doors, drawers, and exposed edges with specified edging. Do not use more than one piece for any single length. Do not install in a manner that will affect operable components.
- C. Fitting: When necessary to cut and fit on site, provide materials with ample allowance for cutting. Provide matching trim for scribing and site cutting.
- D. Linoleum: Apply linoleum in full uninterrupted sheets consistent with manufactured sizes. Fit corners and joints hairline; secure with concealed fasteners. Slightly bevel exposed edges.
- E. Matching Wood Grain: Comply with requirements of quality standard for specified Grade and as follows:
  1. Provide sequence matching across each elevation.
- F. Provide cutouts for inserts, outlet boxes, and fixtures and fittings. Verify locations of cutouts from on-site dimensions. Seal cut edges.

### **2.04 SHOP FINISHING**

- A. Sand work smooth and set exposed nails and screws.
- B. On items to receive transparent finishes, use wood filler matching or blending with surrounding surfaces and of types recommended for applied finishes.
- C. Finish work in accordance with AWI/AWMAC/WI (AWS), Section 5 - Finishing for grade specified and as follows:
  1. Transparent:
    - a. System - 3, Lacquer, Postcatalyzed OR System - 5, Varnish, Conversion.
    - b. Stain: As selected by Architect.
    - c. Sheen: Satin.

### **PART 3 EXECUTION**

#### **3.01 EXAMINATION**

- A. Verify adequacy of backing and support framing.
- B. Verify location and sizes of utility rough-in associated with work of this section.

#### **3.02 INSTALLATION**

- A. Install work in accordance with AWI/AWMAC/WI (AWS) requirements for grades indicated.
- B. Set and secure custom casework and woodwork in place, assuring that they are rigid, plumb, and level.
- C. Use concealed joint fasteners to align and secure adjoining elements.
- D. Carefully scribe casework and woodwork abutting other components, with maximum gaps of 1/32 inch. Do not use additional overlay trim for this purpose.
- E. Secure casework and woodwork to floor using appropriate channels, framing, and anchorages, as detailed.
- F. Countersink anchorage devices at exposed locations. Conceal with solid wood plugs of species to match surrounding wood; finish flush with surrounding surfaces.

#### **3.03 ADJUSTING**

- A. Test installed work for rigidity and ability to support loads.
- B. Adjust moving or operating parts to function smoothly and correctly.

#### **3.04 CLEANING**

- A. Clean casework, woodwork, counters, shelves, hardware, fittings, and fixtures.

### **END OF SECTION**

**SECTION 079200  
JOINT SEALANTS**

**PART 1 GENERAL**

**1.01 SUBMITTALS**

- A. See Section 013000 - Administrative Requirements, for submittal procedures.
- B. Product Data for Sealants: Submit manufacturer's technical data sheets for each product to be used, that includes the following.
  - 1. Physical characteristics, including movement capability, VOC content, hardness, cure time, and color availability.
  - 2. List of backing materials approved for use with the specific product.
  - 3. Substrates that product is known to satisfactorily adhere to and with which it is compatible.
  - 4. Substrates the product should not be used on.
- C. Product Data for Accessory Products: Submit manufacturer's technical data sheet for each product to be used, including physical characteristics, installation instructions, and recommended tools.
- D. Color Cards for Selection: Where sealant color is not specified, submit manufacturer's color cards showing standard colors available for selection.
- E. Preconstruction Laboratory Test Reports: Submit at least four weeks prior to start of installation.
- F. Preinstallation Field Adhesion Test Plan: Submit at least two weeks prior to start of installation.
- G. Preinstallation Field Adhesion Test Reports: Submit filled out Preinstallation Field Adhesion Test Reports log within 10 days after completion of tests; include bagged test samples and photographic records.

**1.02 QUALITY ASSURANCE**

- A. Installer Qualifications: Company specializing in performing the work of this section, and is approved and/or certified by manufacturer.
- B. Preconstruction Laboratory Testing: Arrange for sealant manufacturer(s) to test each combination of sealant, substrate, backing, and accessories.
  - 1. Adhesion Testing: In accordance with ASTM C794.
  - 2. Compatibility Testing: In accordance with ASTM C1087.
  - 3. Allow sufficient time for testing to avoid delaying the work.
  - 4. Deliver to manufacturer sufficient samples for testing.
  - 5. Report manufacturer's recommended corrective measures, if any, including primers or techniques not indicated in product data submittals.
  - 6. Testing is not required if sealant manufacturer provides data showing previous testing, not older than 24 months, that shows satisfactory adhesion, lack of staining, and compatibility.
- C. Preinstallation Field Adhesion Test Plan: Include destructive field adhesion testing of one sample of each combination of sealant type and substrate, except interior acrylic latex sealants, and include the following for each tested sample.
  - 1. Identification of testing agency.
  - 2. Preinstallation Field Adhesion Test Log Form: Include the following data fields, with known information filled out.
    - a. Test date.
    - b. Copy of test method documents.

- c. Age of sealant upon date of testing.
  - d. Test results, modeled after the sample form in the test method document.
  - e. Indicate use of photographic record of test.
- D. Field Adhesion Test Procedures:
- 1. Allow sealants to fully cure as recommended by manufacturer before testing.
  - 2. Have a copy of the test method document available during tests.
  - 3. Record the type of failure that occurred, other information required by test method, and the information required on the Field Quality Control Log.
  - 4. When performing destructive tests, also inspect the opened joint for proper installation characteristics recommended by manufacturer, and report any deficiencies.
  - 5. Deliver the samples removed during destructive tests in separate sealed plastic bags, identified with project, location, test date, and test results, to Owner.
  - 6. If any combination of sealant type and substrate does not show evidence of minimum adhesion or shows cohesion failure before minimum adhesion, report results to Architect.
- E. Destructive Field Adhesion Test: Test for adhesion in accordance with ASTM C1521, using Destructive Tail Procedure.
- 1. Sample: At least 18 inches long.
  - 2. Minimum Elongation Without Adhesive Failure: Consider the tail at rest, not under any elongation stress; multiply the stated movement capability of the sealant in percent by two; then multiply 1 inch by that percentage; if adhesion failure occurs before the "1 inch mark" is that distance from the substrate, the test has failed.
  - 3. If either adhesive or cohesive failure occurs prior to minimum elongation, take necessary measures to correct conditions and re-test; record each modification to products or installation procedures.

### 1.03 WARRANTY

- A. See Section 017800 - Closeout Submittals, for additional warranty requirements.
- B. Correct defective work within a five year period after Date of Substantial Completion.
- C. Warranty: Include coverage for installed sealants and accessories that fail to achieve watertight seal, exhibit loss of adhesion or cohesion, or do not cure.

## PART 2 PRODUCTS

### 2.01 JOINT SEALANT APPLICATIONS

- A. Scope:
  - 1. Interior Joints: Do not seal interior joints unless specifically indicated to be sealed. Interior joints to be sealed include, but are not limited to, the following items.
    - a. Joints between door and other frames and adjacent construction.
    - b. Wall and ceiling joints.
    - c. Other joints indicated below.
  - 2. Do not seal the following types of joints.
    - a. Joints indicated to be treated with manufactured expansion joint cover or some other type of sealing device.
    - b. Joints where sealant is specified to be provided by manufacturer of product to be sealed.
    - c. Joints where installation of sealant is specified in another section.
- B. Interior Joints: Use non-sag polyurethane sealant (ES-1), unless otherwise indicated.

1. Type AS-1 - Joints at sound-rated or acoustic assemblies, and at full-height panel wall and partition assemblies indicated to have sound attenuation batts.
  2. Type LS-1 - Joints around perimeters of interior doors, and similar framed openings.
- C. Interior Wet Areas: Bathrooms, restrooms, and kitchens; fixtures in wet areas include plumbing fixtures, countertops, cabinets, and other similar items.
- D. Sound-Rated Assemblies: Walls and ceilings identified as "STC-rated", "sound-rated", or "acoustical".

## 2.02 NONSAG JOINT SEALANTS

- A. Type ES-1 - Polyurethane Sealant: ASTM C920, Grade NS, Uses M and A; multi-component; not expected to withstand continuous water immersion or traffic.
1. Movement Capability: Plus and minus 25 percent, minimum.
  2. Color: To be selected by Architect from manufacturer's standard range.
  3. Manufacturers:
    - a. ITW Polymers Sealants; Permthane SM 7200.
    - b. Master Builders Solutions by BASF; MasterSeal NP2.
    - c. Pecora Corporation; DynaTrol II:e.
    - d. Sika Corporation; Sikaflex-2c NS.
    - e. Tremco Commercial Sealants & Waterproofing; Dymeric 240 FC or Vulkem 227.
    - f. Substitutions: See Section 016000 - Product Requirements.
- B. Type LS-1 - Acrylic Emulsion Latex: Water-based; ASTM C834, single component, non-staining, non-bleeding, non-sagging; not intended for exterior use.
1. Color: To be selected by Architect from manufacturer's standard range.
  2. Grade: ASTM C834; Grade NF.
  3. Manufacturers:
    - a. Bostik, Inc; Chem-Calk 600.
    - b. ITW Polymers Sealants; SM 8200.
    - c. Master Builders Solutions; MasterSeal NP 520.
    - d. Pecora Corporation; AC-20 +Silicone.
    - e. Tremco Commercial Sealants & Waterproofing; Tremflex 834.
    - f. Substitutions: See Section 016000 - Product Requirements.
- C. Type AS-1 - Acrylic Emulsion Latex: Water-based; ASTM C834, single component, non-staining, non-bleeding, non-sagging acoustical sealant.
1. Color: Standard colors matching finished surfaces, Type OP (opaque).
  2. Grade: ASTM C834; Grade NF.
  3. Manufacturers:
    - a. Accumetric LLC; BOSS 826 Acoustical Sound Sealant.
    - b. Franklin International, Inc; Titebond GREENchoice Acoustical Smoke & Sound Sealant.
    - c. Hilti, Inc; CP 506 Smoke and Acoustical Sealant.
    - d. Master Builders Solutions; MasterSeal NP 520.
    - e. Momentive Performance Materials, Inc/GE Silicones; RCS20 Acoustical.
    - f. Pecora Corporation; AC-20 FTR or AIS-919.
    - g. Specified Technologies Inc; Smoke N' Sound Acoustical Sealant.
    - h. Tremco Commercial Sealants & Waterproofing; Tremstop Smoke and Sound.



- i. Substitutions: See Section 016000 - Product Requirements.

### **2.03 ACCESSORIES**

- A. Backer Rod: Cylindrical cellular foam rod with surface that sealant will not adhere to, compatible with specific sealant used, and recommended by backing and sealant manufacturers for specific application.
- B. Backing Tape: Self-adhesive polyethylene tape with surface that sealant will not adhere to and recommended by tape and sealant manufacturers for specific application.
- C. Masking Tape: Self-adhesive, nonabsorbent, non-staining, removable without adhesive residue, and compatible with surfaces adjacent to joints and sealants.
- D. Joint Cleaner: Non-corrosive and non-staining type, type recommended by sealant manufacturer; compatible with joint forming materials.
- E. Primers: Type recommended by sealant manufacturer to suit application; non-staining.

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Verify that joints are ready to receive work.
- B. Verify that backing materials are compatible with sealants.
- C. Verify that backer rods are of the correct size.
- D. Preinstallation Adhesion Testing: Install a sample for each test location indicated in the test plan.
  - 1. Test each sample as specified in PART 1 under QUALITY ASSURANCE article.
  - 2. Notify Architect of date and time that tests will be performed, at least seven days in advance.
  - 3. Record each test on Preinstallation Adhesion Test Log as indicated.
  - 4. If any sample fails, review products and installation procedures, consult manufacturer, or take whatever other measures are necessary to ensure adhesion; re-test in a different location; if unable to obtain satisfactory adhesion, report to Architect.
  - 5. After completion of tests, remove remaining sample material and prepare joint for new sealant installation.

### **3.02 PREPARATION**

- A. Remove loose materials and foreign matter that could impair adhesion of sealant.
- B. Clean joints, and prime as necessary, in accordance with manufacturer's instructions.
- C. Perform preparation in accordance with manufacturer's instructions and ASTM C1193.
- D. Mask elements and surfaces adjacent to joints from damage and disfigurement due to sealant work; be aware that sealant drips and smears may not be completely removable.
- E. Concrete Floor Joints That Will Be Exposed in Completed Work: Test joint filler in inconspicuous area to verify that it does not stain or discolor slab.

### **3.03 INSTALLATION**

- A. Perform work in accordance with sealant manufacturer's requirements for preparation of surfaces and material installation instructions.
- B. Perform installation in accordance with ASTM C1193.
- C. Perform acoustical sealant application work in accordance with ASTM C919.

- D. Measure joint dimensions and size joint backers to achieve width-to-depth ratio, neck dimension, and surface bond area as recommended by manufacturer, except where specific dimensions are indicated.
- E. Install bond breaker backing tape where backer rod cannot be used.
- F. Install sealant free of air pockets, foreign embedded matter, ridges, and sags, and without getting sealant on adjacent surfaces.
- G. Do not install sealant when ambient temperature is outside manufacturer's recommended temperature range, or will be outside that range during the entire curing period, unless manufacturer's approval is obtained and instructions are followed.
- H. Nonsag Sealants: Tool surface concave, unless otherwise indicated; remove masking tape immediately after tooling sealant surface.
- I. Concrete Floor Joint Filler: After full cure, shave joint filler flush with top of concrete slab.

#### **3.04 FIELD QUALITY CONTROL**

- A. Perform field quality control inspection/testing as specified in PART 1 under QUALITY ASSURANCE article.
- B. Destructive Adhesion Testing: If there are any failures in first 1000 linear feet, notify Architect immediately.
- C. Remove and replace failed portions of sealants using same materials and procedures as indicated for original installation.
- D. Repair destructive test location damage immediately after evaluation and recording of results.

#### **END OF SECTION**

**SECTION 081113  
STEEL DOORS AND FRAMES**

**PART 1 GENERAL**

**1.01 REFERENCE STANDARDS**

- A. ADA Standards - Americans with Disabilities Act (ADA) Standards for Accessible Design 2010.
- B. ANSI/SDI A250.4 - Test Procedure and Acceptance Criteria for Physical Endurance for Steel Doors, Frames and Frame Anchors 2018.
- C. ANSI/SDI A250.8 - Specifications for Standard Steel Doors and Frames (SDI-100) 2017.
- D. ANSI/SDI A250.10 - Test Procedure and Acceptance Criteria for Prime Painted Steel Surfaces for Steel Doors and Frames 2020.
- E. ASTM A1011/A1011M - Standard Specification for Steel, Sheet and Strip, Hot-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, and Ultra-High Strength 2018a.
- F. BHMA A156.115 - Hardware Preparation In Steel Doors And Steel Frames 2016.
- G. ICC A117.1 - Accessible and Usable Buildings and Facilities 2017.
- H. NAAMM HMMA 830 - Hardware Selection for Hollow Metal Doors and Frames 2002.
- I. NAAMM HMMA 831 - Hardware Locations for Hollow Metal Doors and Frames 2011.
- J. NAAMM HMMA 840 - Guide Specifications For Receipt, Storage and Installation of Hollow Metal Doors and Frames 2007.
- K. NAAMM HMMA 861 - Guide Specifications for Commercial Hollow Metal Doors and Frames 2014.
- L. SDI 117 - Manufacturing Tolerances for Standard Steel Doors and Frames 2019.

**1.02 SUBMITTALS**

- A. See Section 013000 - Administrative Requirements for submittal procedures.
- B. Product Data: Materials and details of design and construction, hardware locations, reinforcement type and locations, anchorage and fastening methods, and finishes.
- C. Shop Drawings: Details of each opening, showing elevations, frame profiles, and any indicated finish requirements.
- D. Manufacturer's Certificate: Certification that products meet or exceed specified requirements.

**1.03 QUALITY ASSURANCE**

- A. Maintain at project site copies of reference standards relating to installation of products specified.

**1.04 DELIVERY, STORAGE, AND HANDLING**

- A. Comply with NAAMM HMMA 840 or ANSI/SDI A250.8 (SDI-100) in accordance with specified requirements.
- B. Protect with resilient packaging; avoid humidity build-up under coverings; prevent corrosion and adverse effects on factory applied painted finish.

## **PART 2 PRODUCTS**

### **2.01 MANUFACTURERS**

- A. Hollow Metal Doors and Frames:
  - 1. Ceco Door, an Assa Abloy Group company.
  - 2. Curries, an Assa Abloy Group company.
  - 3. Fleming Door Products, an Assa Abloy Group company.
  - 4. Krieger Specialty Products.
  - 5. Mesker, dormakaba Group.
  - 6. Pioneer Industries, Inc.; an Assa Abloy Group company.
  - 7. Republic Doors, an Allegion brand.
  - 8. Steelcraft, an Allegion brand.
  - 9. Technical Glass Products.

### **2.02 PERFORMANCE REQUIREMENTS**

- A. Requirements for Hollow Metal Doors and Frames:
  - 1. Steel Sheet: Comply with one or more of the following requirements; galvanized steel complying with ASTM A653/A653M, cold-rolled steel complying with ASTM A1008/A1008M, or hot-rolled pickled and oiled (HRPO) steel complying with ASTM A1011/A1011M, commercial steel (CS) Type B, for each.
  - 2. Accessibility: Comply with ICC A117.1 and ADA Standards.
  - 3. Door Top and Bottom Closures: Flush end closure channel, with top and door faces aligned.
    - a. Inverted channel closure is acceptable for bottom edges and top edges of interior doors that are not exposed to view from above.
  - 4. Door Edge Profile: Hinged edge square, and lock edge beveled Beveled edge.
  - 5. Typical Door Face Sheets: Flush.
  - 6. Glazed Lights: Non-removable stops on non-secure side; sizes and configurations as indicated on drawings. Style: Manufacturers standard.
  - 7. Hardware Preparations, Selections and Locations: Comply with NAAMM HMMA 830 and NAAMM HMMA 831 or BHMA A156.115 and ANSI/SDI A250.8 (SDI-100) in accordance with specified requirements.
  - 8. Zinc Coating for Typical Interior and/or Exterior Locations: Provide metal components zinc-coated (galvanized) and/or zinc-iron alloy-coated (galvanized) by the hot-dip process in accordance with ASTM A653/A653M, with manufacturer's standard coating thickness, unless noted otherwise for specific hollow metal doors and frames.
    - a. Based on SDI Standards: Provide at least A40/ZF120 (galvanized) when necessary, coating not required for typical interior door applications, and at least A60/ZF180 (galvanized) for corrosive locations.
- B. Combined Requirements: If a particular door and frame unit is indicated to comply with more than one type of requirement, comply with the specified requirements for each type; for instance, an exterior door that is also indicated as being sound-rated must comply with the requirements specified for exterior doors and for sound-rated doors; where two requirements conflict, comply with the most stringent.

### **2.03 HOLLOW METAL DOORS**

- A. Door Finish: Factory primed and field finished.

- B. Interior Doors, Non-Fire-Rated: Fabricate from either cold-rolled steel sheet or metallic-coated steel sheet.
  - 1. Based on SDI Standards: ANSI/SDI A250.8 (SDI-100).
    - a. Level 3 - Extra Heavy-duty.
    - b. Physical Performance Level A, 1,000,000 cycles; in accordance with ANSI/SDI A250.4.
    - c. Model 1 - Full Flush.
    - d. Door Face Metal Thickness: 16 gauge, 0.053 inch, minimum.
  - 2. Door Core Material: Manufacturers standard core material/construction and in compliance with requirements, except kraft paper honeycomb core is not acceptable.
  - 3. Door Thickness: 1-3/4 inches, nominal.

#### **2.04 HOLLOW METAL FRAMES**

- A. Comply with standards and/or custom guidelines as indicated for corresponding door in accordance with applicable door frame requirements.
- B. Frame Finish: Factory primed and field finished.
- C. Interior Door Frames, Non-Fire Rated: Face welded type.
  - 1. Frame Metal Thickness: 16 gauge, 0.053 inch, minimum.
- D. Frames for Wood Doors: Comply with frame requirements in accordance with corresponding door.
- E. Provide mortar guard boxes for hardware cut-outs in frames to be installed in masonry or to be grouted.

#### **2.05 FINISHES**

- A. Primer: Rust-inhibiting, complying with ANSI/SDI A250.10, door manufacturer's standard.

#### **2.06 ACCESSORIES**

- A. Mechanical Fasteners for Concealed Metal-to-Metal Connections: Self-drilling, self-tapping, steel with electroplated zinc finish.
- B. Grout for Frames: Mortar grout complying with ASTM C476 with maximum slump of 4 inches as measured in accordance with ASTM C143/C143M for hand troweling in place; plaster grout and thinner pumpable grout are prohibited.
- C. Silencers: Resilient rubber, fitted into drilled hole; provide three on strike side of single door, three on center mullion of pairs, and two on head of pairs without center mullions.
- D. Temporary Frame Spreaders: Provide for factory- or shop-assembled frames.

### **PART 3 EXECUTION**

#### **3.01 EXAMINATION**

- A. Verify existing conditions before starting work.
- B. Verify that opening sizes and tolerances are acceptable.
- C. Verify that finished walls are in plane to ensure proper door alignment.

#### **3.02 INSTALLATION**

- A. Install doors and frames in accordance with manufacturer's instructions and related requirements of specified door and frame standards or custom guidelines indicated.

1. Install in accordance with ANSI/SDI A250.11.
  2. Do not remove temporary frame spreaders until after frames have been properly set and secured.
- B. Coordinate frame anchor placement with wall construction.
  - C. Grout frames in masonry construction, using hand trowel methods; brace frames so that pressure of grout before setting will not deform frames.
  - D. Install door hardware as specified in Section 087100.
  - E. Coordinate installation of electrical connections to electrical hardware items.
  - F. Touch up damaged factory finishes.

**3.03 TOLERANCES**

- A. Clearances Between Door and Frame: Comply with related requirements of specified frame standards or custom guidelines indicated in accordance with SDI 117 or NAAMM HMMA 861.
- B. Maximum Diagonal Distortion: 1/16 inch measured with straight edge, corner to corner.

**3.04 ADJUSTING**

- A. Adjust for smooth and balanced door movement.

**END OF SECTION**

**SECTION 081433  
STILE AND RAIL WOOD DOORS**

**PART 1 GENERAL**

**1.01 REFERENCE STANDARDS**

- A. AWI/AWMAC/WI (AWS) - Architectural Woodwork Standards, 2nd Edition 2014, with Errata (2016).

**1.02 SUBMITTALS**

- A. See Section 013000 - Administrative Requirements for submittal procedures.
- B. Product Data: Indicate stile and rail core materials and construction; veneer species, type and characteristics.
- C. Shop Drawings: Illustrate door opening criteria, elevations, sizes, types, swings, undercuts required, special beveling, special blocking for hardware, factory machining criteria, factory finishing criteria, and cutouts for glazing.
- D. Selection Samples: Manufacturer's color charts and swatches for hardwood species and stain finishes, indicating full range of materials and colors.
- E. Verification Samples: Corner section of door, minimum 8- by 8-inch, indicating stile and rail construction, face and edge veneer, wood species and stain finish, to match that selected.
- F. Manufacturer's qualification statement.
- G. Warranty, executed in Owner's name.

**1.03 QUALITY ASSURANCE**

- A. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section, FSC-accredited chain-of-custody manufacturer.

**1.04 DELIVERY, STORAGE, AND HANDLING**

- A. Package, deliver, and store doors in accordance with quality standard specified.
- B. Accept doors on site in manufacturer's packaging, and inspect for damage.
- C. Protect doors with resilient packaging sealed with heat shrunk plastic; do not store in damp or wet areas or areas where sunlight might bleach veneer; seal top and bottom edges with tinted sealer if stored more than one week, and break seal on site to permit ventilation.

**1.05 WARRANTY**

- A. See Section 017800 - Closeout Submittals for additional warranty requirements.
- B. Interior Doors: Provide manufacturer's warranty for the life of the installation.
  - 1. Provide warranty on glass vision panels for minimum 5 years.
- C. Include coverage for delamination of veneer, warping beyond specified installation tolerances, defective materials, and telegraphing core construction.

**PART 2 PRODUCTS**

**2.01 MANUFACTURERS**

- A. Stile and Rail Wood Doors:
    - 1. Artistic Doors and Windows, Inc.
    - 2. Dimension Millworks.
-

3. Masonite Architectural; Aspiro Authentic Stile & Rail Doors.
4. VT Industries, Inc; Eggers Stile and Rail Doors.
5. Substitutions: See Section 016000 - Product Requirements.

## **2.02 DOORS**

- A. Quality Standard: Custom Grade, Heavy Duty performance, in accordance with AWI/AWMAC/WI (AWS), unless otherwise indicated.
- B. Interior Doors: 1-3/4 inches thick unless otherwise indicated; solid lumber construction; mortise and tenon joints. Transparent finish.

## **2.03 DOOR AND PANEL FACINGS**

- A. Veneer Facing for Transparent Finish: American Cherry, veneer grade in accordance with quality standard indicated, plain sliced (flat cut), with book match between leaves of veneer, running match of spliced veneer leaves assembled on door or panel face.
- B. Adhesive: Type II - Water Resistant.

## **2.04 DOOR CONSTRUCTION**

- A. Vertical Exposed Edge of Stiles: Of same species as veneer facing.
- B. Fit door edge trim to edge of stiles after applying veneer facing.
- C. Bond edge banding to cores.
- D. Panels: Flat panel; manufacturer's standard 8-panel construction to match existing.
  1. Panel Trim/Sticking: Manufacturer's standard quarter round (ovolo) or ogee profile to match. Verify match to existing doors in field.
- E. Factory machine doors for finish hardware in accordance with hardware requirements and dimensions. Do not machine for surface hardware.
- F. Factory fit doors for frame opening dimensions identified on shop drawings, with edge clearances in accordance with specified quality standard.

## **2.05 FINISHES**

- A. Finish work in accordance with AWI/AWMAC/WI (AWS), Section 5 - Finishing for grade specified and as follows:
  1. Transparent:
    - a. System - 5, Varnish, Conversion or System - 11, Polyurethane, Catalyzed.
    - b. Stain: As selected by Architect to match existing facility.
    - c. Sheen: Satin.

## **2.06 ACCESSORIES**

- A. Door Hardware: See Section 087100.

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Verify existing conditions before starting work.
  - B. Verify that opening sizes and tolerances are acceptable.
  - C. Do not install doors in frame openings that are not plumb or are out of tolerance for size or alignment.
-



**3.02 INSTALLATION**

- A. Install doors in accordance with manufacturer's instructions and specified quality standards.
- B. Factory-Finished Doors: Do not field cut or trim; if fit or clearance is not correct, replace door.
- C. Machine cut for hardware.
- D. Coordinate installation of doors with installation of frames and hardware.

**3.03 TOLERANCES**

- A. Comply with specified quality standard for fit, clearance, and joinery tolerances.

**3.04 ADJUSTING**

- A. Adjust doors for smooth and balanced door movement.

**END OF SECTION**

**SECTION 083100  
ACCESS DOORS AND PANELS**

**PART 1 GENERAL**

**1.01 SUBMITTALS**

- A. See Section 013000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide sizes, types, finishes, hardware, scheduled locations, and details of adjoining work.

**1.02 COORDINATION**

- A. Verification: Determine specific locations and sizes for access doors needed to gain access to concealed plumbing, mechanical, or other concealed work, and indicate in the schedule specified in "Submittals" Article.
  - 1. This (083100) material specification includes access doors required for Divisions 21 (Fire Suppression), Division 22, (Plumbing), 23 (HVAC) and Division 26 (Electrical) work and any other access doors indicated on Drawings.

**PART 2 PRODUCTS**

**2.01 WALL AND CEILING MOUNTED ACCESS UNITS**

- A. Manufacturers:
  - 1. Activar Construction Products Group, Inc. - JL Industries.
  - 2. ACUDOR Products Inc.
  - 3. Babcock-Davis.
  - 4. Bauco Access Panel Solutions Inc.
  - 5. Best Access Doors.
  - 6. Cendrex, Inc.
  - 7. Karp Associates, Inc.
  - 8. Larsen's Manufacturing Company.
  - 9. Milcor, Inc.
  - 10. Nystrom, Inc.
  - 11. Williams Brothers Corporation of America.
  - 12. Substitutions: See Section 016000 - Product Requirements.
- B. Wall and Ceiling Mounted Units: Factory fabricated door and frame, fully assembled units with corner joints welded, filled and ground flush; square and without rack or warp; coordinate requirements with type of installation assembly being used for each unit.
  - 1. Material: Steel.
  - 2. Style (Gypsum Board locations): Recessed door panel for infill with wall/ceiling finish.
    - a. Gypsum Board Mounting Criteria: Use drywall bead type frame.
  - 3. Style (Masonry locations): Exposed frame, with door surface flush with frame surface.
  - 4. Door Style: Double-skinned hollow panel.
  - 5. Frames: 16 gauge, 0.0598 inch, minimum thickness.
  - 6. Double-Skinned Hollow Steel Sheet Door Panels: 16 gauge, 0.059 inch, minimum thickness, on both sides and along each edge.
  - 7. Units in Fire-Rated Assemblies: Fire rating as required by applicable code for fire-rated assembly that access doors are being installed.

- a. Provide products listed by ITS (DIR) or UL (FRD) as suitable for purpose indicated.
  - b. Provide certificate of compliance from authorities having jurisdiction indicating approval of fire rated doors.
  - c. Fire-rated door assemblies shall conform with and be installed in accordance with (1) NFPA 80, (2) door and frame manufacturer's installation instructions, and (3) listing requirements of qualified testing agency.
8. Steel Finish: Primed.
9. Hardware:
- a. Hardware for Fire-Rated Units: As required for listing.
  - b. Hinges for Non-Fire-Rated Units: Concealed, constant force closure spring type.
  - c. Latch/Lock: Cylinder lock-operated cam latch, two keys for each unit.
    - 1) Detention/I-3 Areas: Provide security type key cylinder by same manufacturer as approved security door hardware (Division 11). Key all secure access doors alike, coordinate with Security Hardware masterkeying.

### **PART 3 EXECUTION**

#### **3.01 EXAMINATION**

- A. Verify that rough openings are correctly sized and located.
- B. Begin installation only after substrates have been properly prepared, and if the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

#### **3.02 PREPARATION**

- A. Clean surfaces thoroughly prior to proceeding with this work.
- B. Prepare surfaces using methods recommended by manufacturer for applicable substrates in accordance with project conditions.

#### **3.03 INSTALLATION**

- A. Install units in accordance with manufacturer's instructions.
- B. Install frames plumb and level in openings, and secure units rigidly in place.
- C. Position units to provide convenient access to concealed equipment when necessary.

### **END OF SECTION**

**SECTION 087100  
DOOR HARDWARE**

**PART 1 GENERAL**

**1.01 ADMINISTRATIVE REQUIREMENTS**

- A. Coordinate the installation of door and frame products to receive door hardware.
- B. Sequence installation to ensure utility connections are achieved in an orderly and expeditious manner.
- C. Preinstallation Meeting: Convene a preinstallation meeting prior to commencing work of this section; verify Owner's security, operation, and keying requirements, and verify specified products Attendance is required by affected installers and the following:
  - 1. Architect.
  - 2. Installer's Architectural Hardware Consultant (AHC).
  - 3. Hardware Installer.
  - 4. Owner's Security Consultant.

**1.02 SUBMITTALS**

- A. See Section 013000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Manufacturer's catalog literature for each type of hardware, marked to clearly show products to be furnished for this project, and includes construction details, material descriptions, finishes, and dimensions and profiles of individual components.
- C. Shop Drawings - Electrified Door Hardware: Submit diagrams for power, signal, and control wiring for electrified door hardware that include details of interface with building safety and security systems. Provide elevations and diagrams for each electrified door opening as follows:
  - 1. Prepared by or under supervision of Architectural Hardware Consultant (AHC) and Electrified Hardware Consultant (EHC).
  - 2. Elevations: Submit front and back elevations of each door opening showing electrified devices with connections installed and an operations narrative describing how opening operates from either side at any given time.
  - 3. Diagrams: Submit point-to-point wiring diagram that shows each device in door opening system with related colored wire connections to each device.
- D. Maintenance Data: Include data on operating hardware, lubrication requirements, and inspection procedures related to preventative maintenance.

**1.03 DELIVERY, STORAGE, AND HANDLING**

- A. Package hardware items individually; label and identify each package with door opening code to match door hardware schedule.

**1.04 WARRANTY**

- A. See Section 017800 - Closeout Submittals, for additional warranty requirements.
- B. Warranty against defects in material and workmanship for period indicated, from Date of Substantial Completion.
  - 1. Locksets and Cylinders: Three years, minimum.
  - 2. Other Hardware: Two years, minimum.

## **PART 2 PRODUCTS**

### **2.01 GENERAL - SCOPE**

- A. Existing Hardware: Salvage existing hardware from two doors to be removed and reinstall on new door/frame assemblies.
  - 1. Salvaged hardware to be reinstalled includes hinges, closers, latches, locksets, cylinders, exit devices, stops and holders, and protection plates.
  - 2. After salvage, verify cutouts, reinforcement, and templates required, and coordinate with steel and wood door manufacturers.
  - 3. For bid purposes, assume the following shall be provided new at both doors:
    - a. Acoustic gasketing.
    - b. Door position switches.
    - c. Electrical connection accessories (power supplies, transfer hinges, relays, wiring) for connection to adjacent card readers (refer to Access Control documents for card readers/access control).
  - 4. Coordinate electrical access control and monitoring requirements; provide necessary adjustments and connections as required for a complete hardware assembly.

### **2.02 DESIGN AND PERFORMANCE CRITERIA**

- A. Provide door hardware products that comply with the following requirements:
  - 1. Applicable provisions of federal, state, and local codes.
  - 2. Accessibility: ADA Standards and ICC A117.1.
  - 3. Hardware Preparation for Steel Doors and Steel Frames: BHMA A156.115.
  - 4. Hardware Preparation for Wood Doors with Wood or Steel Frames: BHMA A156.115W.
  - 5. Products Requiring Electrical Connection: Listed and classified by UL (DIR) as suitable for the purpose specified.
- B. Electrically Operated and/or Controlled Hardware: Provide necessary power supplies, power transfer hinges, relays, and interfaces as required for proper operation; provide wiring between hardware and control components and to building power connection in compliance with NFPA 70.
- C. Fasteners:
  - 1. Provide tamper-resistant fasteners of proper type, size, quantity, and finish that comply with commercially recognized standards for proposed applications.
    - a. Aluminum fasteners are not permitted.

### **2.03 GASKETING**

- A. Gasketing: Comply with BHMA A156.22. Provide neoprene or silicone gasketing at each interior door/frame for acoustic performance.

### **2.04 DOOR POSITION SWITCH (DPS)**

- A. Manufacturers:
  - 1. Interlogix, a unit of United Technologies Corporation.
  - 2. Schlage, an Allegion Company.
  - 3. Securitron, an Assa Abloy Company.
- B. Door Position Switch: Surface mounted magnetic switch, housed in a sealed case, to alert at Owner's security console upon door open/close. Mount with security tamper/resistant screws. Provide all necessary wiring/cable for power and security system connections.

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Verify that doors and frames are ready to receive this work, and dimensions are as indicated on shop drawings.
- B. Verify that electric power is available to power operated devices and of correct characteristics.

### **3.02 INSTALLATION**

- A. Install hardware in accordance with manufacturer's instructions and applicable codes.
- B. Use templates provided by hardware item manufacturer.
- C. Do not install surface mounted items until application of finishes to substrate are fully completed.
- D. Door Hardware Mounting Heights: Distance from finished floor to center line of hardware item. As indicated in following list; unless noted otherwise in Door Hardware Schedule or on drawings.
  - 1. For Steel Doors and Frames: Install in compliance with DHI (LOCS) recommendations.
  - 2. Stile and Rail Wood Doors: Refer to Section 081433.
  - 3. Mounting heights in compliance with ADA Standards:

### **3.03 FIELD QUALITY CONTROL**

- A. Perform field inspection and testing under provisions of Section 014000 - Quality Requirements.
- B. Provide an Architectural Hardware Consultant (AHC) to inspect installation and certify that hardware and installation has been furnished and installed in accordance with manufacturer's instructions and as specified.

### **3.04 ADJUSTING**

- A. Adjust work under provisions of Section 017000 - Execution and Closeout Requirements.
- B. Adjust hardware for smooth operation.
- C. Adjust gasketing for complete, continuous seal; replace if unable to make complete seal.

### **3.05 CLEANING**

- A. Clean finished hardware in accordance with manufacturer's written instructions after final adjustments have been made.
- B. Clean adjacent surfaces soiled by hardware installation.
- C. Replace items that cannot be cleaned to manufacturer's level of finish quality at no additional cost.

### **3.06 PROTECTION**

- A. Protect finished Work under provisions of Section 017000 - Execution and Closeout Requirements.
- B. Do not permit adjacent work to damage hardware or finish.

## **END OF SECTION**

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**SECTION 092216**  
**COLD FORMED STEEL FRAMING - NON-STRUCTURAL (CFSF-NS)**

**PART 1 GENERAL**

**1.01 RELATED REQUIREMENTS**

- A. Refer to Section 054000 - Cold-Formed Steel Framing - Structural (CFSF-S): Requirements for structural, load-bearing, metal stud framing, exterior wall stud framing, and overhead/suspended/bulkhead framing.

**1.02 REFERENCE STANDARDS**

- A. ASTM A36/A36M - Standard Specification for Carbon Structural Steel 2019.
- B. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process 2020.
- C. ASTM A1003/A1003M - Standard Specification for Steel Sheet, Carbon, Metallic- and Nonmetallic-Coated for Cold-Formed Framing Members 2015.
- D. ASTM C645 - Standard Specification for Nonstructural Steel Framing Members 2018.
- E. ASTM C665 - Standard Specification for Mineral-Fiber Blanket Thermal Insulation for Light Frame Construction and Manufactured Housing 2017.
- F. ASTM C754 - Standard Specification for Installation of Steel Framing Members to Receive Screw-Attached Gypsum Panel Products 2020.
- G. ASTM E90 - Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements 2009 (Reapproved 2016).
- H. ASTM E413 - Classification for Rating Sound Insulation 2016.

**1.03 SUBMITTALS**

- A. See Section 013000 - Administrative Requirements for submittal procedures.
- B. Product Data: Provide data describing framing member materials and finish, product criteria, load charts, and limitations.

**PART 2 PRODUCTS**

**2.01 FRAMING MATERIALS**

- A. Non-Loadbearing Framing System Components: ASTM C645; galvanized sheet steel.
  - 1. Steel Thickness (Studs and Runners): Minimum 0.0179-inch (18 mil / 25 gauge) unless otherwise required to comply with ASTM C754 for the spacing indicated, with maximum deflection of wall framing of L/240 at 5 psf, and as indicated below:
    - a. Provide minimum 0.0329-inch thickness (33 mil / 20 gauge - structural) for all partitions using 3-5/8-inch-deep studs where stud partition height is greater than 12 feet above floor level.
    - b. Provide minimum 0.0329-inch (33 mil / 20 gauge - Structural) for high-density board applications, such as ASTM C 1178 tile backing panels and ASTM C 1629 abuse- or impact-resistant gypsum board, and at door frames.
    - c. Provide minimum 0.0329-inch (33 mil / 20 gauge - Structural) for walls receiving heavy wall-hung items or loads, including but not limited to wall cabinets, wall-hung countertops, TV brackets, liquid tanks, folding and fixed seats, grab bars, handrails, exercise equipment, and shelving greater than 9 inches deep and over 3 feet in length.

2. Studs: C shaped with knurled or embossed faces.
  3. Runners: U shaped, sized to match studs.
  4. Furring: Hat-shaped sections, minimum depth of 7/8 inch.
  5. Resilient Furring Channels: Single or double leg configuration; 1/2 inch channel depth.
- B. Deflection and Firestop Track: Intumescent strip factory-applied to track flanges expands when exposed to heat or flames to provide a perimeter joint seal.
- C. Non-Loadbearing Framing Accessories:
1. Partial Height Wall Framing Support: Provides stud reinforcement and anchored connection to floor.
    - a. Materials: ASTM A36/A36M formed sheet steel support member with factory-welded ASTM A1003/A1003M steel plate base.
  2. Framing Connectors: ASTM A653/A653M G90 galvanized steel clips; secures cold rolled channel to wall studs for lateral bracing.
  3. Sheet Metal Backing: 0.036 inch thick, galvanized.
  4. Fasteners: Self-tapping screws designed for attachment of metal framing and recommended by manufacturer.
  5. Anchorage Devices: Powder actuated or screw anchors with sleeves, recommended by manufacturer for anchorage to indicated substrates.
  6. Acoustic Insulation: ASTM C665; preformed glass fiber, friction fit type, unfaced. Thickness as indicated, or sized to fit stud depth indicated.
  7. Acoustic Sealant: Refer to Division 07 Section "Joint Sealants."

## **2.02 FABRICATION**

- A. Fabricate assemblies of framed sections to sizes and profiles required.
- B. Fit, reinforce, and brace framing members to suit design requirements.

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Verify existing conditions before starting work.
- B. Verify that rough-in utilities are in proper location.

### **3.02 INSTALLATION OF STUD FRAMING**

- A. Comply with requirements of ASTM C754.
  - B. Extend partition framing to structure where indicated and to ceiling in other locations.
  - C. Partitions Terminating at Ceiling: Attach ceiling runner securely to ceiling track in accordance with manufacturer's instructions.
  - D. Align and secure top and bottom runners at 24 inches on center.
  - E. At partitions indicated with an acoustic rating:
    1. Provide components and install as required to produce STC ratings as indicated, based on published tests by manufacturer conducted in accordance with ASTM E90 with STC rating calculated in accordance with ASTM E413.
  - F. Fit runners under and above openings; secure intermediate studs to same spacing as wall studs.
  - G. Install studs vertically at 16 inches on center, unless otherwise indicated.
  - H. Align stud web openings horizontally.
-



- I. Secure studs to tracks using crimping method. Do not weld.
- J. Fabricate corners using a minimum of three studs.
- K. Install double studs at wall openings, door and window jambs, not more than 2 inches from each side of openings.
- L. Coordinate erection of studs with requirements of door frames; install supports and attachments.
- M. Coordinate installation of bucks, anchors, and blocking with electrical, mechanical, and other work to be placed within or behind stud framing.
- N. Blocking: Use FRT wood blocking or metal channel stud blocking, secured to studs. Provide blocking for support of plumbing fixtures, toilet partitions, wall cabinets, toilet accessories, hardware, opening frames, and other built-in-place wall mounted items and equipment.
- O. Furring: Install at spacing and locations shown on drawings. Lap splices a minimum of 6 inches.

**3.03 TOLERANCES**

- A. Maximum Variation From True Position: 1/8 inch in 10 feet.
- B. Maximum Variation From Plumb: 1/8 inch in 10 feet.

**END OF SECTION**

**SECTION 092900  
GYPSUM BOARD**

**PART 1 GENERAL**

**1.01 SUBMITTALS**

- A. See Section 013000 - Administrative Requirements for submittal procedures.
- B. Product Data: Provide data on gypsum board, glass mat faced gypsum board, accessories, and joint finishing system.
- C. Test Reports: Bullet resistant sheathing and wallboard.

**PART 2 PRODUCTS**

**2.01 BOARD MATERIALS**

- A. Gypsum Wallboard: Paper-faced gypsum panels as defined in ASTM C1396/C1396M; sizes to minimize joints in place; with tapered edges.
  - 1. Application: Use for vertical surfaces and ceilings, unless otherwise indicated.
  - 2. Mold Resistance: Score of 10, when tested in accordance with ASTM D3273.
    - a. Mold-resistant board is required whenever gypsum board is indicated in rooms subject to steam or water, including mechanical rooms, toilet rooms, custodial rooms, and kitchens.
  - 3. At Assemblies Indicated with Fire-Resistance Rating: Use type required by indicated tested assembly; if no tested assembly is indicated, use Type X board, UL or WH listed.
  - 4. Thickness:
    - a. Vertical Surfaces: 5/8 inch.
    - b. Ceilings: 5/8 inch.
    - c. Curved Surfaces: Provide flexible 1/4 inch thickness gypsum board.
- B. Tile Backing Board:
  - 1. Application: Surfaces behind tile in wet areas including tub and shower surrounds.
  - 2. Mold Resistance: Score of 10, when tested in accordance with ASTM D3273.
  - 3. ANSI Cement-Based Board: Non-gypsum-based; cementitious panels with glass fiber mesh embedded in front and back surfaces complying with ANSI A118.9 and ASTM C 1288 or ASTM C1325.
    - a. Thickness: 5/8 inch.
    - b. Available Products:
      - 1) FinPan, Inc.; Util-A-Crete Backer Board.
      - 2) National Gypsum Company; PermaBase Cement Board.
      - 3) USG Corporation; Durock Cement Board.
      - 4) Substitutions: See Section 016000 - Product Requirements.
- C. Bullet Resistant Sheathing and Wallboard: Woven roving, multi-ply, ballistic grade fiberglass cloth with thermoset polyester resin; comply with UL 752 Level 3. Size boards to minimize joints.
  - 1. Thickness: Nominal 7/16 inch or 1/2 inch as standard with manufacturer.
  - 2. Available Products:
    - a. ArmorCore by Waco Composites; Bullet Resistant Fiberglass Panels.
    - b. Armortex, Div. of Safeguard Security System, Inc.; OF 300.

- c. Chicago Bullet Proof Systems; Fibre-Tex.
  - d. C.R. Laurence of North America; BRF300.
  - e. Insulgard Corporation; FG-300.
  - f. Substitutions: See Section 016000 - Product Requirements.
- D. Exterior Sheathing Board for Ceilings and Soffits: Sizes to minimize joints in place; ends square cut.
- 1. Mold Resistance: Score of 10, when tested in accordance with ASTM D3273.
  - 2. Fungal Resistance: No fungal growth when tested in accordance with ASTM G21.
  - 3. Glass Mat Faced Sheathing: Glass mat faced gypsum substrate as defined in ASTM C1177/C1177M.
  - 4. Edges: Square.
  - 5. Available Glass Mat Faced Products:
    - a. American Gypsum Company; M-Glass Exterior Sheathing.
    - b. CertainTeed Corporation; GlasRoc Exterior Sheathing.
    - c. Continental Building Products; Weather Defense Platinum Exterior Sheathing.
    - d. Georgia-Pacific Gypsum; DensGlass Sheathing.
    - e. National Gypsum Company; Gold Bond eXP Sheathing.
    - f. USG Corporation; USG Securock Brand Ultralight Glass-Mat Sheathing.

## 2.02 GYPSUM WALLBOARD ACCESSORIES

- A. Acoustic Insulation: ASTM C665; preformed glass fiber, friction fit type, unfaced. Thickness sized to fit metal stud cavity.
  - B. Acoustic Sealant: Acrylic emulsion latex or water-based elastomeric sealant; do not use solvent-based non-curing butyl sealant. Refer to sealant AS-1 in Division 7 Section "Joint Sealants."
  - C. Putty Pads: Non-hardening endothermic material, in pad form, faced on both sides with poly liner, designed to seal around penetrations and wiring devices, enhancing acoustic performance.
    - 1. Nominal Size: 7-1/4 x 7-1/4 x 3/16 inches.
    - 2. Available Products:
      - a. 3M; Fire Barrier Moldable Putty Pads MPP+.
      - b. Hilti; Firestop Putty Pad, CFS-P PA.
      - c. Specified Technologies, Inc.; SpecSeal Putty Pad.
  - D. Beads, Joint Accessories, and Other Trim: ASTM C1047, rigid plastic, galvanized steel, or rolled zinc, unless noted otherwise.
    - 1. Corner Beads: Low profile, for 90 degree outside corners.
    - 2. L-Trim with Tear-Away Strip: Sized to fit gypsum wallboard size(s) indicated.
  - E. Moisture Guard Trim: ASTM C1047, rigid plastic, 48 inch length, applied to bottom edge of gypsum board.
    - 1. Height: 1-3/4 inch.
    - 2. Depth: Match gypsum board thickness.
    - 3. In lieu of moisture guard trim; Contractor may at its option install gypsum board with a 1/2- to 5/8-inch gap at base of wall.
  - F. Joint Materials: ASTM C475/C475M and as recommended by gypsum board manufacturer for project conditions.
-

1. Fiberglass Tape (Exterior Soffit/Sheathing Board): 2 inch wide, 10x10 coated glass fiber mesh for joints and corners.
  2. Paper Tape (Interior Gypsum Board): 2 inch wide, creased paper tape for joints and corners.
  3. Joint Compound: Setting type, field-mixed.
- G. Exterior Soffit Vents: One piece, perforated, ASTM B221 6063 T5 alloy aluminum, with edge suitable for direct application to gypsum board and manufactured especially for soffit application. Provide continuous vent.
1. Available Manufacturers:
    - a. Fry Reglet.
    - b. Gordon, Inc.
    - c. Pittcon Industries.
    - d. Stockton Products.
  2. Flat, horizontal-to-horizontal application: 2-inch wide with three rows of vent slots for a minimum of 3 square inches of opening per linear foot.
  3. Finish: High performance organic coating; color selected by Architect from manufacturer's full range.

### **PART 3 EXECUTION**

#### **3.01 EXAMINATION**

- A. Verify that project conditions are appropriate for work of this section to commence.

#### **3.02 ACOUSTIC ACCESSORIES INSTALLATION**

- A. Acoustic Insulation: Place tightly within spaces, around cut openings, behind and around electrical and mechanical items within partitions, and tight to items passing through partitions.
- B. Acoustic Sealant: Install in accordance with manufacturer's instructions.

#### **3.03 BOARD INSTALLATION**

- A. Comply with ASTM C840, GA-216, and manufacturer's instructions. Install to minimize butt end joints, especially in highly visible locations.
- B. Single-Layer Nonrated: Install gypsum board in most economical direction, with ends and edges occurring over firm bearing.
- C. Double-Layer, Nonrated: Use gypsum board for first layer, placed parallel to framing or furring members, with ends and edges occurring over firm bearing. Place second layer perpendicular to framing or furring members. Offset joints of second layer from joints of first layer.
- D. Fire-Resistance-Rated Construction: Install gypsum board in strict compliance with requirements of assembly listing.
- E. Exterior Sheathing: Comply with ASTM C1280. Install sheathing vertically, with edges butted tight and ends occurring over firm bearing.
- F. Cementitious Backing Board: Install over steel framing members where indicated, in accordance with ANSI A108.11 and manufacturer's instructions.
- G. Bullet Resistant Sheathing and Wallboard:
  1. Install bullet-resistant sheathing according to manufacturer's written recommendations and with manufacturer-approved fasteners.
  2. Cover all joints between boards with a 4 inch strip of the same thickness material as the boards, centered on the joint.

### **3.04 INSTALLATION OF TRIM AND ACCESSORIES**

- A. Control Joints: Place control joints in compliance with ASTM C 840, consistent with lines of building spaces, and as indicated.
  - 1. Not more than 30 feet apart on walls and ceilings over 50 feet long.
  - 2. At exterior soffits, not more than 30 feet apart in both directions.
- B. Corner Beads: Install at external corners, using longest practical lengths.
- C. Edge Trim: Install at locations where gypsum board abuts dissimilar materials.
- D. Moisture Guard Trim: Install on bottom edge of gypsum board according to manufacturer's instructions and in locations indicated on drawings. In lieu of moisture guard trim; Contractor may at its option install gypsum board with a 1/2- to 5/8-inch gap at base of wall.
- E. Exterior Soffit Vents: Install according to manufacturer's written instructions and in locations indicated on drawings. Provide vent area specified.
- F. Putty Pads: Install putty pads on the backside of items penetrating gypsum board on all walls/partitions containing acoustic insulation. Items include, but are not limited to, wiring devices, cable, conduit, and pipe. Completely cover and seal around each penetration.

### **3.05 JOINT TREATMENT**

- A. Glass Mat Faced Gypsum Board and Exterior Glass Mat Faced Sheathing: Use fiberglass joint tape, embed and finish with setting type joint compound.
- B. Paper Faced Gypsum Board: Use paper joint tape, embed with drying type joint compound and finish with drying type joint compound.
- C. Finish gypsum board in accordance with levels defined in ASTM C840, as follows:
  - 1. Level 5: Walls and ceilings to receive semi-gloss or gloss paint finish, indicated to receive special applied finishes, and other areas specifically indicated.
  - 2. Level 4: Walls and ceilings to receive paint finish or wall coverings, unless otherwise indicated.
  - 3. Level 2: In utility areas, behind cabinetry, and on backing board to receive tile finish.
  - 4. Level 1: Fire-resistance-rated wall areas above finished ceilings, whether or not accessible in the completed construction.
- D. Tape, fill, and sand exposed joints, edges, and corners to produce smooth surface ready to receive finishes.
  - 1. Feather coats of joint compound so that camber is maximum 1/32 inch.
- E. Where Level 5 finish is indicated, spray apply high build drywall surfacer over entire surface after joints have been properly treated; achieve a flat and tool mark-free finish.
- F. Fill and finish joints and corners of cementitious backing board as recommended by manufacturer.

### **3.06 TOLERANCES**

- A. Maximum Variation of Finished Gypsum Board Surface from True Flatness: 1/8 inch in 10 feet in any direction.

### **END OF SECTION**

**SECTION 096813  
TILE CARPETING**

**PART 1 GENERAL**

**1.01 REFERENCE STANDARDS**

- A. ASTM E648 - Standard Test Method for Critical Radiant Flux of Floor-Covering Systems Using a Radiant Heat Energy Source 2019a, with Editorial Revision (2020).
- B. NFPA 253 - Standard Method of Test for Critical Radiant Flux of Floor Covering Systems Using a Radiant Heat Energy Source 2019.

**1.02 ADMINISTRATIVE REQUIREMENTS**

- A. Substitutions/Prequalification: Manufacturers seeking consideration to bid their product as an acceptable alternative shall provide full product data and full range of selection samples during the bid period. Products that do not meet the technical and aesthetic criteria will not be accepted. No substitutions shall be permitted for carpet tile after receipt of bids.

**1.03 SUBMITTALS**

- A. See Section 013000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide data on specified products, describing physical and performance characteristics; sizes, patterns, colors available, and method of installation.
- C. Shop Drawings: Indicate layout of joints, direction of carpet pile, and location of edge moldings and transition strips.
  - 1. Where multiple carpet tile products are specified (including multiple products in a single space, installed in an indicated pattern), indicate on the shop drawings the locations where each product is being installed.
- D. Selection Samples: Submit manufacturer's color charts indicating full range of colors for carpet tiles and for accessories.
- E. Verification Sample: Submit full size sample for each required color, pattern, and texture.
  - 1. Submit samples in manufacturer's standard size for each accessory product.
- F. Maintenance Data: Include maintenance procedures, recommended maintenance materials, and suggested schedule for cleaning.
  - 1. Include specific procedures and materials that are not recommended, including those that may be harmful to carpet tile or that would void warranty.
- G. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
  - 1. See Section 016000 - Product Requirements, for additional provisions.
  - 2. Extra Carpet Tiles: Quantity equal to 5 percent of total installed of each color and pattern installed.

**1.04 QUALITY ASSURANCE**

- A. Critical Radiant Flux: All carpet tiles shall be Class I rated, with a minimum CRF of 0.45 watts/sq cm, when tested by an independent testing agency in accordance with ASTM E648 or NFPA 253.

**1.05 FIELD CONDITIONS, STORAGE AND HANDLING**

- A. Comply with the Carpet and Rug Institute (CRI) Publication "CRI 104 - Standard for Installation of Commercial Carpet." Comply with Section 4.0 for storage and handling, Section 7.0 for ambient temperature and ventilation, and Section 9.0 for Product Acclimation.

## 1.06 WARRANTY

- A. See Section 017800 - Closeout Submittals, for additional warranty requirements.
- B. Carpet Tile Warranty: Provide a ten (10) year manufacturer warranty, covering defective material and faulty installation.
  - 1. Warranty shall cover excessive surface wear (defined as more than 10% loss by weight of face fiber), edge raveling, backing separation, shrinking, stretching, cupping, doming, static electricity, or color loss or fading.

## PART 2 PRODUCTS

### 2.01 MATERIALS

- A. Tile Carpeting, Type C-TILE-A: Field tile for main courtroom area. Tufted, manufactured in one color dye lot.
  - 1. Product: "Ridge Tile" 5T446; manufactured by Shaw Contract.
    - a. Basis-of-Design Color is Silt 06518.
  - 2. Tile Size: 9 by 36 inch, nominal.
  - 3. Critical Radiant Flux: Minimum of 0.45 watts/sq cm, when tested in accordance with ASTM E648 or NFPA 253.
  - 4. Primary Backing Material: Manufacturer's standard; recycled vinyl with fiberglass reinforcing.
- B. Tile Carpeting, Type C-TILE-B: Accent tile for ramp, jury box, and judge/witness/clerk bench locations only. Tufted, manufactured in one color dye lot.
  - 1. Product: "Ridge Tile" 5T446; manufactured by Shaw Contract.
    - a. Basis-of-Design Color is River Rock 06481.
  - 2. Tile Size: 9 by 36 inch, nominal.
  - 3. Critical Radiant Flux: Minimum of 0.45 watts/sq cm, when tested in accordance with ASTM E648 or NFPA 253.
  - 4. Primary Backing Material: Manufacturer's standard.

### 2.02 ACCESSORIES

- A. Subfloor Filler: Type recommended by flooring material manufacturer.
- B. Edge Strips: Embossed aluminum, color as selected by Architect.
- C. Nosing: Aluminum type, square nose, ribbed top surface, one piece per stair tread width, color as selected by Architect.
- D. Carpet Tile Adhesive: Recommended by carpet tile manufacturer; releasable type.

## PART 3 EXECUTION

### 3.01 EXAMINATION

- A. Verify that subfloor surfaces are smooth and flat within tolerances specified for that type of work and are ready to receive carpet tile.
- B. Verify that subfloor surfaces are dust-free and free of substances that could impair bonding of adhesive materials to subfloor surfaces.
- C. Cementitious Subfloor Surfaces: Verify that substrates are ready for flooring installation by testing for moisture and alkalinity (pH).

- D. Wood Subfloor Surfaces: Verify that subflooring and underlayments as specified in Division 6 "Rough Carpentry" are complete, dust-free, and compatible with adhesive materials.
- E. Verify that required floor-mounted utilities are in correct location.

### **3.02 PREPARATION**

- A. Prepare floor substrates as recommended by flooring and adhesive manufacturers.
- B. Remove subfloor ridges and bumps. Fill minor or local low spots, cracks, joints, holes, and other defects with subfloor filler.
- C. Apply, trowel, and float filler to achieve smooth, flat, hard surface. Prohibit traffic until filler is cured.

### **3.03 INSTALLATION**

- A. Starting installation constitutes acceptance of subfloor conditions.
- B. Install carpet tile in accordance with manufacturer's instructions and CRI 104 (Commercial).
- C. Blend carpet from different cartons to ensure minimal variation in color match.
- D. Cut carpet tile clean. Fit carpet tight to intersection with vertical surfaces without gaps.
- E. Lay carpet tile in square pattern, with pile direction parallel to next unit, set parallel to building lines, unless otherwise indicated.
- F. Locate change of color or pattern between rooms or at transitions to other finish flooring material directly under door leaf centerlines, or at the center of cased openings.
- G. Fully adhere carpet tile to substrate.
- H. Install carpet tile into wall recesses, knee spaces under cabinets or countertops, closets, and other similar spaces.
- I. Trim carpet tile neatly at walls and around interruptions.
- J. Complete installation of edge strips, concealing exposed edges.

### **3.04 INSTALLATION ON STAIRS**

- A. Use one piece of carpet for each tread and the riser below. Apply seam adhesive to all cut edges.
- B. Lay carpet with pile direction in the length of the stair.
- C. Adhere carpet tight to stair treads and risers.

### **3.05 CLEANING AND PROTECTION**

- A. Remove excess adhesive without damage, from floor, base, and wall surfaces.
- B. Clean and vacuum carpet surfaces.
- C. Protect installed carpet in accordance with CRI 104, Section 13.7 "Post Installation."

### **END OF SECTION**



**SECTION 096900  
ACCESS FLOORING**

**PART 1 GENERAL**

**1.01 RELATED REQUIREMENTS**

- A. Section 096813 - Tile Carpeting: Finish for access flooring panels.

**1.02 REFERENCE STANDARDS**

- A. ADA Standards - Americans with Disabilities Act (ADA) Standards for Accessible Design 2010.
- B. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials 2021a.
- C. CISCA (AF) - Recommended Test Procedures for Access Floors 2016.
- D. ICC (IBC) - International Building Code Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- E. ICC A117.1 - Accessible and Usable Buildings and Facilities 2017.
- F. NFPA 75 - Standard for the Fire Protection of Information Technology Equipment 2020.

**1.03 ADMINISTRATIVE REQUIREMENTS**

- A. Preinstallation Meeting: Convene one week before starting work of this section.

**1.04 SUBMITTALS**

- A. See Section 013000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide manufacturer's data sheets including loading capacities, materials, finishes, dimensions of components, profiles, and accessories.
- C. Shop Drawings: Indicate floor layout, appurtenances or interruptions, edge details, ramps.
- D. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.
- E. Designer's Qualification Statement.
- F. Installer's Qualification Statement.

**1.05 QUALITY ASSURANCE**

- A. Designer Qualifications: Design floor system structure layout for this project under direct supervision of a Professional Structural Engineer experienced in design of floors of the type required and licensed in the State in which the Project is located.
- B. Installer Qualifications: Company specializing in performing the type of work required in this section and approved by access flooring manufacturer.

**PART 2 PRODUCTS**

**2.01 MANUFACTURERS**

- A. Access Flooring - Adjustable Height:
  - 1. ASM Modular Systems, Inc.
  - 2. Global IFS.
  - 3. Tate Access Floors, Inc.
  - 4. Substitutions: See Section 016000 - Product Requirements.

## 2.02 PERFORMANCE REQUIREMENTS

- A. General: Comply with the following system requirements and as indicated for specified components.
  - 1. Test in accordance with CISCA (AF).
  - 2. Accessibility: Comply with ICC A117.1 and ADA Standards.
  - 3. Structural Design Live Loads: Comply with requirements of ICC (IBC).
  - 4. Lateral Stability: Design system for lateral stability in all directions, with or without panels in place.
- B. Concentrated Load: Over an area of 1 inch by 1 inch, 1250 pounds at any location, when tested in accordance with CISCA (AF).
  - 1. Maximum Deflection: 0.1 inch.
  - 2. Permanent Deformation: 0.02 inch maximum at design load.
- C. Ultimate Load: Over an area of 1 inch by 1 inch: Not less than twice design load or 2500 pounds, when tested in accordance with CISCA (AF).
- D. Rolling Loads: Permanent deformation not to exceed 0.04 inch, when tested in accordance with CISCA (AF).
  - 1. Wheel A: 10 passes, with loading of 500 pounds.
  - 2. Wheel B: 10,000 passes, with loading of 500 pounds.
- E. Drop Impact Load: 150 pounds, when tested in accordance with CISCA (AF).
- F. Surface Burning Characteristics: Flame spread index of 25, maximum; smoke developed index of 75, maximum; when tested in accordance with ASTM E84.
- G. Electrical Grounding Connection: Listed and classified by Underwriters Laboratories as suitable for the purpose specified and indicated.

## 2.03 ACCESS FLOORING - ADJUSTABLE HEIGHT

- A. Factory-fabricated system consisting of removable floor panels and supporting understructure that allows access to space below floor without requiring removal of panels other than the one directly above the space to which access is needed; provide components and accessories required for complete installation.
- B. Finished Floor Elevation: Top of access floor 4 inches nominal height above building structural floor.
- C. Configuration:
  - 1. Snap-on panels on stringerless understructure.
- D. Components:
  - 1. Pedestal Assembly:
    - a. Material: Steel.
    - b. Finish: Galvanized.
    - c. Base: Manufacturer's standard shape and size in accordance with system performance requirements.
    - d. Column: Threaded supporting rod to permit 1-1/2 inch adjustment.
    - e. Head: Manufacturer's standard shape and size to accept specified configuration.
    - f. Maximum Pedestal Axial Load: 5000 pounds without permanent deformation, when tested in accordance with CISCA (AF).
  - 2. Floor Panels:
    - a. Construction:

- 1) Concrete core laminated with sheet steel plates.
3. Floor Covering: Field applied, as indicated.
  - a. Carpet Tile: As specified in Section 096813.

#### **2.04 ACCESSORIES - ADJUSTABLE HEIGHT**

- A. Perimeter Pedestals: Provide manufacturer's standard perimeter accessory pedestal, sized to required height, where panels must be cut and standard lock-in pedestal is not applicable.
- B. Fascia Panels: Laminated construction as follows:
  1. Front and Back Face Sheets: Galvanized sheet steel.
  2. Core: Manufacturer's standard, plywood or particleboard.
  3. Accessories: Include corner pieces, trim, reinforcing, and clip angles.
- C. Ramps: Same materials, structural strength, and construction as floor panels; flush extruded aluminum cover plates at junction with floor system.
  1. Ramp Surface: Shall be finished with carpet tile to match access flooring finish.
- D. Electrostatic Grounding Connectors: Solid copper.
- E. Cable Cutout Protection: Manufacturer's standard type, self-extinguishing.
- F. Sealant: Any water-based, moisture-curing, or chemically-curing joint sealant suitable for purpose and compatible with materials being sealed; except acrylic latex emulsion.

#### **2.05 FABRICATION**

- A. Fabrication Tolerances:
  1. Floor Panel Flatness: Plus or minus 0.02 inch in any direction.
  2. Floor Panel Width or Length From Specified Size: Plus or minus 0.02 inch.
  3. Floor Panel Squareness: Plus or minus 0.03 inch difference between opposite diagonal dimensions.

### **PART 3 EXECUTION**

#### **3.01 EXAMINATION**

- A. Verify field measurements are as indicated on shop drawings.
- B. Verify that substrates comply with tolerances, dimensioned clearances, and other requirements specified in other sections, and that substrates are clean, dry, and free of conditions and deleterious substances that might interfere with system installation.
- C. Verify that required utilities are available, in proper location, and are ready for use.
- D. Start of installation constitutes acceptance of project conditions.

#### **3.02 PREPARATION**

- A. Vacuum clean substrate surfaces.

#### **3.03 INSTALLATION - ADJUSTABLE HEIGHT ACCESS FLOORING**

- A. Install components in accordance with manufacturer's instructions.
- B. Secure pedestal base plate to subfloor with adhesive.
- C. Install additional pedestals where grid pattern is interrupted by room appurtenances or at cut-outs.
- D. Install floor panels on pedestals with full bearing.

- E. Close field cut floor panels with edge trim.
- F. Cut holes in floor panels to accommodate Owner equipment as indicated on drawings. Provide cable cut-out protection.
- G. Provide floor with edge trim and end closures. Provide lateral braces at stair edges and other locations where pedestals are not braced.
- H. Provide positive electrical earth grounding of entire floor assembly in accordance with NFPA 75.
- I. Fascia Panels:
  - 1. Install fascia panels at exposed sides.
  - 2. Secure panels to clip angles attached to structural floor and edge of floor panels.
  - 3. Install metal trim at intersection of fascia panels and access floor and at abutting walls and columns.

### **3.04 TOLERANCES**

- A. Maximum Out of Level Floor Panel Tolerance: 1/16 inch in 10 ft, non-cumulative.

### **3.05 FIELD QUALITY CONTROL**

- A. See Section 014000 - Quality Requirements, for additional requirements.
- B. Manufacturer's Field Service: Engage a factory-authorized service representative to test and inspect components, assemblies, and equipment installations, including connections.

### **3.06 ADJUSTING**

- A. Adjust pedestals to achieve a level floor and to assure adjacent floor panel surfaces are flush.

### **3.07 PROTECTION**

- A. Do not permit traffic over unprotected floor surface.

### **END OF SECTION**

**SECTION 099100  
PAINTING**

**PART 1 GENERAL**

**1.01 REFERENCE STANDARDS**

- A. MPI (APSM) - Master Painters Institute Architectural Painting Specification Manual Current Edition.
- B. SSPC-SP 1 - Solvent Cleaning 2015, with Editorial Revision (2016).
- C. SSPC-SP 6 - Commercial Blast Cleaning 2007.

**1.02 SUBMITTALS**

- A. See Section 013000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide complete list of products to be used, with the following information for each:
  - 1. Manufacturer's name, product name and/or catalog number, and general product category (e.g., "alkyd enamel").
  - 2. Cross-reference to specified paint system(s) product is to be used in; include description of each system.

**1.03 DELIVERY, STORAGE, AND HANDLING**

- A. Deliver products to site in sealed and labeled containers; inspect to verify acceptability.
- B. Container Label: Include manufacturer's name, type of paint, brand name, lot number, brand code, coverage, surface preparation, drying time, cleanup requirements, color designation, and instructions for mixing and reducing.
- C. Paint Materials: Store at minimum ambient temperature of 45 degrees F and a maximum of 90 degrees F, in ventilated area, and as required by manufacturer's instructions.

**1.04 FIELD CONDITIONS**

- A. Do not apply materials when surface and ambient temperatures are outside the temperature ranges required by the paint product manufacturer.
- B. Follow manufacturer's recommended procedures for producing best results, including testing of substrates, moisture in substrates, and humidity and temperature limitations.
- C. Do not apply materials when relative humidity exceeds 85 percent, at temperatures less than 5 degrees F above the dew point, or to damp or wet surfaces.
- D. Minimum Application Temperatures for Paints: 50 degrees F for interiors unless required otherwise by manufacturer's instructions.
- E. Provide lighting level of 80 ft candles measured mid-height at substrate surface.

**PART 2 PRODUCTS**

**2.01 MANUFACTURERS**

- A. Paints:
  - 1. Benjamin Moore.
  - 2. PPG Paints.
  - 3. Sherwin-Williams Company.

## **2.02 PAINTS AND FINISHES - GENERAL**

- A. Paints and Finishes: Ready-mixed, unless intended to be a field-catalyzed paint.
  - 1. Provide paints and finishes of a soft paste consistency, capable of being readily and uniformly dispersed to a homogeneous coating, with good flow and brushing properties, and capable of drying or curing free of streaks or sags.
  - 2. Supply each paint material in quantity required to complete entire project's work from a single production run.
  - 3. Do not reduce, thin, or dilute paint or finishes or add materials unless such procedure is specifically described in manufacturer's product instructions.

## **2.03 ACCESSORY MATERIALS**

- A. Accessory Materials: Provide primers, sealers, cleaning agents, cleaning cloths, sanding materials, and clean-up materials as required for final completion of painted surfaces.
- B. Patching Material: Latex filler.
- C. Fastener Head Cover Material: Latex filler.

## **PART 3 EXECUTION**

### **3.01 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 application.
- C. Test shop-applied primer for compatibility with subsequent cover materials.
- D. Measure moisture content of surfaces using an electronic moisture meter. Do not apply finishes unless moisture content of surfaces is below the following maximums:
  - 1. Gypsum Wallboard: 12 percent.

### **3.02 PREPARATION**

- A. Clean surfaces thoroughly and correct defects prior to application.
- B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.
- C. Remove or repair existing paints or finishes that exhibit surface defects.
- D. Remove or mask surface appurtenances, including electrical plates, hardware, light fixture trim, escutcheons, and fittings, prior to preparing surfaces or finishing.
- E. Seal surfaces that might cause bleed through or staining of topcoat.
- F. Concrete:
  - 1. Remove release agents, curing compounds, efflorescence, and chalk. Do not coat surfaces if moisture content or alkalinity of surfaces to be coated exceeds that permitted in manufacturer's written instructions.
- G. Masonry:
  - 1. Remove efflorescence and chalk. Do not coat surfaces if moisture content, alkalinity of surfaces, or if alkalinity of mortar joints exceed that permitted in manufacturer's written instructions. Allow to dry.
- H. Gypsum Board: Fill minor defects with filler compound. Spot prime defects after repair.
- I. Galvanized Surfaces:

1. Remove surface contamination and oils and wash with solvent according to SSPC-SP 1.
- J. Ferrous Metal:
1. Solvent clean according to SSPC-SP 1.
  2. Remove rust, loose mill scale, and other foreign substances using methods recommended in writing by paint manufacturer and blast cleaning according to SSPC-SP 6 "Commercial Blast Cleaning". Protect from corrosion until coated.

### 3.03 APPLICATION

- A. Apply products in accordance with manufacturer's written instructions and recommendations in "MPI Architectural Painting Specification Manual".
- B. Where adjacent sealant is to be painted, do not apply finish coats until sealant is applied.
- C. Do not apply finishes to surfaces that are not dry. Allow applied coats to dry before next coat is applied.
- D. Apply each coat to uniform appearance in thicknesses specified by manufacturer.
- E. Sand wood and metal surfaces lightly between coats to achieve required finish.
- F. Vacuum clean surfaces of loose particles. Use tack cloth to remove dust and particles just prior to applying next coat.
- G. Reinstall electrical cover plates, hardware, light fixture trim, escutcheons, and fittings removed prior to finishing.

### 3.04 CLEANING

- A. Collect waste material that could constitute a fire hazard, place in closed metal containers, and remove daily from site.

### 3.05 PROTECTION

- A. Protect finishes until completion of project.
- B. Touch-up damaged finishes after Substantial Completion.

### 3.06 INTERIOR PAINT SCHEDULE

- A. General: Provide the following paint systems for the various substrates, as indicated. Dry film thickness is noted as "DFT." Provide compatibility test areas on existing painted substrates.
- B. Gypsum Board Systems with Latex Finish: Satin (egg-shell) finish at walls and flat finish on ceilings except as indicated otherwise. Provide best commercial Low-VOC formulation with 0 VOC per EPA test method 24.
  1. Filler Coat: 0 VOC (per EPS test method 24) Latex Primer.
    - a. Moore: N534 Ultra Spec 500 Interior Latex Primer.
    - b. PPG: 6-4900 Speedhide Zero VOC Interior Latex Primer.
    - c. S-W: B28-2600 ProMar 200 Zero VOC Interior Latex Primer.
  2. First & Second Finish Coats: Interior Low-VOC Acrylic Satin Finish. (Low lustre/Satin = 25-45% @60°) Provide for wall finishes unless indicated otherwise.
    - a. Moore: N538 Ultra Spec 500 Interior Eggshell.
    - b. PPG: 6-4300 Speedhide Zero VOC Interior Eggshell Latex.
    - c. S-W: B20-2600 ProMar 200 Zero VOC Interior Latex Eg-Shell.
    - d. S-W: B24-2600 ProMar 200 Zero VOC Interior Latex Low Sheen.
  3. First & Second Finish Coats: Interior Low-VOC Acrylic Flat Finish. Provide for ceiling applications unless indicated otherwise.

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- a. Moore: N536 Ultra Spec 500 Interior Flat.
  - b. PPG: 6-4100 Speedhide Zero VOC Interior Latex Flat.
  - c. S-W: B30-2600 ProMar 200 Zero VOC Interior Latex Flat.
- C. Ferrous Metal: Semi-Gloss Direct to Metal ("DTM") Acrylic Enamel Finish: 2 Coats over primer, with total DFT not less than 2.5 mils.
- 1. Prime Coat: Lead-free, acrylic Base Primer. Not required on shop primed items.
    - a. Moore: HP29 Ultra Spec HP DTM Acrylic Semi-Gloss.
    - b. PPG: 90-712 Pitt-Tech Int/Ext Primer/Finish Industrial Enamel.
    - c. S-W: B66 W1 DTM Acrylic Primer/Finish (or B66 W200).
  - 2. First and Second Coat: DTM Acrylic Semi-Gloss Enamel. (30-40 units @ 60°)
    - a. Moore: HP29 Ultra Spec HP DTM Acrylic Semi-Gloss.
    - b. PPG: 90-1210 Pitt-Tech Int/Ext Semi-Gloss DTM Industrial Enamel.
    - c. S-W: B66W1150 Series Pro Industrial DTM Acrylic Semi-Gloss Coating.
- D. Painted Woodwork and Hardboard: Semi-Gloss Acrylic Enamel Finish: Two topcoats over undercoater.
- 1. First Coat: Interior Oil Undercoat.
    - a. Moore: 024 Fresh Start Multi-Purpose Interior/Exterior Oil Based Primer.
    - b. PPG: 17-941NF Seal Grip Int/Ext. Alkyd Universal Primer.
    - c. S-W: B49 W8820 Multi-Purpose Oil-Based Primer.
  - 2. First and Second Finish Coats: Premium Acrylic Semi-Gloss Enamel <150 g/L. DFT 3.5 Mils min.
    - a. Moore: 551 Regal Select Semi-Gloss.
    - b. PPG: 87-6 Manor Hall Interior Semi-Gloss Acrylic Latex.
    - c. S-W: B31W20 ProClassic Waterborne.
- E. Stained woodwork with transparent finish is specified in Division 6 Sections by woodworker.

**END OF SECTION**



**SECTION 126113  
UPHOLSTERED JURY SEATING**

**PART 1 GENERAL**

**1.01 SUBMITTALS**

- A. See Section 013000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Manufacturer's printed data sheets for products specified.
- C. Shop Drawings: Fabrication and installation details, chair layouts and dimensions and seat numbering scheme.

**1.02 QUALITY ASSURANCE**

- A. Installer Qualifications: An experienced installer certified in writing by the seating manufacturer to be qualified for installation of specified seating.

**1.03 DELIVERY, STORAGE, AND HANDLING**

- A. Deliver seats to project site in unopened containers clearly labeled with manufacturer's name and identification of contents.
- B. Store seating units in dry and clean location until needed for installation. During installation, handle in a manner that will prevent marring and soiling of finished surfaces.

**PART 2 PRODUCTS**

**2.01 MANUFACTURERS**

- A. Manufacturers and Products:
  - 1. Gunlocke; Bank of England, fixed base, model no. GK9946USJ.
  - 2. Via; Carmel, fixed base and movable, Model No. 6901 with upholstered arms.
  - 3. Via; Dyce, fixed base and movable, Model No. 5301 with upholstered arms.
- B. Provide all jury seating of a single model by one manufacturer.

**2.02 UPHOLSTERED JURY SEATING**

- A. General: Provide fixed seating system with swivel capability; designed using individual support standards for each chair, equally spaced in rows as indicated on drawings.
  - 1. Seat Height: 18 inches to the top of seat surface.
- B. Chair Construction: Fixed type, panelized construction with fabric covering over padding and protective back and seat panels.
  - 1. Plywood Back and Seat Construction: Molded one-piece hardwood plywood frame; polyurethane foam padding glued to plywood support, and with high density molded urethane shells. Upholster with fabric sewn into box construction without welts and securely fastened with concealed clips to provide smooth, wrinkle-free surface.
  - 2. Operable Mechanisms: Provide manufacturer's standard operating mechanisms to allow for limited height, tilt, and swivel adjustments. Swivel adjustment shall allow for 45 degree swivel in each direction from center and shall include self-return mechanism.
  - 3. Arm Rests: Provide molded urethane with internal steel reinforcing.
  - 4. Upholstery Fabric: Selected from manufacturer's full and complete range of available textile fabrics, in all price ranges/grades. Leather/faux leather shall not be required.
- C. Jury Base: Provide fixed tubular steel standard, securely welded to a steel mounting plate. Seat connections shall be welded to jury base tubing. Provide manufacturer's standard black baked

enamel finish on tube steel, base plate, and anchors.

1. Anchors: Provide wedge type drilled-in expansion bolt anchors, sized for concrete substrate attachment indicated.

### **2.03 FINISHES**

- A. Ferrous Metals: Manufacturer's standard two-coat baked enamel finish, applied over conversion coating appropriate to base metal.
  1. Color and Gloss: As indicated.

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Examine substrates for conditions detrimental to installation of seating. Proceed with installation only after unsatisfactory conditions have been corrected.

### **3.02 INSTALLATION**

- A. Comply with manufacturer's installation instructions and approved shop drawings.
- B. Anchor base supports securely to substrate with anchoring devices of size and quantity as recommended by manufacturer.
  1. Place base supports in each row laterally spaced so the standards will be equally spaced along each row and in alignment front to back.
  2. Comply with the ADA Standards for row and aisle spacing.

### **3.03 ADJUSTING**

- A. Adjust seat mechanisms to ensure that seats in each row are aligned and facing center when unoccupied.
- B. Provide plastic sheeting or other protective covering until Substantial Completion.
- C. Repair minor abrasions and imperfections in painted finishes with a coating that matches factory-applied finish; replace units that cannot be repaired to unblemished appearance.
- D. Clean dust, dirt, and other minor soiling in accordance with manufacturer's cleaning instructions.
- E. Replace upholstery fabric or other seating components that are damaged or soiled during installation if they cannot be cleaned to the Owner's satisfaction.

## **END OF SECTION**

**SECTION 144300  
PLATFORM LIFTS**

**PART 1 GENERAL**

**1.01 REFERENCE STANDARDS**

- A. ASTM A36/A36M - Standard Specification for Carbon Structural Steel 2019.
- B. ASTM A500/A500M - Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes 2021a.
- C. ASTM A572/A572M - Standard Specification for High-Strength Low-Alloy Columbium-Vanadium Structural Steel 2021, with Editorial Revision.
- D. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process 2020.
- E. ASTM A786/A786M - Standard Specification for Hot-Rolled Carbon, Low-Alloy, High-Strength Low-Alloy, and Alloy Steel Floor Plates 2015 (Reapproved 2021).
- F. ASTM F1554 - Standard Specification for Anchor Bolts, Steel, 36, 55, and 105-ksi Yield Strength 2020.
- G. AWS D1.1/D1.1M - Structural Welding Code - Steel 2020, with Errata (2021).
- H. AWS D1.3/D1.3M - Structural Welding Code - Sheet Steel 2018.
- I. ITS (DIR) - Directory of Listed Products current edition.
- J. NFPA 70 - National Electrical Code Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- K. UL (DIR) - Online Certifications Directory Current Edition.

**1.02 ADMINISTRATIVE REQUIREMENTS**

- A. Coordination: Coordinate installation of platform lift system with adjacent construction using necessary attachments; provide anchoring devices in accordance with manufacturers installation instructions; coordinate installation of cast-in-place components.
  - 1. Electrical System: Coordinate utility and electrical system connections to ensure they are made in an orderly and expeditious manner.
- B. Preinstallation Meeting: Conduct preinstallation meeting one week prior to start of this work on project site; require attendance by affected installers including all adjacent finishes.

**1.03 SUBMITTALS**

- A. See Section 013000 - Administrative Requirements for submittal procedures.
- B. Product Data: Provide data on material descriptions, construction details, component dimensions and profiles, and finishes; including data on rated capacities, electrical and operating characteristics, and necessary accessories.
- C. Shop Drawings: Provide plans, elevations, sections, and attachment details; include equipment assembly details with dimensions, weights, loads, required clearances, components, size and location of anchors and required field connections, and methods for field assembly; provide diagrams indicating signal, power, and control wiring.
- D. Designer's qualification statement.
- E. Manufacturer's qualification statement.
- F. Installer's qualification statement.

- G. Maintenance contracts.

#### **1.04 QUALITY ASSURANCE**

- A. Quality Standards and Requirements:
  - 1. Courtroom platform lift shall comply with ASME A 18.1 standard for lifts in public installations.
  - 2. Courtroom platform lift shall be ADA-compliant, customized assemblies, specifically designed for use in courtrooms to facilitate mobility-impaired judges and clerks.
  - 3. Courtroom platform lift shall raise and lower the platform within the confines of stationary millwork walls and entrance/exit doors attached thereto. The lift manufacturer and Installer shall coordinate with adjacent millwork and floor finishes to provide a complete, integrated assembly.
- B. Designer Qualifications: Provide platform lift design under direct supervision of a Professional Engineer experienced in design of this type of work and licensed in the State in which the Project is located.
- C. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section, with documented experience in providing lifts for courtroom applications.
- D. Installer Qualifications: Company specializing in performing work of type specified and with documented experience installing lifts for courtroom applications, and approved by manufacturer.

#### **1.05 FIELD CONDITIONS**

- A. Existing Conditions: Verify existing dimensions of project construction adjacent to platform lift system location, including platform heights, sub-level area dimensions, and slope of access routes; provide field measurements prior to fabrication.

#### **1.06 WARRANTY**

- A. See Section 017800 - Closeout Submittals for additional warranty requirements.

### **PART 2 PRODUCTS**

#### **2.01 PLATFORM LIFTS**

- A. Basis-of-Design Lift: The design is based on the Model UL-42 unenclosed vertical wheelchair lift by Symmetry Elevating Solutions.
  - 1. Comparable manufacturers wishing to provide substitute products shall submit qualification data for approval by Architect. Qualification data shall include previous courtroom installations that required coordination with adjacent courtroom elements including judges bench platform construction, adjacent and integrated millwork, flooring finishes, and electrical components.
  - 2. By submitting a substitution, comparable manufacturers certify that their lift model can be surface mounted in existing courtroom condition, fits the indicated platform dimension and available space, and can integrate with courtroom finishes.

#### **2.02 PERFORMANCE REQUIREMENTS**

- A. Structural Performance: Provide factory fabricated structures capable of withstanding the following loads and stresses without damage or failure.
  - 1. Load Capacity: 750 lbs.
  - 2. Platform and Framing Deflection: Limited to 1/360 of span length.

3. Fabricate frame and platform using structural or formed-steel shapes, welded to supports; assembly to withstand deformation during operating and stored periods.

### **2.03 OPERATING SYSTEM**

- A. Electric: Electric controlled lift system from remote-control station with motorized operation; provide unitized electric motor and shaft assembly. Hydraulic lift is not acceptable.
  1. Drive System: Manufacturer's standard acme screw drive; stationary nute on a rotating, 1 inch diameter acme screw with a secondary safety nut.
  2. Vertical Travel Speed: 10 feet per minute.

### **2.04 MATERIALS**

- A. Rolled Steel Sections, Shapes, and Rods: Comply with ASTM A36/A36M.
- B. Sheet Steel: Hot-dipped galvanized steel sheet, ASTM A653/A653M, Designation SS (structural steel), Grade 33 (230), with G90/Z275 coating.
- C. Rolled Steel Floor Plates: Comply with ASTM A786/A786M, 1/8 inch thick, with manufacturers standard surface pattern; rolled from steel plate complying with ASTM A572/A572M, Grade 55 (380).
- D. Steel Tubing: Comply with ASTM A500/A500M, cold formed.
- E. Anchor Bolts and Rods: Comply with ASTM F1554, Grade 55.
- F. Welding: Comply with applicable requirements of AWS D1.1/D1.1M and AWS D1.3/D1.3M.

### **2.05 EQUIPMENT**

- A. Lubrication of Equipment: Provide grease fittings for lubricating bearings requiring periodic lubrication, automatic feed type grease cups, and visible and easily accessible lubrication points.
- B. Attachment Brackets and Anchors: Sized in accordance with local building code, including safety factors.
- C. Maintenance Devices: Provide as necessary within lift system, supported on structural members within accessible locations.
- D. Platform: Fabricated of 12 gauge hot rolled steel plate.
  1. Platform Configuration: 90 degree.
  2. Access Ramp: Automatic folding type; fabricated of 12 gauge slip resistant steel plate.
- E. Drive Tower: Fabricated of 7 gauge steel structural channel & plate; with 16 gauge steel sheet skin.
- F. Upper and Lower Door/Gate Construction: Provide solid core oak laminated door and frame; provide with mesh vision panel, spring hinges, dummy trim door handle, lock plate cover, electric operator, and electric interlocks.
  1. Provide upper and lower door/gate operation with manufacturer's standard low-energy power door operator, compliant with ANSI A156.19 and UL 325. Provide closing operation such that door automatically closes and centers after each cycle.

### **2.06 ELECTRICAL CHARACTERISTICS AND COMPONENTS**

- A. Electrical Characteristics: (Per Basis-of-design)
  1. 1-1/2 hp.
  2. 25 rated load amperes.
  3. 115 volts, single phase, 60 Hz.

4. Refer to Division 26 and electrical drawings for wiring requirements and additional electrical requirements.
- B. Operation and Control: Low-voltage, constant-pressure control switch at top and bottom landing, and intermediate platform if indicated. Provide with key-operated security switch to prevent unauthorized use.
  1. Provide controls with emergency stop button.
  2. Provide limit switches for upper and lower limits of travel.
  3. Provide battery-powered emergency lowering function.
- C. Disconnect Switch: Factory mount disconnect switch in control panel.
- D. Electrical Components, Boxes, Conduit, Wiring, and Devices: Comply with NFPA 70, and UL (DIR) or ITS (DIR) listed and labeled, and marked as applicable for proposed locations.

## **2.07 FINISHES**

- A. Baked-On Factory Finish for Structural Metal Surfaces: Clean surfaces of rust, oil or grease and wipe clean with solvent; apply manufacturer's standard two-coat, baked-on finish consisting of primer and thermosetting top coat.
  1. Color: As selected by Architect from manufacturer's standard line.
- B. Wood Door/Gate Finish: Coordinate manufacturer's available wood construction with adjacent interior woodwork prior to fabrication. Factory stain wood surfaces to match, or provide wood surfaces that are field stainable for final finishing by Division 9.

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Verify that areas and conditions are in compliance with installation tolerances and other conditions affecting this work.
- B. Verify that locations for electrical rough-in connections to system equipment are in acceptable locations prior to installing equipment.
- C. Verify that electrical power is available and of correct characteristics.
- D. Do not proceed with installation until unacceptable conditions have been corrected.

### **3.02 INSTALLATION**

- A. Install platform lifts system and components in accordance with manufacturer's written installation instructions.
- B. Install platform lifts system securely to supporting structure, and flush with adjacent surfaces.
- C. Install structural components using methods that comply with requirements indicated relative to layout and structural position.

### **3.03 ADJUSTING**

- A. Adjust platform lift equipment to operate smoothly and safely.
- B. Verify vertical travel of platfo lift system, and adjust as necessary to maintain operating range indicated.
- C. After installation, inspect exposed factory finished lift equipment, and repair damaged finishes.

### **3.04 CLEANING**

- A. Remove protective coverings from finished surfaces.

- B. Clean surfaces and components.

### **3.05 CLOSEOUT ACTIVITIES**

- A. See Section 017900 - Demonstration and Training for additional requirements.
- B. Demonstration: Demonstrate operation of platform lift system to Owner's personnel.
  - 1. Use operation and maintenance data as reference during demonstration.
  - 2. Briefly describe function, operation, and maintenance of each component.
- C. Training: Train Owner's personnel on operation and maintenance of system.
  - 1. Use operation and maintenance manual as training reference, supplemented with additional training materials as required.
  - 2. Provide minimum of two hours of training.
  - 3. Instructor: Manufacturer's training personnel.
  - 4. Location: At project site.

### **3.06 MAINTENANCE**

- A. See Section 017000 - Execution and Closeout Requirements for additional requirements.
- B. Provide a separate maintenance contract for service and maintenance of platform lifts system and components for one year after Date of Substantial Completion.
- C. Perform maintenance work using competent personnel, under supervision and in direct employment of lift installer.
- D. Assigning or transfer of maintenance service to any agent or subcontractor is not permitted without prior consent of Owner.
- E. Provide preventive maintenance and examination quarterly, at minimum; clean, adjust, and lubricate equipment.
- F. Repair or replace parts whenever required, with parts produced by manufacturer of original equipment.

**END OF SECTION**

SECTION 260519 - LOW-VOLTAGE ELECTRICAL POWER CONDUCTORS AND CABLES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:
  - 1. Building wires and cables rated 600 V and less.
  - 2. Connectors, splices, and terminations rated 600 V and less.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.

1.4 INFORMATIONAL SUBMITTALS

- A. Field quality-control reports.

PART 2 - PRODUCTS

2.1 CONDUCTORS AND CABLES

- A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
  - 1. Cerro Wire LLC.
  - 2. General Cable; General Cable Corporation.
  - 3. Southwire Company.
  - 4. Encore Wiring Corporation.
- B. Copper Conductors: Comply with NEMA WC 70/ICEA S-95-658.
- C. Conductor Insulation: Comply with NEMA WC 70/ICEA S-95-658 for Type THHN-2-THWN-2.
- D. Multiconductor Cable: Comply with NEMA WC 70/ICEA S-95-658 for metal-clad cable, Type MC with ground wire.



2.2 CONNECTORS AND SPLICES

- A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
1. 3M.
  2. Hubbell Power Systems, Inc.
  3. ILSCO.
  4. Tyco Electronics Corp.
- B. Description: Factory-fabricated connectors and splices of size, ampacity rating, material, type, and class for application and service indicated.

2.3 SYSTEM DESCRIPTION

- A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
- B. Comply with NFPA 70.

PART 3 - EXECUTION

3.1 CONDUCTOR MATERIAL APPLICATIONS

- A. Branch Circuits: Copper. Solid for No. 10 AWG and smaller; stranded for No. 8 AWG and larger.

3.2 CONDUCTOR INSULATION AND MULTICONDUCTOR CABLE APPLICATIONS AND WIRING METHODS

- A. Branch Circuits Concealed in Ceilings, Walls, and Partitions: Type THHN-2-THWN-2, single conductors in raceway or Metal-clad cable, Type MC.
- B. Branch Circuits Installed Below Raised Flooring: Metal-clad cable, Type MC.
- C. Cord Drops and Portable Appliance Connections: Type SO, hard service cord with stainless-steel, wire-mesh, strain relief device at terminations to suit application.

3.3 INSTALLATION OF CONDUCTORS AND CABLES

- A. Conceal cables in finished walls, ceilings, and floors unless otherwise indicated.
- B. Complete raceway installation between conductor and cable termination points according to Section 260533 "Raceways and Boxes for Electrical Systems" prior to pulling conductors and cables.

- C. Use manufacturer-approved pulling compound or lubricant where necessary; compound used must not deteriorate conductor or insulation. Do not exceed manufacturer's recommended maximum pulling tensions and sidewall pressure values.
- D. Use pulling means, including fish tape, cable, rope, and basket-weave wire/cable grips, that will not damage cables or raceway.
- E. Install exposed cables parallel and perpendicular to surfaces of exposed structural members and follow surface contours where possible.
- F. Branch Circuits Concealed in Casework: MC cable may be used to feed to outlet boxes fish concealed in built-in casework. Route cable supported tight in upper inside corners of casework, not in conflict with drawers or cabinet doors.
- G. Support cables according to Section 260529 "Hangers and Supports for Electrical Systems."
- H. All single-phase circuits shall include a dedicated neutral (grounded) and grounding conductor, unless specifically noted otherwise.
  - 1. The intent of this is to eliminate multiwire branch circuits and allow disconnection of one circuit without requiring disconnection of other(s) as would be required to comply with NEC 210.4(B). Per NEC 310.15(B)(b) each of these neutral (grounded) conductor is not considered to be load-bearing, so derating is not required.
- I. Contract drawings are based upon a maximum of 3 current-carrying conductors in a conduit. Contractor may rework indicated circuitry to install a maximum of (6) L-N circuits (120 or 277V) in a single conduit. There shall be no more than 2 each A, B, C phase conductors per homerun. Each shall have dedicated neutral (grounded) conductor.
  - 1. Do not group L-L circuits in a homerun, unless specifically indicated on the drawings.
  - 2. Where there are more than 3 current-carrying conductors in a conduit, derate conductor ampacities in accordance with NEC Table 310.15(B)(2)(a).
  - 3. When running more than 3 ungrounded conductors in a raceway, increase size of conduits beyond those indicated in contract documents, as required to not exceed NEC Chapter 9, Table 1 conduit-fill requirements. As-built drawings shall clearly indicate which circuits are grouped in homeruns.
- J. Unless otherwise indicated, minimum conductor size shall be 12 AWG.

### 3.4 CONNECTIONS

- A. Tighten electrical connectors and terminals according to manufacturer's published torque-tightening values. If manufacturer's torque values are not indicated, use those specified in UL 486A-486B.
- B. Make splices, terminations, and taps that are compatible with conductor material and that possess equivalent or better mechanical strength and insulation ratings than unspliced conductors.
- C. Wiring at Outlets: Install conductor at each outlet, with at least 12 inches of slack.

3.5 IDENTIFICATION

- A. Identify and color-code conductors and cables according to Section 260553 "Identification for Electrical Systems."
- B. Identify each spare conductor at each end with identity number and location of other end of conductor and identify as spare conductor.

3.6 SLEEVE AND SLEEVE-SEAL INSTALLATION FOR ELECTRICAL PENETRATIONS

- A. Install sleeves and sleeve seals at penetrations of exterior floor and wall assemblies. Comply with requirements in Section 260544 "Sleeves and Sleeve Seals for Electrical Raceways and Cabling."

3.7 FIRESTOPPING

- A. Apply firestopping to electrical penetrations of fire-rated floor and wall assemblies to restore original fire-resistance rating of assembly according to Section 078413 "Penetration Firestopping."

3.8 FIELD QUALITY CONTROL

- A. Manufacturer's Field Service: Engage a factory-authorized service representative to test and inspect components, assemblies, and equipment installations, including connections.
- B. Perform the following tests and inspections:
  - 1. After installing conductors and cables and before electrical circuitry has been energized, test service entrance and feeder conductors for compliance with requirements.
  - 2. Perform each visual and mechanical inspection and electrical test stated in NETA Acceptance Testing Specification. Certify compliance with test parameters.
- C. Test and Inspection Reports: Prepare a written report to record the following:
  - 1. Procedures used.
  - 2. Results that comply with requirements.
  - 3. Results that do not comply with requirements and corrective action taken to achieve compliance with requirements.
- D. Cables will be considered defective if they do not pass tests and inspections.

END OF SECTION 260519

SECTION 260526 - GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 ACTION SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Field quality-control reports.

1.3 CLOSEOUT SUBMITTALS

- A. Operation and Maintenance Data: For grounding to include in emergency, operation, and maintenance manuals.

1.4 QUALITY ASSURANCE

- A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
- B. Comply with UL 467 for grounding and bonding materials and equipment.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
  1. Burndy; Part of Hubbell Electrical Systems.
  2. ERICO International Corporation.
  3. Galvan Industries, Inc.; Electrical Products Division, LLC.
  4. ILSCO.
  5. O-Z/Gedney; an EGS Electrical Group brand; an Emerson Industrial Automation business.

## 2.2 SYSTEM DESCRIPTION

- A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
- B. Comply with UL 467 for grounding and bonding materials and equipment.

## 2.3 CONDUCTORS

- A. Insulated Conductors: Copper wire or cable insulated for 600 V unless otherwise required by applicable Code or authorities having jurisdiction.
- B. Bare Copper Conductors:
  - 1. Solid Conductors: ASTM B 3.
  - 2. Stranded Conductors: ASTM B 8.
  - 3. Tinned Conductors: ASTM B 33.
  - 4. Bonding Cable: 28 kcmil, 14 strands of No. 17 AWG conductor, 1/4 inch in diameter.
  - 5. Bonding Conductor: No. 4 or No. 6 AWG, stranded conductor.
  - 6. Bonding Jumper: Copper tape, braided conductors terminated with copper ferrules; 1-5/8 inches wide and 1/16 inch thick.
  - 7. Tinned Bonding Jumper: Tinned-copper tape, braided conductors terminated with copper ferrules; 1-5/8 inches wide and 1/16 inch thick.

## 2.4 CONNECTORS

- A. Listed and labeled by an NRTL acceptable to authorities having jurisdiction for applications in which used and for specific types, sizes, and combinations of conductors and other items connected.
- B. Bolted Connectors for Conductors and Pipes: Copper or copper alloy.
- C. Welded Connectors: Exothermic-welding kits of types recommended by kit manufacturer for materials being joined and installation conditions.

## PART 3 - EXECUTION

### 3.1 APPLICATIONS

- A. Conductors: Install solid conductor for No. 8 AWG and smaller, and stranded conductors for No. 6 AWG and larger unless otherwise indicated.
- B. Conductor Terminations and Connections:
  - 1. Pipe and Equipment Grounding Conductor Terminations: Bolted connectors.
  - 2. Connections to Structural Steel: Welded connectors.

### 3.2 EQUIPMENT GROUNDING

- A. Install insulated equipment grounding conductors with all branch circuits.
- B. Install insulated equipment grounding conductors with the following items, in addition to those required by NFPA 70:
  - 1. Branch circuits.
  - 2. Receptacle circuits.
  - 3. Single-phase motor and appliance branch circuits.
  - 4. Flexible raceway runs.
  - 5. Metal-clad cable runs.

### 3.3 INSTALLATION

- A. Grounding Conductors: Route along shortest and straightest paths possible unless otherwise indicated or required by Code. Avoid obstructing access or placing conductors where they may be subjected to strain, impact, or damage.
- B. Bonding Straps and Jumpers: Install in locations accessible for inspection and maintenance except where routed through short lengths of conduit.
  - 1. Bonding to Structure: Bond straps directly to basic structure, taking care not to penetrate any adjacent parts.
  - 2. Bonding to Equipment Mounted on Vibration Isolation Hangers and Supports: Install bonding so vibration is not transmitted to rigidly mounted equipment.
  - 3. Use exothermic-welded connectors for outdoor locations; if a disconnect-type connection is required, use a bolted clamp.
- C. Bonding Interior Metal Ducts: Bond metal air ducts to equipment grounding conductors of associated fans, blowers, electric heaters, and air cleaners. Install bonding jumper to bond across flexible duct connections to achieve continuity.
- D. Grounding for Steel Building Structure: Install a driven ground rod at base of each corner column and at intermediate exterior columns at distances not more than 60 feet apart.

### 3.4 FIELD QUALITY CONTROL

- A. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect, test, and adjust components, assemblies, and equipment installations, including connections.
- B. Perform tests and inspections.
- C. Tests and Inspections:
  - 1. After installing grounding system but before permanent electrical circuits have been energized, test for compliance with requirements.

2. Inspect physical and mechanical condition. Verify tightness of accessible, bolted, electrical connections with a calibrated torque wrench according to manufacturer's written instructions.
- D. Grounding system will be considered defective if it does not pass tests and inspections.
  - E. Prepare test and inspection reports.
  - F. Report measured ground resistances that exceed the following values:
    1. Power and Lighting Equipment or System with Capacity of 500 kVA and Less: 10 ohms.
  - G. Excessive Ground Resistance: If resistance to ground exceeds specified values, notify Architect promptly and include recommendations to reduce ground resistance.

END OF SECTION 260526

SECTION 260529 - HANGERS AND SUPPORTS FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes the following:
  - 1. Hangers and supports for electrical equipment and systems.

1.3 DEFINITIONS

- A. EMT: Electrical metallic tubing.
- B. RMC: Rigid metal conduit.

1.4 ACTION SUBMITTALS

- A. Product Data: For the following:
  - 1. Steel slotted support systems.

1.5 QUALITY ASSURANCE

- A. Welding: Qualify procedures and personnel according to AWS D1.1/D1.1M, "Structural Welding Code - Steel."
- B. Comply with NFPA 70.

PART 2 - PRODUCTS

2.1 SUPPORT, ANCHORAGE, AND ATTACHMENT COMPONENTS

- A. Steel Slotted Support Systems: Comply with MFMA-4, factory-fabricated components for field assembly.



1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
    - a. Cooper B-Line, Inc.; a division of Cooper Industries.
    - b. ERICO International Corporation.
    - c. Thomas & Betts Corporation.
    - d. Unistrut; an Atkore International company.
  2. Metallic Coatings: Hot-dip galvanized after fabrication and applied according to MFMA-4.
  3. Channel Dimensions: Selected for applicable load criteria.
- B. Raceway and Cable Supports: As described in NECA 1 and NECA 101.
- C. Conduit and Cable Support Devices: Steel and malleable-iron hangers, clamps, and associated fittings, designed for types and sizes of raceway or cable to be supported.
- D. Support for Conductors in Vertical Conduit: Factory-fabricated assembly consisting of threaded body and insulating wedging plug or plugs for non-armored electrical conductors or cables in riser conduits. Plugs shall have number, size, and shape of conductor gripping pieces as required to suit individual conductors or cables supported. Body shall be malleable iron.
- E. Structural Steel for Fabricated Supports and Restraints: ASTM A 36/A 36M, steel plates, shapes, and bars; black and galvanized.
- F. Mounting, Anchoring, and Attachment Components: Items for fastening electrical items or their supports to building surfaces include the following:
1. Powder-Actuated Fasteners: Threaded-steel stud, for use in hardened Portland cement concrete, steel, or wood, with tension, shear, and pullout capacities appropriate for supported loads and building materials where used.
    - a. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
      - 1) Hilti, Inc.
      - 2) MKT Fastening, LLC.
      - 3) Simpson Strong-Tie Co., Inc.
  2. Mechanical-Expansion Anchors: Insert-wedge-type, zinc-coated steel, for use in hardened portland cement concrete with tension, shear, and pullout capacities appropriate for supported loads and building materials in which used.
    - a. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
      - 1) Cooper B-Line, Inc.; a division of Cooper Industries.

- 2) Hilti, Inc.
- 3) MKT Fastening, LLC.
3. Concrete Inserts: Steel or malleable-iron, slotted support system units similar to MSS Type 18; complying with MFMA-4 or MSS SP-58.
4. Clamps for Attachment to Steel Structural Elements: MSS SP-58, type suitable for attached structural element.
5. Through Bolts: Structural type, hex head, and high strength. Comply with ASTM A 325.
6. Toggle Bolts: All-steel springhead type.
7. Hanger Rods: Threaded steel.

## 2.2 FABRICATED METAL EQUIPMENT SUPPORT ASSEMBLIES

- A. Description: Welded or bolted, structural-steel shapes, shop or field fabricated to fit dimensions of supported equipment.
- B. Materials: Comply with requirements in Section 055000 "Metal Fabrications" for steel shapes and plates.

## PART 3 - EXECUTION

### 3.1 APPLICATION

- A. Comply with NECA 1 and NECA 101 for application of hangers and supports for electrical equipment and systems except if requirements in this Section are stricter.
- B. Maximum Support Spacing and Minimum Hanger Rod Size for Raceway: Space supports for EMT and RMC as required by NFPA 70. Minimum rod size shall be 1/4 inch in diameter.
- C. Multiple Raceways or Cables: Install trapeze-type supports fabricated with steel slotted support system, sized so capacity can be increased by at least 25 percent in future without exceeding specified design load limits.
  1. Secure raceways and cables to these supports with two-bolt conduit clamps.
- D. Spring-steel clamps designed for supporting single conduits without bolts may be used for 1-1/2-inch and smaller raceways serving branch circuits and communication systems above suspended ceilings and for fastening raceways to trapeze supports.

### 3.2 SUPPORT INSTALLATION

- A. Comply with NECA 1 and NECA 101 for installation requirements except as specified in this Article.
- B. Raceway Support Methods: In addition to methods described in NECA 1, EMT and RMC may be supported by openings through structure members, as permitted in NFPA 70.

- C. Strength of Support Assemblies: Where not indicated, select sizes of components so strength will be adequate to carry present and future static loads within specified loading limits. Minimum static design load used for strength determination shall be weight of supported components plus 200 lb.
- D. Mounting and Anchorage of Surface-Mounted Equipment and Components: Anchor and fasten electrical items and their supports to building structural elements by the following methods unless otherwise indicated by code:
  - 1. To Wood: Fasten with lag screws or through bolts.
  - 2. To Masonry: Approved toggle-type bolts on hollow masonry units and expansion anchor fasteners on solid masonry units.
  - 3. To Existing Concrete: Expansion anchor fasteners.
  - 4. Instead of expansion anchors, powder-actuated driven threaded studs provided with lock washers and nuts may be used in existing standard-weight concrete 4 inches thick or greater. Do not use for anchorage to lightweight-aggregate concrete or for slabs less than 4 inches thick.
  - 5. To Steel: Beam clamps (MSS Type 19, 21, 23, 25, or 27) complying with MSS SP-69.
  - 6. To Light Steel: Sheet metal screws.
  - 7. Items Mounted on Hollow Walls and Nonstructural Building Surfaces: Mount cabinets, panelboards, disconnect switches, control enclosures, pull and junction boxes, transformers, and other devices on slotted-channel racks attached to substrate.
- E. Drill holes for expansion anchors in concrete at locations and to depths that avoid reinforcing bars.

### 3.3 INSTALLATION OF FABRICATED METAL SUPPORTS

- A. Comply with installation requirements in Section 055000 "Metal Fabrications" for site-fabricated metal supports.
- B. Cut, fit, and place miscellaneous metal supports accurately in location, alignment, and elevation to support and anchor electrical materials and equipment.
- C. Field Welding: Comply with AWS D1.1/D1.1M.

### 3.4 PAINTING

- A. Touchup: Clean field welds and abraded areas of shop paint. Paint exposed areas immediately after erecting hangers and supports. Use same materials as used for shop painting. Comply with SSPC-PA 1 requirements for touching up field-painted surfaces.
  - 1. Apply paint by brush or spray to provide minimum dry film thickness of 2.0 mils.
- B. Touchup: Comply with requirements in Division 9 for cleaning and touchup painting of field welds, bolted connections, and abraded areas of shop paint on miscellaneous metal.

- C. Galvanized Surfaces: Clean welds, bolted connections, and abraded areas and apply galvanizing-repair paint to comply with ASTM A 780.

END OF SECTION 260529

## SECTION 260533 - RACEWAYS AND BOXES FOR ELECTRICAL SYSTEMS

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

#### 1.2 SUMMARY

- A. Section Includes:
  - 1. Metal conduits, tubing, and fittings.
  - 2. Boxes, enclosures, and cabinets.
- B. Part 2 of this section includes material requirements for all raceways and boxes that may or may not be used on the project. Part 3 of this Section defines where a given type of product shall be or is permitted to be utilized.

#### 1.3 DEFINITIONS

- A. GRC: Galvanized rigid steel conduit.

#### 1.4 ACTION SUBMITTALS

- A. Product Data: For surface raceways, wireways and fittings, floor boxes, hinged-cover enclosures, and cabinets.
- B. Shop Drawings: For custom enclosures and cabinets. Include plans, elevations, sections, and attachment details.

#### 1.5 INFORMATIONAL SUBMITTALS

- A. Source quality-control reports.

### PART 2 - PRODUCTS

#### 2.1 METAL CONDUITS, TUBING, AND FITTINGS

- A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

1. Allied Tube & Conduit.
  2. O-Z/Gedney; an EGS Electrical Group brand; an Emerson Industrial Automation business.
  3. Robroy Industries.
  4. Thomas & Betts Corporation.
- B. Listing and Labeling: Metal conduits, tubing, and fittings shall be listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
- C. GRC: Comply with ANSI C80.1 and UL 6.
- D. EMT: Comply with ANSI C80.3 and UL 797.
- E. FMC: Comply with UL 1; zinc-coated steel.
- F. LFMC: Flexible steel conduit with PVC jacket and complying with UL 360.
- G. Fittings for Metal Conduit: Comply with NEMA FB 1 and UL 514B.
1. Conduit Fittings for Hazardous (Classified) Locations: Comply with UL 886 and NFPA 70.
  2. Fittings for EMT:
    - a. Material: Steel.
    - b. Type: compression.
  3. Expansion Fittings: Steel to match conduit type, complying with UL 651, rated for environmental conditions where installed, and including flexible external bonding jumper.
- H. Joint Compound for GRC: Approved, as defined in NFPA 70, by authorities having jurisdiction for use in conduit assemblies, and compounded for use to lubricate and protect threaded conduit joints from corrosion and to enhance their conductivity.

## 2.2 BOXES, ENCLOSURES, AND CABINETS

- A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
1. EGS/Appleton Electric.
  2. Erickson Electrical Equipment Company.
  3. Hoffman; a brand of Pentair Equipment Protection.
  4. Hubbell Incorporated.
  5. O-Z/Gedney; an EGS Electrical Group brand; an Emerson Industrial Automation business.
  6. RACO; Hubbell.
- B. General Requirements for Boxes, Enclosures, and Cabinets: Boxes, enclosures, and cabinets installed in wet locations shall be listed for use in wet locations.

- C. Sheet Metal Outlet and Device Boxes: Comply with NEMA OS 1 and UL 514A.
- D. Metal Floor Boxes:
  - 1. Material: sheet metal.
  - 2. Type: Fully adjustable.
  - 3. Shape: Rectangular.
  - 4. Listing and Labeling: Metal floor boxes shall be listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
- E. Small Sheet Metal Pull and Junction Boxes: NEMA OS 1.
- F. Box extensions used to accommodate new building finishes shall be of same material as recessed box.
- G. Device Box Dimensions: 4 inches square by 2-1/8 inches deep.
- H. Gangable boxes are allowed.
- I. Hinged-Cover Enclosures: Comply with UL 50 and NEMA 250, Type 1 with continuous-hinge cover with flush latch unless otherwise indicated.
  - 1. Metal Enclosures: Steel, finished inside and out with manufacturer's standard enamel.
- J. Cabinets:
  - 1. NEMA 250, Type 1 galvanized-steel box with removable interior panel and removable front, finished inside and out with manufacturer's standard enamel.
  - 2. Hinged door in front cover with flush latch and concealed hinge.
  - 3. Key latch to match panelboards.
  - 4. Metal barriers to separate wiring of different systems and voltage.
  - 5. Accessory feet where required for freestanding equipment.

### 2.3 FLOOR BOXES AND SERVICE FITTINGS

- A. Basis of Design: Wiremold, RFB4 Series Floor Boxes.
  - 1. Floor boxes shall be manufactured from stamped-steel and be approved for use on raised floor tile. The box shall be 13 5/8" L x 10" W x 2 7/16" H. There shall be four independent wiring compartments that allow capacity for up to four duplex receptacles and/or communication services. The RFB4-SS Series Box shall permit feed through tunneling from adjacent compartments. Two of the four compartments shall have a minimum wiring capacity of 15.7 cu in., and two compartments shall have a minimum wiring capacity of 31.2 cu in. The box shall provide the following number of conduit knockouts: two 1/2", six 3/4", and eight 1". The box shall be fully adjustable, providing a maximum of 1 7/8" pre-pour adjustment, and a maximum of 3/4" after-pour adjustment. Wiremold RFB4-SS.

2. Activation covers shall be available in flanged and flangeless versions of cast aluminum with aluminum, black, bronze, brass, nickel or gray finish. Covers shall be available with options for tile or carpet inserts, flush covers, or furniture feed. Flanged covers shall be 7 3/4" L x 6 9/16" W. Flangeless covers shall be 6 3/4" L x 5 9/16" W.
  - a. Unless indicated otherwise, provide the following cover configurations:
    - 1) Power/Telecom Outlets: Brushed aluminum flanged with blank lid flush with floor and NO carpet/tile cutouts.
    - 2) Furniture Floor Feed: Brushed aluminum flanged with 1" trade size screw plug opening and one combination 1 1/4" and 2" trade size screw plug openings.

### PART 3 - EXECUTION

#### 3.1 RACEWAY APPLICATION

- A. Indoors: Apply raceway products as specified below unless otherwise indicated:
  1. Exposed, Not Subject to Physical Damage: EMT.
  2. Exposed, Not Subject to Severe Physical Damage: EMT.
  3. Exposed and Subject to Severe Physical Damage: GRC. Raceway locations include the following:
    - a. Mechanical rooms.
  4. Concealed in Ceilings and Interior Walls and Partitions: EMT.
  5. Connection to Vibrating Equipment (Including Transformers and Hydraulic, Pneumatic, Electric Solenoid, or Motor-Driven Equipment): FMC, except use LFMC in damp or wet locations.
  6. Damp or Wet Locations: GRC.
  7. Boxes and Enclosures: NEMA 250, Type 1, except use NEMA 250, Type 4 stainless steel in institutional and commercial kitchens and damp or wet locations.
- B. Minimum Raceway Size: 3/4-inch trade size.
- C. Raceway Fittings: Compatible with raceways and suitable for use and location.
  1. Rigid Steel Conduit: Use threaded rigid steel conduit fittings unless otherwise indicated. Comply with NEMA FB 2.10.
  2. EMT: Use compression, steel fittings. Comply with NEMA FB 2.10.
  3. Flexible Conduit: Use only fittings listed for use with flexible conduit. Comply with NEMA FB 2.20.



3.2 INSTALLATION

- A. Comply with NECA 1 and NECA 101 for installation requirements except where requirements on Drawings or in this article are stricter. Comply with NFPA 70 limitations for types of raceways allowed in specific occupancies and number of floors.
- B. Keep raceways at least 6 inches away from parallel runs of flues and steam or hot-water pipes. Install horizontal raceway runs above water and steam piping.
- C. Complete raceway installation before starting conductor installation.
- D. Comply with requirements in Section 260529 "Hangers and Supports for Electrical Systems" for hangers and supports.
- E. Arrange stub-ups so curved portions of bends are not visible above finished slab.
- F. Install no more than the equivalent of three 90-degree bends in any conduit run except for control wiring conduits, for which fewer bends are allowed. Support within 12 inches of changes in direction.
- G. Conceal conduit and EMT within finished walls, ceilings, and floors unless otherwise indicated. Install conduits parallel or perpendicular to building lines.
- H. Support conduit within 12 inches of enclosures to which attached.
- I. Stub-ups to Above Recessed Ceilings:
  - 1. Use EMT for raceways.
  - 2. Use a conduit bushing or insulated fitting to terminate stub-ups not terminated in hubs or in an enclosure.
- J. Threaded Conduit Joints, Exposed to Wet, Damp, Corrosive, or Outdoor Conditions: Apply listed compound to threads of raceway and fittings before making up joints. Follow compound manufacturer's written instructions.
- K. Raceway Terminations at Locations Subject to Moisture or Vibration: Use insulating bushings to protect conductors including conductors smaller than No. 4 AWG.
- L. Terminate threaded conduits into threaded hubs or with locknuts on inside and outside of boxes or cabinets. Install bushings on conduits up to 1-1/4-inch trade size and insulated throat metal bushings on 1-1/2-inch trade size and larger conduits terminated with locknuts. Install insulated throat metal grounding bushings on service conduits.
- M. Install raceways square to the enclosure and terminate at enclosures with locknuts. Install locknuts hand tight plus 1/4 turn more.
- N. Do not rely on locknuts to penetrate nonconductive coatings on enclosures. Remove coatings in the locknut area prior to assembling conduit to enclosure to assure a continuous ground path.
- O. Cut conduit perpendicular to the length. For conduits 2-inch trade size and larger, use roll cutter or a guide to make cut straight and perpendicular to the length.

- P. Install pull wires in empty raceways. Use polypropylene or monofilament plastic line with not less than 200-lb tensile strength. Leave at least 12 inches of slack at each end of pull wire. Cap underground raceways designated as spare above grade alongside raceways in use.
- Q. Install raceway sealing fittings at accessible locations according to NFPA 70 and fill them with listed sealing compound. For concealed raceways, install each fitting in a flush steel box with a blank cover plate having a finish similar to that of adjacent plates or surfaces. Install raceway sealing fittings according to NFPA 70.
- R. Install devices to seal raceway interiors at accessible locations. Locate seals so no fittings or boxes are between the seal and the following changes of environments. Seal the interior of all raceways at the following points:
1. Where conduits pass from warm to cold locations, such as boundaries of refrigerated spaces.
  2. Where otherwise required by NFPA 70.
- S. Comply with manufacturer's written instructions for solvent welding RNC and fittings.
- T. Expansion-Joint Fittings:
1. Install in each run of aboveground RNC that is located where environmental temperature change may exceed 30 deg F and that has straight-run length that exceeds 25 feet. Install in each run of aboveground EMT conduit that is located where environmental temperature change may exceed 100 deg F and that has straight-run length that exceeds 100 feet.
  2. Install fitting(s) that provide expansion and contraction for at least 0.00041 inch per foot of length of straight run per deg F of temperature change for PVC conduits. Install fitting(s) that provide expansion and contraction for at least 0.000078 inch per foot of length of straight run per deg F of temperature change for metal conduits.
  3. Install expansion fittings at all locations where conduits cross building or structure expansion joints.
  4. Install each expansion-joint fitting with position, mounting, and piston setting selected according to manufacturer's written instructions for conditions at specific location at time of installation. Install conduit supports to allow for expansion movement.
- U. Flexible Conduit Connections: Comply with NEMA RV 3. Use a maximum of 72 inches of flexible conduit for equipment subject to vibration, noise transmission, or movement; and for transformers and motors.
1. Use LFMC in damp or wet locations subject to severe physical damage.
  2. Use LFMC or LFNC in damp or wet locations not subject to severe physical damage.
- V. Mount boxes at heights indicated on Drawings. If mounting heights of boxes are not individually indicated, give priority to ADA requirements, and also refer to Architectural elevations. Install boxes with height measured to center of box unless otherwise indicated.

- W. Recessed Boxes in Masonry Walls: Saw-cut opening for box in center of cell of masonry block and install box flush with surface of wall. Prepare block surfaces to provide a flat surface for a raintight connection between box and cover plate or supported equipment and box.
- X. Horizontally separate boxes mounted on opposite sides of walls, so they are not in the same vertical channel.
- Y. Locate boxes so that cover or plate will not span different building finishes.
- Z. Support boxes of three gangs or more from more than one side by spanning two framing members or mounting on brackets specifically designed for the purpose.
- AA. Fasten junction and pull boxes to or support from building structure. Do not support boxes by conduits.
- BB. Set metal floor boxes level and flush with finished floor surface.

### 3.3 FIRESTOPPING

- A. Install firestopping at penetrations of fire-rated floor and wall assemblies. Comply with requirements in Division 07.

### 3.4 PROTECTION

- A. Protect coatings, finishes, and cabinets from damage and deterioration.
  - 1. Repair damage to galvanized finishes with zinc-rich paint recommended by manufacturer.
  - 2. Repair damage to PVC coatings or paint finishes with matching touchup coating recommended by manufacturer.

END OF SECTION 260533

## SECTION 260553 - IDENTIFICATION FOR ELECTRICAL SYSTEMS

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

#### 1.2 SUMMARY

- A. Section Includes:
  - 1. Identification for raceways.
  - 2. Identification of power and control cables.
  - 3. Identification for conductors.
  - 4. Miscellaneous identification products.

#### 1.3 ACTION SUBMITTALS

- A. Product Data: For each electrical identification product indicated.

#### 1.4 QUALITY ASSURANCE

- A. Comply with ANSI A13.1 and IEEE C2.
- B. Comply with NFPA 70.
- C. Comply with 29 CFR 1910.144 and 29 CFR 1910.145.
- D. Comply with ANSI Z535.4 for safety signs and labels.
- E. Adhesive-attached labeling materials, including label stocks, laminating adhesives, and inks used by label printers, shall comply with UL 969.

#### 1.5 COORDINATION

- A. Coordinate identification names, abbreviations, colors, and other features with requirements in other Sections requiring identification applications, Drawings, Shop Drawings, manufacturer's wiring diagrams, and the Operation and Maintenance Manual; and with those required by codes, standards, and 29 CFR 1910.145. Use consistent designations throughout Project.
- B. Coordinate installation of identifying devices with completion of covering and painting of surfaces where devices are to be applied.

- C. Coordinate installation of identifying devices with location of access panels and doors.
- D. Install identifying devices before installing acoustical ceilings and similar concealment.

## PART 2 - PRODUCTS

### 2.1 POWER AND CONTROL RACEWAY IDENTIFICATION MATERIALS

- A. Comply with ANSI A13.1 for minimum size of letters for legend and for minimum length of color field for each raceway size.
- B. Colors for Raceways Carrying Circuits at 600 V or Less:
  - 1. Black letters on an orange field.
  - 2. Legend: Indicate voltage and system or service type.
- C. Vinyl Labels for Raceways Carrying Circuits at 600 V or Less: Preprinted, flexible label laminated with a clear, weather- and chemical-resistant coating and matching wraparound clear adhesive tape for securing ends of legend label.

### 2.2 ARMORED AND METAL-CLAD CABLE IDENTIFICATION MATERIALS

- A. Comply with ANSI A13.1 for minimum size of letters for legend and for minimum length of color field for each cable size.
- B. Colors for Cables Carrying Circuits at 600 V and Less:
  - 1. Black letters on an orange field.
  - 2. Legend: Indicate voltage and system or service type.
- C. Vinyl Labels: Preprinted, flexible label laminated with a clear, weather- and chemical-resistant coating and matching wraparound clear adhesive tape for securing ends of legend label.

### 2.3 POWER AND CONTROL CABLE IDENTIFICATION MATERIALS

- A. Comply with ANSI A13.1 for minimum size of letters for legend and for minimum length of color field for each cable size.
- B. Vinyl Labels: Preprinted, flexible label laminated with a clear, weather- and chemical-resistant coating and matching wraparound clear adhesive tape for securing ends of legend label.

### 2.4 CONDUCTOR IDENTIFICATION MATERIALS

- A. Color-Coding Conductor Tape: Colored, self-adhesive vinyl tape not less than 3 mils thick by 1 to 2 inches wide.

2.5 CABLE TIES

- A. Plenum-Rated Cable Ties: Self-extinguishing, UV stabilized, one-piece, self locking.
  - 1. Minimum Width: 3/16 inch.
  - 2. Tensile Strength at 73 deg F, According to ASTM D 638: 7000 psi.
  - 3. UL 94 Flame Rating: 94V-0.
  - 4. Temperature Range: Minus 50 to plus 284 deg F.
  - 5. Color: Black.

2.6 MISCELLANEOUS IDENTIFICATION PRODUCTS

- A. Paint: Comply with requirements in painting Sections for paint materials and application requirements. Select paint system applicable for surface material and location (exterior or interior).
- B. Fasteners for Labels and Signs: Self-tapping, stainless-steel screws or stainless-steel machine screws with nuts and flat and lock washers.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Verify identity of each item before installing identification products.
- B. Location: Install identification materials and devices at locations for most convenient viewing without interference with operation and maintenance of equipment.
- C. Apply identification devices to surfaces that require finish after completing finish work.
- D. Self-Adhesive Identification Products: Clean surfaces before application, using materials and methods recommended by manufacturer of identification device.
- E. Attach signs and plastic labels that are not self-adhesive type with mechanical fasteners appropriate to the location and substrate.
- F. System Identification Color-Coding Bands for Raceways and Cables: Each color-coding band shall completely encircle cable or conduit. Place adjacent bands of two-color markings in contact, side by side. Locate bands at changes in direction, at penetrations of walls and floors, at 50-foot maximum intervals in straight runs, and at 25-foot maximum intervals in congested areas.
- G. Cable Ties: For attaching tags. Use general-purpose type, except as listed below:
  - 1. In Spaces Handling Environmental Air: Plenum rated.
- H. Painted Identification: Comply with requirements in painting Sections for surface preparation and paint application.

3.2 IDENTIFICATION SCHEDULE

- A. Accessible Raceways and Metal-Clad Cables, 600 V or Less, for Branch Circuits More Than 30 A, and 120 V to ground: Identify with self-adhesive vinyl label. Install labels at 10-foot maximum intervals.
- B. Accessible Raceways and Cables within Buildings: Identify the covers of each junction and pull box of the following systems with self-adhesive vinyl labels with the wiring system legend and system voltage. System legends shall be as follows:
  - 1. Emergency Power.
  - 2. Power.
  - 3. UPS.
- C. Power-Circuit Conductor Identification, 600 V or Less: For conductors in vaults, pull and junction boxes, manholes, and handholes, use color-coding conductor tape to identify the phase.
  - 1. Color-Coding for Phase and Voltage Level Identification, 600 V or Less: Use colors listed below for ungrounded service feeder and branch-circuit conductors.
    - a. Color shall be factory applied or field applied for sizes larger than No. 8 AWG, if authorities having jurisdiction permit.
    - b. Colors for 208/120-V Circuits:
      - 1) Phase A: Black.
      - 2) Phase B: Red.
      - 3) Phase C: Blue.
      - 4) Grounded (Neutral): White.
      - 5) Ground: Green.
    - c. Colors for 480/277-V Circuits:
      - 1) Phase A: Brown.
      - 2) Phase B: Orange.
      - 3) Phase C: Yellow.
      - 4) Grounded (Neutral): Gray.
      - 5) Ground: Green.
    - d. Field-Applied, Color-Coding Conductor Tape: Apply in half-lapped turns for a minimum distance of 6 inches from terminal points and in boxes where splices or taps are made. Apply last two turns of tape with no tension to prevent possible unwinding. Locate bands to avoid obscuring factory cable markings.
- D. Install instructional sign including the color-code for grounded and ungrounded conductors using adhesive-film-type labels.
- E. Control-Circuit Conductor Identification: For conductors and cables in pull and junction boxes, manholes, and handholes, use self-adhesive, self-laminating polyester labels with the conductor or cable designation, origin, and destination.

- F. Control-Circuit Conductor Termination Identification: For identification at terminations provide heat-shrink preprinted tubes or self-adhesive, self-laminating polyester labels with the conductor designation.
- G. Conductors to Be Extended in the Future: Attach marker tape to conductors and list source.
- H. Auxiliary Electrical Systems Conductor Identification: Identify field-installed alarm, control, and signal connections.
  - 1. Identify conductors, cables, and terminals in enclosures and at junctions, terminals, and pull points. Identify by system and circuit designation.
  - 2. Use system of marker tape designations that is uniform and consistent with system used by manufacturer for factory-installed connections.
  - 3. Coordinate identification with Project Drawings, manufacturer's wiring diagrams, and the Operation and Maintenance Manual.
- I. Equipment Identification Labels: On each unit of equipment, install unique designation label that is consistent with wiring diagrams, schedules, and the Operation and Maintenance Manual. Apply labels to disconnect switches and protection equipment, central or master units, control panels, control stations, terminal cabinets, and racks of each system. Systems include power, lighting, control, communication, signal, monitoring, and alarm systems unless equipment is provided with its own identification.
  - 1. Labeling Instructions:
    - a. Indoor Equipment: Adhesive film label with clear protective overlay. Unless otherwise indicated, provide a single line of text with 1/2-inch- high letters on 1-1/2-inch- high label; where two lines of text are required, use labels 2 inches high.
    - b. Elevated Components: Increase sizes of labels and letters to those appropriate for viewing from the floor.
    - c. Unless provided with self-adhesive means of attachment, fasten labels with appropriate mechanical fasteners that do not change the NEMA or NRTL rating of the enclosure.
  - 2. Equipment to Be Labeled:
    - a. Panelboards: Typewritten directory of circuits in the location provided by panelboard manufacturer. Panelboard identification shall be, laminated acrylic or melamine label.
    - b. Enclosures and electrical cabinets.
    - c. Access doors and panels for concealed electrical items.

END OF SECTION 260553



## SECTION 262726 - WIRING DEVICES

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

#### 1.2 SUMMARY

- A. Section Includes:
  - 1. Receptacles, receptacles with integral GFCI, and associated device plates.
  - 2. Tamper-resistant receptacles.
  - 3. Floor service outlets, poke-through assemblies, service poles, and multioutlet assemblies.

#### 1.3 DEFINITIONS

- A. EMI: Electromagnetic interference.
- B. GFCI: Ground-fault circuit interrupter.
- C. Pigtail: Short lead used to connect a device to a branch-circuit conductor.
- D. RFI: Radio-frequency interference.
- E. SPD: Surge Protective Device.
- F. UTP: Unshielded twisted pair.

#### 1.4 ADMINISTRATIVE REQUIREMENTS

- A. Coordination:
  - 1. Receptacles for Owner-Furnished Equipment: Match plug configurations.
  - 2. Cord and Plug Sets: Match equipment requirements.

#### 1.5 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Shop Drawings: List of legends and description of materials and process used for pre-marking wall plates.

- C. Samples: One for each type of device and wall plate specified, in each color specified.

#### 1.6 INFORMATIONAL SUBMITTALS

- A. Field quality-control reports.

#### 1.7 CLOSEOUT SUBMITTALS

- A. Operation and Maintenance Data: For wiring devices to include in all manufacturers' packing-label warnings and instruction manuals that include labeling conditions.

### PART 2 - PRODUCTS

#### 2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
  - 1. Cooper Wiring Devices, Inc.
  - 2. Hubbell.
  - 3. Leviton Manufacturing Co., Inc.
  - 4. Pass & Seymour/Legrand (Pass & Seymour).
- B. Source Limitations: Obtain each type of wiring device and associated wall plate from single source from single manufacturer.

#### 2.2 GENERAL WIRING-DEVICE REQUIREMENTS

- A. Wiring Devices, Components, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
- B. Comply with NFPA 70.
- C. Devices that are manufactured for use with modular plug-in connectors may be substituted under the following conditions:
  - 1. Connectors shall comply with UL 2459 and shall be made with stranding building wire.
  - 2. Devices shall comply with the requirements in this Section.

#### 2.3 STRAIGHT-BLADE RECEPTACLES

- A. Convenience Receptacles, 125 V, 20 A: Comply with NEMA WD 1, NEMA WD 6 Configuration 5-20R, UL 498, and FS W-C-596.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
  - a. Cooper Wiring Devices, Inc.
  - b. Hubbell.
  - c. Leviton Manufacturing Co., Inc.
  - d. Pass & Seymour/Legrand (Pass & Seymour).
- B. Tamper-Resistant Convenience Receptacles, 125 V, 20 A: Comply with NEMA WD 1, NEMA WD 6 Configuration 5-20R, UL 498 Supplement sd, and FS W-C-596.
  1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
    - a. Cooper Wiring Devices, Inc.
    - b. Hubbell Premise Wiring.
    - c. Leviton Manufacturing Co., Inc.
    - d. Pass & Seymour/Legrand (Pass & Seymour).
  2. Description: Labeled shall comply with NFPA 70, "Health Care Facilities" Article, "Pediatric Locations" Section.

## 2.4 WALL PLATES

- A. Single and combination types shall match corresponding wiring devices.
  1. Plate-Securing Screws: Metal with head color to match plate finish.
  2. Material for Finished Spaces: 0.035-inch- thick, satin-finished, Type 302 stainless steel.
  3. Material for Unfinished Spaces: **Galvanized steel.**
  4. Material for Damp Locations: Cast aluminum with spring-loaded lift cover, and listed and labeled for use in wet and damp locations.

## 2.5 FLOOR SERVICE FITTINGS

- A. Type: Modular, flap-type, dual-service units suitable for wiring method used.
- B. Compartments: Barrier separates power from voice and data communication cabling.
- C. Service Plate: Rectangular, solid brass with satin finish.

## 2.6 FINISHES

- A. Device Color:
  1. Wiring Devices Connected to Normal Power System: Ivory unless otherwise indicated or required by NFPA 70 or device listing.

- B. Wall Plate Color: For plastic covers, match device color.

### PART 3 - EXECUTION

#### 3.1 INSTALLATION

- A. Comply with NECA 1, including mounting heights listed in that standard, unless otherwise indicated.
- B. Coordination with Other Trades:
  - 1. Protect installed devices and their boxes. Do not place wall finish materials over device boxes and do not cut holes for boxes with routers that are guided by riding against outside of boxes.
  - 2. Keep outlet boxes free of plaster, drywall joint compound, mortar, cement, concrete, dust, paint, and other material that may contaminate the raceway system, conductors, and cables.
  - 3. Install device boxes in brick or block walls so that the cover plate does not cross a joint unless the joint is troweled flush with the face of the wall.
  - 4. Install wiring devices after all wall preparation, including painting, is complete.
- C. Conductors:
  - 1. Do not strip insulation from conductors until right before they are spliced or terminated on devices.
  - 2. Strip insulation evenly around the conductor using tools designed for the purpose. Avoid scoring or nicking of solid wire or cutting strands from stranded wire.
  - 3. The length of free conductors at outlets for devices shall meet provisions of NFPA 70, Article 300, without pigtails.
  - 4. Existing Conductors:
    - a. Cut back and pigtail, or replace all damaged conductors.
    - b. Straighten conductors that remain and remove corrosion and foreign matter.
    - c. Pigtailling existing conductors is permitted, provided the outlet box is large enough.
- D. Device Installation:
  - 1. Replace devices that have been in temporary use during construction and that were installed before building finishing operations were complete.
  - 2. Keep each wiring device in its package or otherwise protected until it is time to connect conductors.
  - 3. Do not remove surface protection, such as plastic film and smudge covers, until the last possible moment.
  - 4. Connect devices to branch circuits using pigtails that are not less than 6 inches in length.
  - 5. When there is a choice, use side wiring with binding-head screw terminals. Wrap solid conductor tightly clockwise, two-thirds to three-fourths of the way around terminal screw.
  - 6. Use a torque screwdriver when a torque is recommended or required by manufacturer.

7. When conductors larger than No. 12 AWG are installed on 15- or 20-A circuits, splice No. 12 AWG pigtails for device connections.
8. Tighten unused terminal screws on the device.
9. When mounting into metal boxes, remove the fiber or plastic washers used to hold device-mounting screws in yokes, allowing metal-to-metal contact.

E. Receptacle Orientation:

1. Install ground pin of vertically mounted receptacles up, and on horizontally mounted receptacles to the right.
2. Install hospital-grade receptacles in patient-care areas with the ground pin or neutral blade at the top.

F. Device Plates: Do not use oversized or extra-deep plates. Repair wall finishes and remount outlet boxes when standard device plates do not fit flush or do not cover rough wall opening.

G. Arrangement of Devices: Unless otherwise indicated, mount flush, with long dimension vertical and with grounding terminal of receptacles on top. Group adjacent switches under single, multigang wall plates.

H. Adjust locations of floor service outlets and service poles to suit arrangement of partitions and furnishings.

### 3.2 IDENTIFICATION

A. Comply with Section 260553 "Identification for Electrical Systems."

B. Identify each receptacle with panelboard identification and circuit number. Use hot, stamped, or engraved machine printing with black-filled lettering on face of plate, and durable wire markers or tags inside outlet boxes.

### 3.3 FIELD QUALITY CONTROL

A. Perform the following tests and inspections:

1. Test Instruments: Use instruments that comply with UL 1436.

B. Tests for Convenience Receptacles:

1. Line Voltage: Acceptable range is 105 to 132 V.
2. Percent Voltage Drop under 15-A Load: A value of 6 percent or higher is unacceptable.
3. Ground Impedance: Values of up to 2 ohms are acceptable.
4. Using the test plug, verify that the device and its outlet box are securely mounted.
5. Tests shall be diagnostic, indicating damaged conductors, high resistance at the circuit breaker, poor connections, inadequate fault current path, defective devices, or similar problems. Correct circuit conditions, remove malfunctioning units and replace with new ones, and retest as specified above.

C. Wiring device will be considered defective if it does not pass tests and inspections.

- D. Prepare test and inspection reports.

END OF SECTION 262726

## SECTION 27 4100 - GENERAL CONDITIONS FOR INTEGRATED AUDIOVISUAL SYSTEMS

## PART 1 - GENERAL

## 1.1 REFERENCE TO OWNER'S GENERAL CONDITIONS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other contract documents, apply to this Section.

## 1.2 RELATED DOCUMENTS

- A. Refer to the following Sections for specifications related to the Work:
  - 1. Section 27 4116 – Audiovisual Specification

## 1.3 RELATED WORK

- A. AV Contractor shall coordinate with the General Contractor on all locations for audio visual equipment and routing of audio, video, control, and power cables/raceway from equipment, terminal and pull boxes to system equipment racks, where applicable.

## 1.4 DEFINITIONS

- A. The following shall serve as general identifiers as specified herein:
  - 1. Owner – Arlington County
  - 2. Contractor – The Contractor is the firm submitting a proposal to furnish and install the Work as defined within this Specification.
  - 3. Project – The Project is the Audiovisual Systems installation in the renovated space, for the Owner.
  - 4. Work – The term “Work” means all construction and services specified within this document. The Work includes all related labor, materials, equipment, and services provided, or to be provided, by the Contractor to fulfill the proposal’s obligations.
  - 5. Drawings – The term “Drawings” means all Audiovisual Systems Drawings and associated sketches, details, riser diagrams, etc.
- B. As used in the Drawings and Specifications for the Work, certain non-technical words and phrases shall be understood to have specific meanings as follows, regardless of indications to the contrary in the General Conditions or other documents governing the Work.
  - 1. “Furnish” – Purchase and deliver to the project site, complete with every necessary appurtenance and support, all as part of the Audio Visual Systems Work. Purchasing shall include payment of all sales taxes and other surcharges as may be required to assure that purchased items are free of all liens, claims, or encumbrances.

2. "Install" – Unload at the delivery point at the site and perform every operation necessary to establish secure mounting and correct operation at the proper location in the project, all as part of the Work.
  3. "New" – Manufactured within the past year and never before used.
  4. "Provide" – Furnish and Install.
  5. "OFE" – equipment to be provided by the Owner
- C. Regardless of their usage in codes or other industry standards, certain words or phrases as used in the Drawings or Specifications for the Work, shall be understood to have the specific meanings as ascribed to them in the following list:
1. "Circuitry" – Any Work which consists of wires, cables, raceways, and/or specialty wiring method assemblies complete with associated junction boxes, pull boxes, outlet boxes, joints, couplings, splices, and connections except where limited to a lesser meaning by specific description.
  2. "Concealed" (as applied to circuitry) – Covered completely by building materials, except for penetrations (by boxes and fittings) to a level flush with the surface as necessitated by functional or specified accessibility requirements.
  3. "Exposed" (as applied to circuitry) – Not covered in any way by building materials.
  4. "Normal Work Conditions" – Locations within building confines that are not damp, wet, or hazardous and that are not used for air handling.
  5. "Patch Panel" – A System of terminal blocks, patch cords, and backboards that facilitate administration of cross-connecting cables.
  6. "Raceway" – Any pipe, duct, extended enclosure, or conduit (as specified for a particular System) which is used to contain wires and which is of such nature as to require that the wires be installed by a "pulling in" procedure.
  7. "Riser" – Shall refer to the portion of the installation that transmits between building floors (or between Audiovisual Systems rooms), also referred to as "Backbone Cabling".
  8. "Audiovisual Closet" – The enclosed area or room specifically designated for the routing, termination, and/or cross connecting of Audiovisual Systems cable (i.e. riser cable) to other Audiovisual Systems cable and/or equipment.
  9. "AV System(s)" – Audiovisual System(s), includes all components contained herein that work in conjunction to create and completely integrated and fully functioning system as described within the Drawings and Specifications



## 1.5 SCOPE OF WORK

- A. General: Provide audiovisual systems design, engineering, and installation within the building. Systems are to include all devices, equipment, installation, programming and commissioning in accordance with requirements of the contract documents and drawings.
  - 1. The Work detailed within the Contract Documents has been specified to meet certain requirements for performance, appearance, and costs. It shall be the responsibility of the Contractor to implement the guidelines and requirements contained in the Contract Documents and translate them into a complete design package containing all elements necessary for a complete, operational, and functionally integrated Audiovisual System(s).
  - 2. Provide all work as detailed in the Contract Documents as a turnkey installation including all material, labor, engineering, warranties, taxes, freight, and permits. Only items and requirements specifically stated to be provided by others shall not be a requirement for this Section of the Work.
- B. Work Specified Elsewhere
  - 1. Installation and termination of network systems.
  - 2. Cutting, patching and painting of walls, unless damaged performing the work described herein.
  - 3. Moveable furniture, desks, and chairs.
- C. Coordinated Work
  - 1. Coordinate with related trades to schedule the Work and ensure a complete installation in accordance with the schedule outlined by the Owner.
  - 2. Coordinate all IP device requirements with the Data vendor, Owner, and Contractor.
  - 3. Coordinate all network connectivity requirements with the low voltage cabling contractor and Owner.
  - 4. Coordinate all wall blocking/backing to support AV device mounting.
  - 5. Coordinate all projector mount structure and location
  - 6. Provide NEMA electrical power conditioning components for installation by the Electrical Contractor in a timely manner.

## 1.6 GENERAL CONDITIONS

- A. The Contractor represents that they are familiar with, and have expertise in the Work of this nature and scope. The Contractor further agrees that they shall provide all Work as may be required to make a complete job of that which may not be fully defined in the Programmatic Documents.
- B. The Contractor shall comply with all of the regulations, including safety regulations of national, city, local and other government agencies having jurisdiction concerning the work of the Contractor. The Contractor shall give all notices and comply with all laws, ordinances, codes, rules, and regulations bearing on the conduct of the Work. If the Contractor performs any work, which

- is contrary to such laws, ordinances, codes, rules and regulations, they shall make all changes for compliance and bear all associated costs.
- C. The Contractor shall be responsible to provide and maintain a storage facility. If this storage facility is required to be on-site it shall be the Contractor's responsibility to coordinate the size and spatial requirements with the Owner. The Contractor shall assume full responsibility for the storage facility and all contents, unless otherwise indicated by the Owner.
  - D. The Contractor shall provide all protection necessary to safeguard their work from damage by their operations and the operations of others. Unless the Contractor proves to the Owner's satisfaction that the Work has been damaged by others, the Contractor shall promptly repair, adjust, and clean all defective installations and bear all associated costs.
  - E. All of the Contractor's work shall be tested and inspected by all authorities having jurisdiction and in accordance with all Specifications. The Contractor shall coordinate and cooperate fully and shall provide at no additional cost to the Owner, manpower, blueprints, facilities, scaffolds, etc. to reasonably assist the inspectors.
  - F. The project documentation is, in general, diagrammatic and/or developed to communicate design intent. The Contractor shall coordinate the installation of all devices and/or equipment with the Owner prior to installation based on the existing field conditions.
  - G. The Contractor shall examine the site and the Programmatic Documents and review with the Owner the designated areas of access, delivery, and storage for the Contractor's use. The Contractor agrees that such areas are satisfactory and sufficient for their needs in the completion of their work and in conformance with the terms of this Contract.
  - H. The Owner reserves the right to furnish any materials necessary for the Project.
  - I. All permits required for any part of the Contractor's work shall be procured and paid for by the Contractor. The Contractor shall determine all permits required and transmit this information to the Owner.
  - J. The Contractor warrants that both they and their subcontractors are licensed as required by the authorities having jurisdiction and as required by local ordinances.
  - K. The Contractor must state if they intend to utilize a subcontractor, and provide said subcontractor's name and address. The subcontractor shall comply with all the same rules, regulations, laws and codes, licenses, etc. as required by the Contractor and as specified herein. The Owner reserves the right to approve or disapprove any subcontractor proposed by Contractor.
  - L. The Owner shall provide to the Contractor AutoCAD backgrounds for all required floor plans for the facility. All pre-fabrication and record drawings required for the Project and as stated herein, shall be completed within the latest version of AutoCAD.
  - M. The Contractor, upon receiving notice from Owner that the Contractor has furnished inferior, improper or unsound work or materials (including equipment), or work or materials at variance with that which is specified, will, within 24 hours, proceed to remove such work or materials and make good all other work or materials damaged thereby, and, at the option of the Owner, the Contractor shall immediately replace such work or materials with work or materials as specified. The removal, replacement, and repair shall be performed at such times and with

manpower sufficient, in the judgment of the Owner, so as to avoid disturbance to occupants, or other ongoing work for the Project.

1. If the Contractor does not remove such unsound Work within a reasonable time, the Owner may remove it and may store the material at the expense of the Contractor. If the Contractor does not pay the expenses of such removal within ten (10) days time thereafter, the Owner may, upon written notice, sell such materials at auction or at private sale and shall account for the net proceeds thereof, after deducting all the costs and expenses that should have been borne by the Contractor and all expenses of the sale.
  2. The Owner shall have the authority at all times, until final completion and acceptance of the Work, to inspect and reject work and materials which in its judgment are not in conformity with the Drawings and Details, and Specifications, and its decision in regard to character and value of Work shall be final and conclusive on both contracting parties. If the Owner permits said Work or materials to remain, the Owner shall be allowed the difference in value or shall at its election have the right to have said Work or materials repaired or replaced, as well as the damage caused thereby, at the expense of the Contractor, at any time within one (1) year after the completion of the entire project, or within such longer period as may be covered by any guaranty; and neither payments made to the Contractor, nor any other acts of the Owner, shall be construed as evidence of acceptance, waiver, or estoppels.
  3. Any expense incurred by the Owner in connection with the foregoing, shall be borne by the Contractor, and the Owner may withhold money due to the Contractor or recover money already paid to the Contractor, to the extent of such expense.
- N. It shall be understood that Specifications and Drawings are complementary. Where there are conflicts within the documents, the overall design intent shall govern.
- O. To the extent that they govern the Work, the Program documents, Specifications and Drawings also govern change order Work, if any.
- P. The Drawings for the Work utilize symbols and schematic diagrams that have no dimensional significance. The Work shall be installed to fulfill the diagrammatic intent expressed on the Drawings, field layouts, and shop drawings of all trades
- Q. Certain details appear on the Drawings for the Work that are specified with regard to the dimensioning and positioning of the Work. These are intended only for general information purposes. They do not obviate field coordination for individual items of the indicated Work.
- R. Information as to general construction and architectural general construction and architectural features and finishes shall be derived from the structural and architectural drawings and specifications, are may require ongoing coordination with the Design Professional.
- S. Ratings of devices, materials, and equipment specified without reference to specific performance criteria shall be understood to be nominal or nameplate ratings established by means of industry standard procedures.

- T. It is the intent of the Drawings and Specifications to provide complete operating Audio Visual Systems. All Work necessary to provide such a System shall be performed. Any discrepancies shall be brought to the Owner's attention.
- U. The Work called for under this Contract shall be carried on simultaneously with the Work of other trades and Owner functions in such a manner as to not delay the overall progress of the construction project. The Contractor is responsible for all coordination of the Work with other trades.
- V. Include in the Work all necessary supervision and issuing of all coordination information to any other trades who are supplying work to accommodate the Audio Visual Systems installation.
- W. For items of equipment which are to be installed but not purchased as part of the Work, the Work shall include:
  - 1. Coordination of delivery
  - 2. Unloading from delivery trucks
  - 3. Safe handling and field storage up to the time of permanent placement in the project
  - 4. Correction of any damage to the item(s)
  - 5. Mounting in place and connection(s) as specified
- X. Items which are to be installed, but not purchased as part of the Work shall be carefully examined upon delivery to the project. Claims that any of these items have been received in such condition that their installation will require procedures beyond the reasonable scope of the Work will be considered only if presented in writing within one (1) week of the date of delivery to the project of the items in question. The Work includes all procedures necessary to put in satisfactory operation all items for which no claims have been submitted as outlined above.
- Y. It is the Contractor's responsibility to ensure that the information is complete and accurate. Any errors or omissions in the ordering information will be the responsibility of the Contractor.

#### 1.7 PROJECT MANAGEMENT

- A. The Contractor shall provide a Project Manager to oversee and coordinate all activities on the Project
- B. Project Manager's Duties and Responsibilities:
  - 1. The Contractor shall provide to the Owner, as a part of the prefabrication submittal, the name of the Project Manager that will provide all duties and responsibilities as specified herein, during the term of the project.
  - 2. The Project Manager shall maintain the ability of making all managerial decisions on behalf of the Contractor on a day-to-day basis, and shall retain the authority of accepting notices of deduction, inspection reports, payment schedules and any other project related correspondence on behalf of the Owner.
  - 3. The Project Manager shall schedule and attend project management meetings, during which time all System related issues are discussed, scheduled, confirmed, and/or resolved.

4. The Project Manager shall be available during normal business hours and within two (2) hours by telephone during the term of the project.
  - a. After normal business hours, the Project Manager shall be available within four (4) hours by telephone during the term of the project.
  - b. In the event that the Project Manager is not available within the allotted time frame, the Contractor may designate another employee to temporarily act as the Project Manager in all correspondence with the Owner.
  - c. The Contractor shall ensure that any individual temporarily assuming the duties of the Project Manager is at equal or higher level in the Contractor's managerial chain of command.
5. Upon notification by the Owner, of any project related installation issue, or issue that may contradict the Specifications as stated herein, the Project Manager shall respond to such issue, verbally and/or in writing within an eight (8) hour period
  - a. Responses to such issues as stated above shall include a clear understanding of the issue, along with a tentative plan of action, reflecting milestones and/or deadlines to resolve the issue.
  - b. Where appropriate, based on the overall importance of the project issue, the Project Manager shall follow-up their initial response with a written response to the issue within 24 hours of identification of the issue.
6. Prior to the initiation of the Work, the Project Manager shall submit a schedule reflecting key milestones of the Work, including but not limited to the following:
  - a. Offer award
  - b. Kick-off meeting
  - c. Submittals
  - d. Ordering and delivery of equipment
  - e. On site wire pull
  - f. Rack Fabrication
  - g. Field equipment installation
  - h. Control System programming
  - i. Project management schedule
  - j. Installation completion date
  - k. System training
  - l. Delivery of As-Built documentation
  - m. Delivery of Operations & Maintenance Manuals
  - n. Final System test
  - o. Acceptance of System
7. The Project Manager shall update the schedule on a weekly basis to reflect the status of each key milestone as the Work progresses.
8. As the System installation progresses, the Project Manager shall be capable of discussing any/or all of the above mentioned items at the request of the Owner, and shall address each item, as it relates to the current status of the Work.

## 1.8 REFERENCES

- A. The Audiovisual Systems shall be installed in accordance with the latest applicable revisions pertaining to all applicable national, state, and local codes and standards including, but not limited to the following:
1. International Building Code (IBC)
  2. NFPA-72 National Fire Alarm and Signaling Code
  3. International and National Electric Codes (IEC/ NEC)
    - i. IEC 60268-16 Third Edition 2003-05 Objective rating of speech intelligibility
  4. ANSI/Infocomm
    - i. 1M:2009 Audio Coverage Uniformity Standard in Enclosed Listener Areas
    - ii. 2M:2010 Standard Guide for Audiovisual Systems Design and Coordination
    - iii. 3M:2011 Projected Image System Contrast Ratio
    - iv. X3T9.5 FDDI
    - v. X3T9.5 CDDI
  5. Sustainable Technology Environments Program
  6. Underwriters Laboratories, Inc. (UL)
  7. Society of Motion Picture and Television Engineers (SMPTE)
  8. Building Industry Consulting Service International (BICSI)  
Telecommunications Distribution Methods Manual – latest edition
  9. ANSI/TIA/EIA-568-B – Commercial Building Telecommunications Cabling Standard
  10. ANSI/TIA/EIA-569 – Commercial Building Standards for Telecommunications Pathways and Spaces
  11. ANSI/TIA/EIA-606-A. Administration Standard for Commercial Telecommunications Infrastructure
  12. ANSI J-STD-607-A, Commercial Building Grounding (Earthing) and Bonding Requirements for Telecommunications
  13. EIA RS-232 Serial Communications Electrical Interface
  14. EIA RS-310-C Racks, Panels and Associated Equipment
  15. FCC Part 15
  16. FCC Part 68
  17. IEE 802.3
  18. IEEE 802.5
  19. Article 770 Optical Fiber Cables
  20. Article 800 Communications Circuits
  21. NFPA 70 National Electrical Code
  22. NFPA 75 Protection of Electronic Computer/Data Processing Equipment

23. United States Green Building Council (USGBC); Leadership in Energy & Environmental Design(LEED): Green Building Rating System for New Construction & Major Renovations (NC) Version 3.0 (2009) [www.usgbc.org](http://www.usgbc.org)

- B. Submit references for three projects completed within the last 3 years with similar size and scope criteria to the Project. Submit project details including quantity and fit-out of audio spaces, quantity and type of mixing systems, quantity and type of amplification systems, etc.

#### 1.9 SYSTEM DESCRIPTION

- A. Any item not specifically shown on the drawings or called for in the specifications, but normally required to conform to the intent, are to be considered as part of the Work.
- B. Any given item of equipment or material shall be the product of one manufacturer throughout the facility. Multiple manufacturers of any one item will not be permitted, unless specifically noted otherwise.
- C. These specifications are equipment and performance specifications and are considered to be one all encompassing package with the drawings. Actual installation shall be as engineered by the CONTRACTOR with prior approval by the Design Professional.
- D. Provide audiovisual devices and equipment with performance levels and capacities as noted herein.

#### 1.10 SUBMITTALS

- A. Furnish submittals in accordance with general requirements specified in Division 1, SUBMITTAL PROCEDURES
- B. Prefabrication Submittals
1. Submit pre-fabrication submittals in accordance with the Owner's construction schedule.
  2. Pre-fabrication submittals shall consist of product data, shop drawings, samples, and a detailed completion schedule. Partial submittals will not be accepted without prior written approval from the Design Professional.
  3. Pre-fabrication submittals shall be furnished in electronic formats as defined by the General Conditions under Part 1 of the Project Specifications.
  4. No portion of the Work shall commence nor shall any equipment be procured until the Design Professional has approved the pre-fabrication submittals in writing.
  5. A letter of transmittal identifying the name of the Project, Contractor's name, date submitted for review, shall accompany pre-fabrication submittals and a list of items transmitted.
- C. Product data required as part of the pre-fabrication submittal shall include the following:

1. Submit manufacturer's product data sheets for all materials and equipment proposed for use on the project sorted by room and indexed.
  2. Submit manufacturer's product data sheets for all fire stopping materials proposed for use on the project.
  3. Equipment schedules listing all System components, manufacturer, model number and the quantity of each
  4. General functional descriptions for each System
  5. Manufacturer's data specification sheets for all System components, including any warranty information.
    - a. Mark each product data sheet to show applicable choices and options (sheets containing more than one device or component model number shall be clearly marked to delineate items included in the Work)
    - b. Manufacturer's Data: For each manufactured device submit manufacturers' specifications and print photograph of the proposed device. Include engineering descriptions, principle of operation, application, and proposed model, style or size clearly indicated.
  6. A complete list of cable and wiring types, sizes, manufacturer, and model number
  7. A complete list of finishes and sample graphics, including custom art work and custom graphics (if applicable)
  8. List of parts inventory to provide manufacturer recommended service and maintenance of the Work
- D. Shop Drawings shall include the following:
1. Detailed plan views and elevations of AV Control and/or Headend rooms (in addition to relevant telecommunications rooms) showing raceway, sleeves, cable tray, cable paths, equipment racks, equipment cabinets, termination blocks, power receptacles and grounding bus bars.
  2. Drawings to show evidence of coordination with other trades.
  3. Cable run sheets denoting cable type, signal type, termination type, cable number designation, start point and end point.
  4. Cable termination schedules showing cable transmission and device location. Provide schedules in printed and electronic format.
  5. Floor plan drawings indicating device locations with device legends
  6. System riser diagram with all devices, wire runs, and wire designations
  7. Schematic block diagrams for each System showing all equipment, interconnects, data flow, etc.



8. Wiring diagrams for each subsystem defining the interconnection of all inputs and outputs for all equipment
  9. Fabrication shop drawings for all custom equipment (if applicable)
  10. Plans and elevations of the Audiovisual equipment racks and/or custom furniture (including consoles, desks, and lecterns) quantifying all equipment to be mounted therein
  11. The Contractor shall submit samples of any equipment components upon request of the Owner. Samples submitted shall be the latest version of equipment.
  12. It is the responsibility of the Contractor to confirm all dimensions, quantities, and the coordination of materials and products supplied by the Contractor with other trades. Approval of shop drawings containing errors does not relieve the Contractor from making corrections at their expense.
- E. Record Documentation shall include all information required in the Pre-fabrication Submittals but revised to reflect "as installed" conditions.
1. General Description and Requirements
    - a. Submit Record Documentation in accordance with the Design Professional's construction schedule.
    - b. Record Documentation shall consist of Record Drawings and Operation and Maintenance Manuals.
    - c. Provide a letter of transmittal with Record Documentation identifying the name of the Project, Contractor's name, date submitted for review, and a list of items transmitted.
    - d. Prior to the final acceptance of the Work, submit two draft sets of the Record Drawings portion of Record Documentation to the Design Professional. The draft copy shall be used during the final acceptance testing by the Design Professional.
    - e. Update all record documentation to reflect changes or modifications made during final acceptance testing as required and submit three blue/black lines and one reproducible set.
    - f. Provide cable test results for all cables installed under this Work, tested and documented as described herein.
    - g. Provide Owner with Operation and Maintenance Manuals including wiring diagrams, parts lists, shop drawings and manufacturers' information on all equipment and cables provided by the Contractor. Manuals shall be provided in a high quality, 3-ring binder and completely indexed.
    - h. Provide Owner with all systems programming on electronic media. All programming and source code is to be considered as a work for hire and will be the property of the Owner upon completion of the project.
    - i. Provide Owner with a full set of installation pictures of any work that is not visible, including but not limited to:
      - 1) Equipment Rack population
      - 2) Finished Ceiling population
      - 3) Wall box product population

- 4) Large Screen Display Wall Mount
  - 5) Under Table product population
  - 6) Above Table product population
  - 7) Overall Room Perspective
2. Record Drawings
- a. Produce all Record "as-built" Drawings using the latest version of AutoCAD. Record drawings shall, at a minimum, include the following:
    - 1) Floor plan drawings indicating device locations, with device legends indicating manufacturers and model numbers for each device
    - 2) Floor plan drawings indicating wire routing, wire routing shall be delineated in straight line runs and be tagged with cable identification and terminal strip numbers to coincide with the installation
    - 3) Mounting details for all equipment and hardware
    - 4) Functional block diagrams for each subsystem
    - 5) Wiring details showing rack elevations, equipment wiring and terminations, and inter-rack wiring
    - 6) Wiring diagrams for all custom circuitry including interfaces to various control output controlled devices, lighting control interfaces, projections screens, operable window treatments, motorized doors/partitions, etc.
    - 7) Wiring diagrams for each System, wiring diagrams shall be identical to those laminated and located within the door of
    - 8) Typical point-to-point wiring diagrams for each piece of equipment and groups of equipment within the System
    - 9) Layout details for each riser location, including Audiovisual panels, power supplies, junction boxes, conduit, and any other Audiovisual related equipment
3. Operation and Maintenance Manuals
- a. Operation and Maintenance Manuals shall apply to all Audio Visual related devices, equipment and software modules.
  - b. Operation and Maintenance Manuals shall be formatted as follows:
    - 1) Bind each manual in a hard-back loose-leaf binder.
    - 2) Identify each manual's contents on the cover.
    - 3) Provide a table of contents and tabulated sheets for each manual. Place tab sheets at the beginning of each chapter or section and at the beginning of each appendix if applicable.
    - 4) Any hardware manual demonstrating more than one model number of device on any one page shall be clearly marked as to delineate which model has been implemented in the Work.
  - c. Operation and Maintenance Manuals shall include, at a minimum, the following:
    - 1) Operational description of each subsystem
    - 2) Detailed programming descriptions for each subsystem
    - 3) Explanations of subsystem interrelationships
    - 4) Electrical schematics for each piece of equipment specified
    - 5) Power-up and power-down procedures for each subsystem
    - 6) Description of all diagnostic procedures

- 7) A menu tree for each subsystem
  - 8) Setup procedures for each component of the subsystems
  - 9) A list of manufacturers, their local representatives, and subcontractors that have performed Work on the Project
  - 10) Installation and service manuals for each piece of equipment
  - 11) Maintenance schedules for all installed components
- d. Operation and Maintenance Manuals shall include a separate section for each software program incorporated into the Project. The software section shall include, at a minimum, the following information:
- 1) Definitions of all software related terms and functions
  - 2) Description of required sequences
  - 3) Directory of all disk files
  - 4) Description of all communications protocols, including data formats, command characters, and a sample of each type of data transfer
  - 5) Instructions for manufacturer supplied report generation
  - 6) Instructions for custom report generation
  - 7) Database format and data entry requirements

F. Procedure for Resubmitting

1. Make corrections or changes in O & M and/or Record Drawings as required by the Design Professional and resubmit when the Design Professional's stamp requires re-submittal.
2. Clearly identify changes made other than those specifically requested by the Design Professional when resubmitting Record Drawings. Changes shall be clouded or similarly highlighted as coordinated with the Design Professional. Only changes that have been specifically requested by the Design Professional or have been clouded by the Contractor will be reviewed on resubmittals.
3. Any drawing sheets added to the resubmittal shall be clearly identified and clouded, and shall not change the sheet numbering scheme for previously issued Record Drawings.
4. The Contractor shall be responsible for any delays caused by the re-submittal process.
5. Re-submittal Review Fees
  - a. If the Design Professional rejects the Contractor's Record Submittal (Rejected, Revise, and Resubmit) more than two times, the Design Professional will be compensated for all subsequent reviews, whether partial or comprehensive. The amount of such compensation will be incorporated by Change Order and withheld from the Contractor's Application for Payment.

1.11 QUALITY ASSURANCE

A. Contractor Qualifications

1. Work specified herein shall be the responsibility of a single Audiovisual Systems Contractor. Submissions shall document a minimum of five (5)

years experience in the fabrication, assembly, and installation of Systems of similar complexity as specified herein. The documentation shall include the names, locations, and points of contact for at least three (3) installations of the type and complexity specified herein.

2. Installer Training Process: – Contractor's labor force shall have certified installers who attended training programs of the proposed system preparing them to perform the work.
3. The Installer for this Project is to be certified by all manufacturers of the installed equipment that the Contractor proposes.
4. Registered and Certified supervisors- Contractor must have all supervisory personnel certified for the type of work they are overseeing (installation and design) from Avixa.
5. Quality assurances for audio visual systems includes a multi-step program consisting of pre-qualification procedure for manufacturers and installation specialists; products phase; installation; operating instruction and training; and the submission of maintenance and operating manuals.
6. The Contractor shall have local in-house engineering and project management capabilities consistent with the requirements of the Work.
7. By submitting an offer, the Contractor thereby certifies that it is qualified in all areas pertaining to, directly or indirectly, the Work. In the event the Contractor becomes unable to complete the Work in accordance with the Contract Documents, or the satisfaction of the Owner, it shall be the responsibility of the Contractor to retain the services of applicable manufacturers' representatives to expeditiously complete the Work in accordance with the Owner's construction schedule with no additional cost to the Owner.
8. The Contractor shall maintain, or establish and maintain, a fully staffed office including a service center capable of providing maintenance and service to the Project. The Contractor shall staff the service center with factory trained technicians and adequately equip the office to provide emergency service within 4 hours phone response, 24 hours on site.
9. The Contractor shall provide factory-certified technicians to install, commission, and maintain the Work. All installing personnel shall be licensed as required by local and/or state jurisdictions.
10. The Contractor shall ensure compliance with, and have a thorough understanding of, all local codes and contract conditions pertaining to this Project.
11. The Contractor shall maintain an inventory of spare parts and other items critical to System operation and as necessary to meet the emergency service requirements of this Project within the local service center.

B. Product Standards

1. All equipment and materials for contained herein shall be the products of recognized manufacturers and shall be new.
2. New equipment and materials shall:
  - a. Be Underwriters Laboratories, Inc. (U.L.) listed and approved where specifically called for; or where normally subject to such U.L. labeling and/or listing services.
  - b. Be without blemish or defect.
  - c. Be products that meet with the acceptance of the agency inspecting the Audio Visual Systems work.
3. It is the intent of these specifications that wherever a manufacturer of a product is specified, and the terms "other approved" or "approved equal" are used, the substituted item must conform in all respects to the specified item. Consideration will not be given to claims that the substituted item meets the performance requirements with lesser construction. Performance as delineated in schedules and in the specifications shall be interpreted as minimum performance.
4. Substituted equipment or optional equipment, where permitted and approved, must conform to space requirements. Any substituted equipment that cannot meet space requirements, whether approved or not, shall be replaced at the Contractor's expense. Any modifications of related Systems as a result of substitutions shall be made at the Contractor's expense.
5. The approval of shop drawings, or other information submitted in accordance with the requirements hereinbefore specified, does not ensure that the Owner attests to the dimensional accuracy, dimensional suitability of the material, or mechanical performance of equipment. Approval of shop drawings does not invalidate the Drawings and Specifications.
6. Substitutions of equipment shown on the schedules or designated by model number in the specifications will not be considered if the item is not a regular catalogued item carried by the manufacturer.
7. Within the Specifications, certain manufacturers have been listed. These manufacturers are listed for example purposes (unless followed by "No Exceptions"). The Contractor may substitute manufacturers and models that may be more cost effective or readily available than that specified. However, all substitutions shall meet or exceed the specified functional and technical requirements. Acceptance of such substitutions is at the discretion of the Owner.

#### 1.12 WARRANTY AND MAINTENANCE

- A. Systems Contractor shall provide a three (3) year warranty for the Work. The warranty shall cover all Work, Systems, and subsystems against defects in materials and workmanship. The Work as specified herein, including all materials and labor, but excepting any existing devices and equipment which are incorporated in the completed Work, shall be warranted to be free from defects in design, workmanship, and materials. Further, the Contractor shall warrant that the completed Systems, including all components (except those, which are

existing or provided by others), are of sufficient size and capacity to fulfill the requirements of the Specifications.

- B. The warranty shall be valid for a period of three (3) years following the date of System acceptance by the Owner. System acceptance shall commence when all parts, components, sub-Systems, and Systems have been tested, shown to be working in accordance with the Specification, and approved by the Owner
- C. Warranty Service:
  - 1. In the event that defects in the materials and/or workmanship are identified during the warranty period, the Contractor shall provide all labor and materials as may be required for prompt correction of the defect.
- D. Provide written notice to the Owner documenting any Work performed during the warranty period, including any preventative maintenance Work performed.
- E. Provide loaner equipment that is fully compatible with the Audiovisual Systems for any equipment not field repairable.
- F. Loaner equipment for components that must be shipped to/from the manufacturer or distributor shall be on site and operational within 48 hours of the component failure. Furnish lists of equipment that will require shipment from the manufacturer or distributor and lead times associated with that equipment.

## PART 2 PRODUCTS

### 2.1 WIRE AND CABLE

- A. Cable Selection: Signal type is indicated on schematic diagram at equipment input or output.
- B. Plenum Rated / Non-Plenum Ratings: Cable routed in conduits or equipment racks to have non-plenum rated (PVC) jacket. All other cables to have plenum rated jacket. Cable to be run continuous without splices.
- C. Cable Types:
  - 1. Microphone and Line Audio Cable:
    - a. Configuration: Non-Plenum Type CMR (CMP Plenum) – 22 AWG (.644mm) (7x30) stranded twisted shielded pair with overall shield
    - b. Properties: 17 ohms /M' with OD = 3.4 mm
  - 2. Low Impedance Loudspeaker Cable:
    - a. Configuration: Type CL3 – 12 AWG (2mm) (19x25) stranded twisted pair (size based on length of run)
    - b. Properties: 1.7 ohms / M' with OD = 6.8 mm
  - 3. High Impedance Loudspeaker Cable (25V / 70V)
    - a. Configuration: Type CMR – 18 AWG (1 mm), (7x26) stranded pair (size based on length of run)
    - b. Properties: 6.2 ohms / M' with OD = 4 mm
  - 4. Wireless Microphone Antenna Cables within equipment racks

- a. Configuration: Type CM 50 ohm RG-58/U 22 AWG (.644mm) solid center conductor.
    - b. Properties: OD = 5 mm
  5. Wireless Microphone and Hearing Assistance Antenna Cables outside of equipment racks
    - a. Configuration: Type CM 50 ohm RG-8/U 11 AWG (2.3 mm), (7x19) center conductor
    - b. Properties: OD = 10.2 mm
  6. Video Tie Line Cable:
    - a. Configuration: Type CM RG6/U coaxial cable 18 AWG (1.02 mm) solid bare copper
    - b. Properties: 2.5 dB attenuation at 10Mhz per 100 m with OD = 6.42 mm
  7. Video Tie Line Cable baseband five (5) conductor:
    - a. Configuration: Type CM RG6/U coaxial cable 18 AWG (1.02 mm) solid bare copper
    - b. Properties: 15 dB attenuation at 400 MHz per 100 m with OD = 10.2 mm
  8. Digital Video/Audio (unbalanced) Tie Line Cable one (1) conductor:
    - a. Configuration: Type CMR RG6/U coaxial cable 18 AWG (1.02mm) solid bare copper
    - b. Properties: 35 dB attenuation at 3 GHz per 100 m with OD= 6.9 mm
  9. Digital Video UTP Tie Line Cable
    - a. Configuration: Type CMR Category 6, 4 pair, 24 AWG (.5mm)
    - b. Properties: 30.5 dB attenuation at 250 MHz per 100 m with OD = 5.8 mm
    - c. Controlled media twist, where applicable
  10. Data Tie Line Cable:
    - a. Configuration: Type CMR Category 6, 4 pair, 24 AWG (.5mm)
    - b. Properties: 30.5 dB attenuation at 250 MHz per 100 m with OD = 5.8 mm
  11. RS-232 Control Cable
    - a. Configuration: Type CL3R, Two Pair twisted shielded with overall shield, 22 AWG (.644 mm), (7x30)
    - b. Properties: 55 pf/ft with OD = 5 mm
  12. Specialty Control Cable:
    - a. Control and communication cable as required for DSP configuration to be verified and included.
- D. Manufacturers:
1. Belden

2. West Penn
3. Commscope
4. Substitution: By approved substitution means.

### PART 3 EXECUTION

#### 3.1 EXAMINATION

- A. Verification of Conditions: Examine the areas to receive the work and the conditions under which the Work would be performed. Contractor shall remedy conditions detrimental to the proper and timely completion of the Work. Do not proceed until unsatisfactory conditions have been corrected.

#### 3.2 INSTALLATION

##### A. General

1. Installation shall include the delivery to the installation site, unloading, setting in place, fastening to walls, floors, ceilings, counters, or other structures where required, interconnecting wiring of the system components, equipment alignment and adjustment, and all other work whether or not expressly required herein which is necessary to result in complete and fully operational systems.
2. Prior to ordering equipment, the contractor shall coordinate the frequencies of all wireless devices to prevent unwanted interaction between devices and rooms. This includes, but is not limited to, wireless microphones, assisted listening system devices, wireless control panels, etc.
3. All accessories, including rack mounting hardware, power supplies, etc., shall be obtained from the original equipment manufacturer. Unless otherwise noted or specified, third party accessories shall not be used.
4. All installation practices shall be in accordance with, but not limited to, these specifications and drawings. Installation shall be performed in accordance with the applicable standards, requirements, and recommendations of National and Local authorities having jurisdiction.
5. If, in the opinion of the Contractor, an installation practice is desired or required, which is contrary to these specifications or drawings, a written request for modification shall be made to the Owner. Modifications shall not commence without written approval from the Owner. Every effort will be made to respond to all written requests, in a timely manner, as to not delay the installation or completion of the project.
6. During the installation, and up to the date of final acceptance, the Contractor shall be under obligation to protect his finished and unfinished work against damage and loss. In the event of such damage or loss, the damage shall be replaced or repaired at no cost to the Owner.

##### B. Physical Installation



1. All equipment shall be firmly secured in place unless requirements of portability dictate otherwise.
  2. All equipment shall have an engraved plaque permanently affixed, denoting its function.
  3. Fastenings and supports shall be adequate to support their loads with a safety factor of at least three. All boxes, equipment, etc., shall be secured plumb and square.
  4. In the installation of equipment and cable, consideration shall be given not only to operational efficiency, but also to overall aesthetic factors.
  5. Where audio visual devices are attached to a wall, ADA requirements will be adhered to for height and protrusion from wall.
  6. Trim and Escutcheon Components
    - a. To insure a proper finished appearance, the AV Contractor shall furnish and install trim/escutcheon components at all conditions where A/V components pass through the finished ceilings. This would include but not be limited to video projector supports, flat-panel display supports and any other component which is not specifically supplied with integral flanges/trim components; i.e. speaker mounts, assistance listening devices, etc.
    - b. All trim components at the ceiling plane shall be finished to match the approved ACT ceiling grid system components. The audiovisual contractor should obtain a sample from the General Contractor, including any custom color information, or standard color numbers. All trim components shall be submitted to the Design Professional for review and approval prior to fabrication.
- C. Cable Installation
1. All wire bundles are to be neat and combed free of cable crossovers.
  2. All cables, regardless of length, shall be marked with a permanent, self-laminating wrap-around number or letter cable marker at both ends. Labels must be computer-generated for legibility. Wire labels done by hand in the field must be replaced with computer generated labels. There shall be no unmarked cables at any place in the system. Marking codes used on cables shall correspond to codes shown on drawings and or run sheets.
  3. All cables shall be grouped according to the signals being carried. In order to reduce signal contamination, separate groups shall be formed for the following cable families:
    - a. Power cables
    - b. Control cables
    - c. Video cables
    - d. Audio cables carrying signals less than – 20 dBm
    - e. Audio cables carrying signals between – 20 dBm and +20 dBm
    - f. Audio cables carrying signals above +20 dBm

4. As a general practice, all power cables, control cables, and high level cables shall be run on the left side of an equipment rack as viewed from the rear. All other cables shall be run on the right side of an equipment rack, as viewed from the rear.
5. Cables ties shall be placed at appropriate intervals of no greater than six inches for vertical bundles, two inches for horizontal bundles.
6. All vertical cable bundles shall be attached to the rack frame.
7. All cables shall be continuous lengths without splices. All system wire, after being cut and stripped, shall have the wire strands twisted back to their original lay and be terminated by approved soldered or mechanical means. Except where noted otherwise in the specifications, **NO BARE WIRE TERMINATIONS WILL BE ACCEPTED**. Heat-shrink tubing shall be used to insulate the ground or drain wire. Unused wires at the end of a cable shall remain unstripped and shall be laid back and held in place with wire ties.
8. All solder connections shall be made with rosin-core solder using temperature-controlled solder stations. Care shall be taken to avoid cold or cracked solder joints. Any connections that do not appear to be clean and shiny, or which show signs of cracking, shall be re-soldered by the contractor before final acceptance of the system.
9. Mechanical connections using insulated, crimp-type connectors shall be bonded to the connector by soldering the wire to the metal part of the connector.
10. Connections made with screw actuated pressure type terminal strips shall be made by stripping approximately 1/4 inch of insulation from the stranded conductor. Then the un-tinned wire shall be inserted into the terminal and the screw tightened using a secure fitting precision screwdriver.
11. Terminal blocks, boards, strips or connectors shall be furnished for all cables which interface with racks, cabinets, consoles, or equipment modules. No audio cables shall run directly to the audio patch panel jacks. Each audio patch panel shall be furnished with an audio terminal-block and all audio cables to and from the audio patch panel shall terminate on this block.
12. All wire markers shall face a common direction.
13. All cables shall have proper connector housing.
14. Cables shall not protrude from the back of racks.
15. All cable entry shall be through the tops of racks or through entrance holes in the base of the rack. No cable shall enter racks through front, rear or side panel openings.
16. Refer to PART II for cable types and specifications. However, general guidelines for signal type to cable model matching are included below:

- Type..... Non-Plenum..... Plenum
- Video (Baseband & SDI) ..... Belden 1505A .... 1506A
- S-Video ..... Belden 1807A .... 7700A
- Control (4 conductor shielded) ..... Belden 1502R.... 1502P
- Control (12 conductor shielded) ..... Belden 9556 ..... 6309FE
- Audio ..... Belden 9451/1266A
- Audio (8 ohm program speakers)..... Belden 8473 ..... 1861A
- Audio (70 Volt Speaker) ..... Belden 8461 ..... 1863A
- Video, RGB (RG6)..... Belden 7712A .... None
- Video, RGB (RG59)..... Belden 7796A .... 1826A
- Multi-channel Audio ..... Belden 8774 ..... 88778
- Digital Audio (110 Ohm) ..... Belden 1800B .... 1801B

Note: These cable types are cited to illustrate the type and quality of cable required. Unless otherwise noted, cables from other manufacturers, i.e. Canare, CommScope, Extron, Liberty, etc. will be considered acceptable if data sheets are submitted prior to installation.

17. Unless otherwise noted, all analog video and computer video cables are to be terminated using seventy-five ohm (75 Ohm) connectors, with a captive center pin.
18. Cables running in plenum areas without conduit shall be plenum rated cable, and match the specified cable above. It is the responsibility of the offerer to inspect the electrical drawings, and verify in what spaces plenum cable shall be used. No claims for additional monies, based on the use of plenum cable, will be allowed.
19. All cables (except video and pulse cables, which must be cut to an electrical length) shall be cut to the length dictated by the run. No splices shall be permitted in any pull boxes without prior permission of the Owner. For equipment mounted in drawers or on slides, the interconnecting cables shall be provided with a service loop of appropriate length.
20. No cable shall be installed with a bend radius less than that recommended by the cable manufacturer.
21. Where cables are installed in architectural niches, ensure that the cables are black, unless otherwise directed, to reduce visibility from the audience.
22. Where cables are installed that are visible, the cables will be sheathed in a color wrap that has been pre-approved for the location.
23. Contractor to provide all appropriate patch cables where necessary for use from connection plates to equipment. Network patch cables will be minimum CAT6.

D. Connection Plate Receptacles

1. Audio (microphone) – XLR type.
2. Audio (line level) – ¼ inch diameter tip/ring/sleeve type, or as required by the intercom system. Jack shall be insulated from panel type.
3. Audio (loudspeaker level) – Neutrik “Speak-On” Type.
4. Audio (computer) 1/8 inch diameter tip/sleeve
5. Video – BNC type.
6. VGA – DB15HD Female
7. DVI – DVI-I jack, isolated from panel type, with hex nuts.
8. HDMI – HDMI type A
9. RF – “F” type. Receptacles shall be insulated from panel type.
10. Category 5/6 - RJ45 type
11. USB – USB Type A
  - a. Note: All connectors on wall plates, or in other exposed locations, are to be recessed.

E. Grounding Procedures

1. In order to minimize problems resulting from improper grounding, and to achieve maximum signal-to-noise ratios, the following grounding procedures shall be adhered to:
  - a. System Grounds: A single primary “system ground” shall be established for the systems in each particular area. All grounding conductors in that area shall connect to this primary system ground. See the perimeter grounding conductor installed under the base construction contract.
    - 1) The system ground shall be provided in the audio equipment rack for the area, and shall consist of a copper bar of sufficient size to accommodate all secondary ground conductors. A copper conductor having a maximum of 0.1 Ohms total resistance shall connect the primary system ground bar to the nearest approved electrical ground. The Contractor shall be responsible for determining if the metallic conduit is properly electrically bonded to the building ground system.
    - 2) Secondary system grounding conductors shall be provided from all racks, audio consoles, and grounding points for the area. Each of these grounding conductors shall have a maximum of 0.1 Ohms total resistance.
    - 3) Under no conditions shall the AC neutral conductor, either in the power panel or in a receptacle outlet, be used for a system ground, except as specifically defined by NFPA for bonding.
  - b. Audio Cable Shields

- 1) All audio cable shields shall be grounded at one point only. There are no exceptions. For inter and intra-rack wiring, this requires that the shield be connected at one end only. For ungrounded portable equipment, such as microphones, the shield shall be connected at both ends but grounded at only one end.
- c. Video Receptacles
  - 1) All video receptacles that are provided and installed by the Contractor shall be insulated from the mounting panel, outlet box, or wireway. Unless otherwise detailed herein, this shall be accomplished by using insulated-from-panel type receptacles.
- d. Audio Receptacles
  - 1) All audio receptacles that are provided and installed by the Contractor shall be insulated from the mounting panel, outlet box, or wireway. Unless otherwise detailed herein, this shall be accomplished by using insulated-from-panel type receptacles.
- e. General
  - 1) Because of the great number of possible variations in grounding systems, it shall be the responsibility of the Contractor to follow good engineering practice, as outlined above, and to deviate from these practices only when necessary to minimize crosstalk and to maximize signal-to-noise ratios in the audio, video, and control systems.

### 3.3 PERFORMANCE STANDARDS

- A. Unless restricted by the published specifications of a particular piece of equipment, or unless otherwise required under the Detailed Specifications, the following performance standards shall be met by each system. The signal paths for the Performance Standards shall be as follows: From all source inputs to all signal destinations. See Contractor System Checkout Section for testing procedures.
1. Analog Audio
    - a. Frequency Response - plus or minus 0.5dB, 20- 20,000 Hz.
    - b. Signal-to-Noise Ratio -greater than 90dB (including crosstalk and hum at all input/output levels)
    - c. Total Harmonic Distortion - 0.05% max. from 20- 20,000 Hz.
    - d. Input Levels
      - 1) Microphone (Nominal): -50dbu
        - a) Overload (Minimum gain) : -5dbu
        - b) Maximum Gain: -26dbu
      - 2) Line (Nominal): +4dbu
        - a) Overload (Minimum gain):+24bu
        - b) Maximum Gain: +9dbu
    - e. Output Levels
      - 1) Line (Nominal): +4dbu
      - 2) Maximum: +24dbu
      - 3) Output Impedance: <0.5 Ohms
      - 4) Load Impedance: >150 Ohms
  2. Analog Video (signal)
    - a. Frequency Response - plus or minus 0.5dB, DC to 4.2 MHz

- b. Signal to Noise Ratio: 55 dB minimum. (Peak to RMS) unweighted, DC to 4.2 MHz
  - c. Crosstalk: 45 dB minimum unweighted DC to 4.2 MHz
  - d. Line and Field Tilt: 2% maximum
  - e. Differential Gain: 3% maximum
- B. Optical projection systems shall meet the following performance standards:
1. The total averaged light output from a projector, in lumens, shall be within plus-or-minus 15% of that specified by the projector manufacturer.
  2. The light fall-off from the center of the projected image to all four corners, as measured at the projected image plane, shall not exceed 35% for projector images. The light intensity shall be measured at all five positions of the projected image after the projector has been adjusted to provide the light output as specified above.
  3. The light meter used for the above measurements shall be a properly calibrated foot-candle (or lux) meter and shall be cosine-corrected.
  4. Projectors, lenses, and mirrors shall be solidly mounted and braced, so that there will be no observable movement in the image induced by motor vibration or other mechanical operations.
- C. Control System User Interface
1. Control system user interfaces pages shall be designed for this project exclusively. While there are a great number of design approaches to designing the user interface, the following guidelines shall be adhered to:
    - a. All panels are to have the time and date as icons, in the same position on every page.
    - b. All panels are to have a title, indicating the piece of equipment and/or functionality being controlled.
    - c. Each individual room type shall be given the same user interface design and layout, throughout the entire campus, to the greatest extent possible.
    - d. User interface design, shall, to the greatest extent possible – taking into account the variations in system functionality from room type to room type, maintain continuity throughout the campus.
  2. Final programming shall include capability to remotely control all functions of the Audio system. Individual device controls shall provide full manufacturer's functionality.
  3. Devices similar in nature shall be programmed to operate with a common format.
  4. No individual component shall be programmed to function atypically.
  5. Whenever the same button appears on more than one page, it will be in the same position on each page.
  6. Functions used during a general presentation shall be accessible with a minimal amount of button presses/page flips.
  7. Where feasible, multi-level access to controls should be implemented.

8. During performance testing, all equipment shall be operated under standard conditions as recommended by the manufacturer.

### 3.4 CONTRACTOR SYSTEM CHECKOUT

- A. Before Acceptance Tests are scheduled, the Contractor shall perform his own system check-out. He shall furnish all required test equipment and shall perform all work necessary to determine and/or modify performance of the system to meet the requirements of this specification. This work shall include the following:

1. Test all audio systems for compliance with the Performance Standards, using the following test procedure:
  - a. Test Equipment: Assemble the following test equipment (or equivalent) on site.
    - 1) Audio check:
      - a) Signal generator
      - b) Audio test via portable device
      - c) Computer audio output
      - d) Audio cables
    - 2) Video checks:
      - a) Video signal generator, Extron
      - b) DVI signal generator, Sencore 403C-SH
      - c) HDMI and VGA computer output
      - d) Test patterns
    - 3) Gain Setting
      - a) Adjust all systems (starting at source equipment and terminating at the power amplifiers) for maximum gain and minimum distortion.
2. Signal Paths
  - a. Video/Audio
    - 1) Connect the output of the video signal generator to a floor box/table/rack connector and select the "Full Field Color Bar" signal.
    - 2) Measure and record the signal amplitudes.
    - 3) Repeat item '1' after selecting the "Multiburst, 50 IRE" test signal.
    - 4) Measure and record the signal amplitudes.
    - 5) Repeat item '1' after selecting the "Modulated 5-step" test signal.
    - 6) Measure and record the signal differential phase and gain.
    - 7) Repeat item #'s '1' through '6' for other video signal paths.
    - 8) Repeat item '1' after selecting the Window test signal.
    - 9) Measure and record the signal line and field tilt.
    - 10) Repeat item '1' after connecting the Black Burst signal from a rear mounted connector.
    - 11) Measure and record the signal/noise ratio.
    - 12) Connect the output of the audio test set to a floor box/table/rack program audio connector and connect the input of the audio test set to a final output point, e.g. an input to a program speaker power amplifier. Ensure that the test

- signal is routed to the selected output, that the volume control is set to 100% and that the equalizers are bypassed.
- 13) Measure and record the signal/noise ratio, total harmonic distortion and frequency response.
  - 14) Repeat items '12' and '13' for other audio signal paths.
  - 15) Connect the output of the audio test set to a floor box/table/rack speech audio connector and connect the input of the audio test set to a final output point, e.g. an input to a speech speaker power amplifier. Ensure that the test signal is routed to the selected output, that the volume control is set to 100% and that the equalizer is bypassed.
  - 16) Measure and record the signal/noise ratio, total harmonic distortion and frequency response.
  - 17) Repeat items '15' and '16' for other audio signal paths.
  - 18) DVI: Connect the DVI output of the signal generator to a floorbox/table/rack connector and select the SMPTE & PLUGE signal at the various computer scan rates as follows:
 

a)	640 x 480	31.5 kHz H, 60 Hz V
b)	640 x 480	37.5 kHz H, 75 Hz V
c)	800 x 600	38 kHz H, 60 Hz V
d)	832 x 624	49.7 kHz H, 75 Hz V
e)	1024 x 768	48 kHz H, 60 Hz V
f)	1280 x 768	48 kHz H, 60 Hz V
g)	1366 x 768	47.8 kHz H, 60 Hz V
h)	1280 x 1024	64 kHz H, 60 Hz V
i)	1400 x 1050	63.9 kHz H, 60 Hz V
j)	HD 720p	45 kHz H, 60 Hz V
k)	HD 1080i	33.75 kHz H, 30/60 Hz V
l)	HD 1080p	33.75 kHz H, 30/60 Hz V
  - 19) Check that the image is correctly displayed on the picture monitor(s) and/or by the video projector.
  - 20) Repeat item '2' using Crosshatch signal, checkerboard signal and H Pattern signal.
  - 21) Repeat item '2' for other DVI connection locations.
  - 22) Connect the output of the audio signal generator to a floorbox/table/rack 'Left' and 'Right' connectors and select the 1 kHz tone. Check that the signal is emitted from the left and right program speakers.
  - 23) Repeat item 'v' for other audio connection location.
  - 24) Note: Whenever possible, include computer sources provided by the Owner, at the desired resolution, in your testing.
- b. At the conclusion of the tests, return all equipment settings to previously calibrated positions.
  - c. Provide written records of all test results in spreadsheet form.
  - d. Check all control functions, from all controlling devices to all controlled devices, for proper operations.
  - e. Adjust, balance, and align all equipment for optimum quality and to meet the manufacturer's published specifications. Establish and mark normal settings for all level controls, and record these settings in the "System Operation and Maintenance Manual".
  - f. Check all optical projection images for average light level, light fall-off, and image alignment and size to comply with the Performance Standards and specifications drawings. Check to



- determine that all projectors, projector bases, carts, tables, and mirrors are rigid and vibration-less in operation.
- g. Maintain documentation of all performance tests for reference by the Owner during the System Acceptance Tests.

### 3.5 SYSTEM ACCEPTANCE TESTS

- A. System Acceptance Tests will not be performed until the Contractor's System Checkout has been completed and the test results have been reviewed. The System Acceptance Tests will be supervised by the Owner and will consist of the following:
1. A physical inventory will be taken of all equipment on site and will be compared to equipment lists in the contract documents.
  2. The operation of all system equipment shall be demonstrated by the Contractor.
  3. Both subjective and objective tests will be required by the Owner to determine compliance with the specifications. The Contractor shall be responsible for providing test equipment for these tests.
  4. All final, "as-built" drawings, run sheets, manuals, and other required documents, as detailed in Part I, shall be on hand. Two complete sets of these documents shall be delivered to the Owner at this time.

### 3.6 SYSTEM TRAINING

- A. System Training will be performed by the Contractor after the systems have been fully completed and tested by the Contractor. The Owner will determine the number of personnel to participate in the training. The System Training will consist of up to 8 hours of training.

END OF SECTION 27 41 00

## SECTION 27 41 16 - AUDIO VISUAL SYSTEMS AND EQUIPMENT

## PART 1 - GENERAL

## 1.1 RELATED DOCUMENTS

- A. Refer to the following Sections for specifications related to the Work:
  - 1. Section 27 4100 Audiovisual General Conditions

## 1.2 SUMMARY

- A. Applicable Locations
  - 1. Courtroom 10B and adjacent AV Closet

## 1.3 SUBMITTALS

- A. Provide in accordance with Section 27 41 00, General Conditions and Requirements for Audiovisual Systems

## 1.4 INSTALLATION, COMMISSIONING, TESTING, DELIVERY

- A. Provide in accordance with Section 27 41 00, General Conditions and Requirements for Audiovisual Systems

## PART 2 - PRODUCTS

## 2.0 GENERAL NOTES - AUDIOVISUAL PRODUCTS

- A. Shall operate on 120 to 240VAC at 50/60 Hz as appropriate.
- B. Shall be capable of operating continuously for 12 hours over the external ambient temperature range of +10°C to +65°C (20% to 95% humidity, non-condensing) without permanent damage.
- C. All programmed software-based, microprocessor-based control and DSP devices shall be powered by a UPS supply capable of providing 10 minimum minutes backup time.
- D. RJ-45 UTP Cabling shall be terminated via punch down method only as compliant to EIA / TIA telecommunications standards. No field terminated RJ-45 cable ends shall be accepted.
- E. See section 27 41 00 – General Conditions and Requirements of Audiovisual systems for wire and cable requirements.

## 2.1 Courtroom 10B and AV closet

- A. The Courtroom will be provided with three (3) wall mounted flat panel displays, eight (8) displays mounted on the Jury rail, and eight (8) table top displays. Five of the table top displays will be interactive with USB extension to OFE PCs. Two videoconferencing codecs will be provided, one for each of the two separate networks. HDMI inputs will be provided at five (5) locations. Three (3) video cameras will be provided for remote viewing. A video windows processor will be provided to allow viewing of the three camera images and 1 content image simultaneously. Two video bridges will be provided in order

to utilize OFE PCs with soft codecs, one for each of two separate networks. Ten (10) tabletop microphones with speakers will be used for in room voice reinforcement, conferencing and court recording/reporting. Eight (8) Jury Rail mounted microphones will also be provided. Audio output will be provided for a court reporter at two locations, and an audio output will be provided to the OFE court recording system. Recessed ceiling speakers will be provided in a zoned configuration for in room reinforcement and program audio. Two tabletop control panels will provide control of the AV system. One control panel at the bench will provide full control for the Judge and Clerks. One control panel at the OFE lectern will provide limited control. A document camera will be provided at the lectern. Reference the TA series of drawings. Owner provided equipment (OFE) as indicated on Appendix A is to be installed and integrated as part of the fully functional system.

B. Display System

1. Three (3) 85" wall mounted flat panel displays on swing arm mounts will be installed. This will include UHD resolution, RS 232/IP control capability, inputs and other requirements as indicated in Appendix A.
2. Three (3) 24" tabletop flat panel displays, HD resolution, RS232/IP control capability, inputs and other requirements as indicated in Appendix A.
3. Eight (8) 24" rail mounted flat displays, HD resolution, RS232/IP control capability, inputs and other requirements as indicated in Appendix A.
4. Five (5) 24" interactive tabletop flat displays, HD resolution, RS232/IP control capability, inputs and other requirements as indicated in Appendix A.
5. Coordinate location of centerline of all AV devices with the Owner.

C. Video and Data System

1. Provide HDMI connectivity and AV over IP signal transport at two floor box locations behind the counsel tables, at each of the two counsel tables, and at the OFE lectern.
2. Provide a document camera at the OFE lectern, with HDMI connection and AV over IP signal transport.
3. Provide two (2) wall mounted video cameras with IP streaming output as indicated on the TA series of drawings
4. Provide one (1) video camera with IP streaming output on the front of the bench as indicated on the TA series of drawings.
5. Provide two video conferencing codecs, one for each of two separate networks
6. Provide one 4 input video window processor
7. Provide AV over IP encoders and decoders necessary for a fully functioning system
8. Provide two AV bridges for USB connection to OFE PCs, for two separate networks.
9. Provide HDMI Distribution amplifiers for the Jury Rail and Clerk displays
10. Provide USB extension for the interactive displays to OFE PCs.

## D. Audio System

1. Provide microphones as indicated in Appendix A and on the TA series of drawings for in room reinforcement, conferencing with both hard codecs, conferencing for two OFE soft codec PCs, Assistive Listening, Court Reporter and Court Recording
2. Provide ceiling recessed speakers for zoned in room voice reinforcement, far end and program audio.
3. Provide IR Assistive Listening system with transmitters, receivers and headsets.
4. Provide audio output for court reporter
5. Provide audio output for court recording system. Coordinate with the Court for audio format to be provided.
6. Provide Audio USB bridge for soft codecs.
7. Provide necessary digital signal processing, routing, and amplification

## E. Control System

1. Provide and install two touch panels, with two different levels of control capability. The control panel at the bench will provide easy, intuitive control of all functions, including preview to the Judge's and Clerks' displays, with authorization control to display on all other displays.
2. Custom program control to provide the following functions:
  - a. System/displays on/off
  - b. Preset configuration for common court use as directed by the Clerks
  - c. Source selection with preview to the Judge's and Clerks displays before authorization to be shown on all other displays.
    - 1) Document Camera
    - 2) Lectern HDMI input
    - 3) Counsel Tables' HDMI input
    - 4) Floor box HDMI input
    - 5) Video conferencing
  - d. Program audio volume up/down/mute
    - 1) Far end audio volume up/down/mute
    - 2) microphone volume control and muting
    - 3) Audio teleconference functions
  - e. VTC functions for each of the two codecs.

## F. Furnishings / Miscellaneous

1. Provide and install plates as required to support the connection needs for the space. If a particular infrastructure connection is not being used as a day one capability ensure that the infrastructure boxes are covered with a blank plate with a style and finish as approved by the Design Professional.
2. Provide all necessary equipment racks, shelves, accessories, etc. where applicable as needed for a neat and professional installation per Specification Section 27 4100.

3. Provide all connectors, cables, adapters, plates, panels and power supplies as necessary to provide a complete and operating system as outlined in these documents and as drawn in the TA-series drawing package.
4. Provide necessary ventilation fans to provide appropriate temperature control, where applicable

### PART 3 - EXECUTION

#### 3.1 INSTALLATION

- A. Adhere to Section 27 41 00 – General Conditions and Requirements of Audiovisual Systems
- B. All audiovisual cabling shall pass through walls via properly installed conduit sleeves. Any damage to above-ceiling drywall shall be repaired and fire-stop sealed per building regulations.

#### 3.2 MOUNTING HEIGHTS/ LOCATIONS

- A. Section 27 41 00 – General Conditions and Requirements of Audiovisual systems
- B. Coordinate locations of the following with mounting heights as indicated on drawings:
  1. Technical wall plates
  2. AV input/output connections
  3. Video projector connections
  4. Control panels
  5. Pull boxes
- C. Install all technical panels plumb.
- D. Install equipment racks in location shown on drawings
- E. Arrange for adequate ventilation and access.

#### 3.3 CABLE SUPPORT

- A. Supporting method in accordance with Section 26 0500
- B. Section 27 4100 – General Conditions and Requirements of Audiovisual systems
  - Individual runs throughout building – Support from building structure with approved hanger assemblies. Cables on top of ceiling tiles will be rejected. Cable supported by ceiling grid support wires will be rejected.
  - Cable Bundles – Provide additional support as needed for larger bundles

#### 3.4 CABLE SEPARATION

- A. Section 27 4100 – General Conditions and Requirements of Audiovisual systems
- B. Cable separation of cables for runs greater than 25ft:
  1. Microphone Level – 1ft from all other circuits.

2. Line Level and Control – 1ft from any circuit with signal of 20dB or greater than Line Level and Control cables.

3. Speaker level circuits – 1ft from other circuits.

4. Video and Data – 1ft from any circuit with signal of 20dB or greater than Video and Data.

5. AC Power Circuits – 1ft from all other circuits.

### 3.5 RACK CABLING

A. Section 27 4100 – General Conditions and Requirements of Audiovisual systems

1. Neatly train and lace cables.

2. Route cables from components to lacing bars installed on rear rack rail.

3. Provide service loops for each cable.

4. Cable separation for runs within equipment rack:

1. Microphone Level – 2” from all other circuits.

2. Line Level and Control – 2” from any circuit with signal of 20dB or greater than Line Level and Control cables.

3. Speaker level circuits – 2” from other circuits.

4. Video and Data – 2” from any circuit with signal of 20dB or greater than Video and Data.

5. AC Power Circuits – 2” from all other circuits.

### 3.6 APPROVED WIRE TERMINATION MEANS

A. Section 27 4100 – General Conditions and Requirements of Audiovisual systems

Solder Connections – For connectors utilizing Solder Cups

Terminal strip connectors – For termination of blunt cut cables, cable to be tinned prior to termination

Multi-Pin connectors – Utilize connector manufacturers crimper

Crimp Cap Terminations – For Loudspeaker circuits at individual devices.

Distribution cable termination to utilize terminal strip connectors.

### 3.7 CONTRACTORS' FINAL CHECKOUT

A. Section 27 4100 – General Conditions and Requirements of Audiovisual systems

## APPENDIX A – EQUIPMENT LIST

END OF SECTION

Arlington County Courthouse Courtroom 10B  
274116 Appendix A AV Equipment

March 18, 2022

Line #	Description	Manufacturer	Model	Qty	Each	Extended
	<b>Control</b>					
1	Control Panel, Table top, 10"	Crestron	TS-770-B-S	2	\$	-
2	Control Processor	Crestron	PRO4	1	\$	-
3					\$	-
4	<b>SUB TOTAL</b>				\$	-
5	<b>Display</b>					
6	85" Display Monitor	Planar	URP85	3	\$	-
7	Swing Arm Wall Mount	Chief	PNRWUB	3	\$	-
8	24" Table Top Display	Planar	PLL2450MW	3	\$	-
9	24" Rail mounted display	Planar	PLL2450MW	8	\$	-
10	Rail Mount	Chief	KOW100S	8	\$	-
11	24" Table top Interactive Display	Planar	PC12435	5	\$	-
12					\$	-
13	<b>SUB TOTAL</b>				\$	-
14	<b>Video</b>					
15	Passive HDMI Wall Plate	Crestron	MP-WP152-W	4	\$	-
16	DM NVX 4K/60 4:4:4 HDR Network AV Encoder	Crestron	DM-NVX-360	6	\$	-
17	DM NVX Card Rack-mountable Chassis - 8 Slots	Crestron	DMF-CI-8	3	\$	-
18	DM NVX 4K/60 4:4:4 HDR Network AV Decoder Card, HDMI & Audio I/O	Crestron	DM-NVX-D30C	9	\$	-
19	DM NVX 4K/60 4:4:4 HDR Network AV Encoder Card, HDMI & Audio I/O	Crestron	DM-NVX-E30C	12	\$	-
20	AV over IP Director	Crestron	DM-NVX-DIR-80	1	\$	-
21	Document Camera	Wolfvision	VZ-8.UHD	1	\$	-
22	DM NVX 4K/60 4:4:4 HDR Network AV Decoder	Crestron	DM-NVX-360	12	\$	-
23	HDMI Matrix	Extron	DXP 1616 HD 4K PLUS	1	\$	-
24	Video 4 Window Processor	Crestron	HD-WP-4K-401-C	1	\$	-
25	IP Video Camera	Aver	CAM520 Pro 2	3	\$	-
26	HDMI DA x4	Crestron	HD-DA4-4KZ-E	3	\$	-
27	USB Extender TX	Extron	USB Extender Plus T	5	\$	-
28	USB Extender RX	Extron	USB Extender Plus D R	5	\$	-
29	USB Matrix Controller	Extron	USB Plus Matrix Controller	1	\$	-
30	AV Bridge	Vaddio	AV Bridge	2	\$	-
31	OFE PC for soft codecs	OFE	OFE	2	\$	-
32					\$	-
33	<b>SUB TOTAL</b>				\$	-
34	<b>Audio</b>					
35	Table top gooseneck microphone base with speaker	Shure	MXC615	10	\$	-
36	Goosneck Microphone, cardioid	Shure	MXC416	10	\$	-
37	Delegate Microphone control unit	Shure	DIS-CCU	1	\$	-
38	Rail mounted boundary microphone, cardioid	Shure	CVB-B/C	8	\$	-
39	DSP Processor	QSC	Core 110f	1	\$	-
40	4 channel Audio amplifier	QSC	DPA-2K4Q	3	\$	-
41	Assistive Listening System IR transmitter	Listen	LT-82	1	\$	-
42	Assistive Listening System IR radiator	Listen	LT-140	2	\$	-
43	Assistive Listening System IR receiver	Listen	LR-5200-IR	5	\$	-
44	Assistive Listening System headset	Listen	LA-402	5	\$	-
45	Ceiling recessed speaker (Each)	Crestron	SAROS ICI6T-W-T-EACH	6	\$	-
46	Audio output plates	Vendor	Vendor	2	\$	-
47					\$	-
48	<b>SUB TOTAL</b>				\$	-
49	<b>VTC</b>					
50	VTC Appliance	Poly	Group 7500	2	\$	-
51	<b>SUB TOTAL</b>				\$	-
52	<b>Racks, Furniture and Misc.</b>					
53	Misc. accessories, cables, etc.	Vendor	Vendor	1	\$	-
54	45RU, 32" Deep Rack, Pre-Configured for AV	Middle Atlantic	BGR-4532-AV	1	\$	-
55	Front Plexi Door	Middle Atlantic	BFPD-45	1	\$	-
56	Rack Leveling Feet	Middle Atlantic	LF-HD	1	\$	-
57	Surge Eliminate Power Sequencer, 20A, 1RU	Surge X	SEQ-TU	1	\$	-
58	Rack mounted UPS, 2200VA/1650W, IP Control	Middle Atlantic	UPS-2200R-IP	1	\$	-
59	OFE Network Layer-3 Stackable PoE+ Switcher, 28P	OFE Cisco	SG350X-28MP	2	\$	-
60	OFE Warranty of Network Switcher, 1 Year	Cisco	Smartnet	2	\$	-
61	Optional: Year 4 Warranty	Vendor	Vendor	1	\$	-
62	Optional: Year 5 Warranty	Vendor	Vendor	1	\$	-
63					\$	-
64	<b>SUB TOTAL</b>				\$	-
65	<b>Systems Overview</b>					
66	Control Components			1	\$	-
67	Display Components			1	\$	-
68	Video Components			1	\$	-
69	Audio Components			1	\$	-
70	VTC Components			1	\$	-
71	Racks, Furniture & MISC			1	\$	-
72	<b>Room Overview</b>					
73	Equipment Total				\$	-
74	Labor / ODC's - (Labor, freight, G&A, MISC)				\$	-
75	<b>Total</b>				\$	-

Total Cost \$ -