

**STANDARD
BID & SPECIFICATIONS PACKAGE**

Renovations to 13th Ave. South
for
Facilities Maintenance
Bid #19-B0097



Prepared for

**THE CITY OF MYRTLE BEACH
HORRY COUNTY, SOUTH CAROLINA**

Procurement Office
3231 Mr. Joe White Avenue
Myrtle Beach, SC 29577
Ph# (843) 918-2170

SECTION 0100

NOTICE TO BIDDERS

Bid #19-B0097
Renovations to 13th Ave. South
for Facilities Maintenance

Owner: CITY OF MYRTLE BEACH
Post Office Drawer 2468
Myrtle Beach, South Carolina 29578

Architect: Tych & Walker Architects, LLP
PO Box 509
Pawleys Island, SC 29585

Date: March 21, 2019

Interested parties are invited to submit sealed bids to the Owner at the Procurement Office Conference Room located on 3231 Mr. Joe White Avenue, Myrtle Beach, South Carolina before 2:00pm, April 16, 2019.

The work is to entail, but not be limited to the following:

Renovations and alterations to an existing approximately 5,000 sf metal building structure. Work will include removal of all existing siding and roofing, and converting the building to a maintenance facility for the City of Myrtle Beach. The new work will include new metal stud walls, new sheet membrane roofing, new fiber cement siding, and all associated plumbing/mechanical/electrical work.

General Contractor to be responsible for security of premises throughout the duration of the project, and the protection of existing conditions.

Bidders shall comply with the requirements set forth in Section 0200 - Instruction to Bidders.

“Bid documents containing Plans and Specifications may be obtained from the printing agent DUNCAN-PARNELL (Myrtle Beach Office), ATTN: Debbie Flinchum, 1478 Dividend Loop, Myrtle Beach, SC 29577, Telephone (843) 626-3641 or email: debbie.flinchum@duncan-parnell.com. Please order documents via Duncan Parnell planroom [www.dpibidroom.com]. Bidders shall pay for printing, copying, delivery, shipping and/or handling charges. A CD containing Construction Documents (in .pdf format) may also be obtained from Duncan Parnell. No partial sets or electronic files will be issued.”

Direct any questions on this matter to Lauren Harrelson, Tych & Walker Architects at 843-651-7151, or Lauren@tychwalker.com.

Refer to other bidding requirements described in Document 0200 - Instructions to Bidders.

Bidders are required to submit their bid on the Bid Form provided. Bidders may not supplement this form unless otherwise directed. The Owner reserves the right to accept or reject any or all bids. Lowest bid may not prevail. Award of the bid will be based on the bid prices, references, past performance of bidder and any proposed subcontractor with projects of comparable scope, complexity, and time constraints.

Questions should be submitted in accordance with the timeline, following the mandatory pre-bid meeting scheduled on **Thursday, March 28, at 10:00 AM at the Job Site**. All interpretations, clarifications, or changes will be made in the form of written Addenda. See 3.04.D. page 0200-4.

Bidders shall comply with the requirements set forth in Section 0200 - Instruction to Bidders.

Bidders shall include bid security in the sum of no less than five percent (5%) of the bid price.

Refer to other bidding requirements described in Document 0200 - Instructions to Bidders.

The Owner shall have the right to accept Alternates in any order or combination, and to determine the low bidder on the basis of the sum of the Base Bid and alternates accepted.

Questions shall be submitted in writing to: Lauren@tychwalker.com. A copy of the response will be provided to all parties requesting a copy of the bid package.

Time Line:

Item		Time	Location*
Advertised Date of Issue:	Thursday, March 21, 2019	n/a	n/a
Mandatory Pre-Bid Conf & Site Inspection	Thursday, March 28, 2019	10:00AM ET	ON SITE*
Material Substitution Cut-Off Time:	Monday, April 8, 2019	3:00PM ET	n/a
Inquiry Cut-Off Time:	Monday, April 8, 2019	3:00PM ET	n/a
Bids Must be Received on/or Before:	Tuesday, April 16, 2019	2:00PM ET	City Purchasing
Public Bid Opening:	Tuesday, April 16, 2019	2:00PM ET	City Purchasing

*** Project site address is 520 13th Avenue South, Myrtle Beach, SC 29577.**

END OF SECTION

SECTION 0100A

SPECIAL INSTRUCTIONS TO BIDDERS

1. The work under this contract includes the furnishing of all material, labor, tools and equipment necessary for the project: Renovations to 13th Ave. South for Facilities Maintenance
2. The successful contractor must have approval and coordinate with the City of Myrtle Beach their scheduled working hours. Once the project begins, work will be continuous and conducted without delay for any contractor reason (s).
3. The contractor shall provide any and barricades and signage for the project or portion of the project within which operations are being conducted. All operations and material and equipment stockpiles shall be adequately barricaded and lighted. Access all work areas must be maintained at all times.
4. The contractor shall take proper measures to protect adjacent and adjoining areas of the project site that might be damaged by any process of the work in the contract. In case of damage the contractor shall restore, at its expense, the property to a similar or equal condition to that existing before damage was done.
5. The contractor is wholly responsible for the safety of the project and associated hazards/liability of the work performed. Sound safety practices will be adhered to.
6. Upon completion of the work, the contractor shall clean the entire area to a normal level or “first class” condition.
7. ***All roofing work under this contract is to be performed by a single source contractor.***

END OF SECTION

SECTION 0200

INSTRUCTIONS TO BIDDERS

1. SUMMARY

1.01 DOCUMENT INCLUDES:

- A. Invitation
 - 1. Bid Submission
 - 2. Work Identified in the Contract Documents
 - 3. Contract Time and Liquidated Damages

- B. Bid Documents and Contract Documents
 - 1. Definitions
 - 2. Availability
 - 3. Examination
 - 4. Queries/Addenda
 - 5. Product/System Substitutions
 - 6. Contract Documents

- C. Site Assessment
 - 1. Site Examination

- D. Qualifications
 - 1. Evidence of Qualifications
 - 2. Subcontractors/Suppliers/Others

- E. Bid Submission
 - 1. Submission Procedure
 - 2. Bid Ineligibility

- F. Bid Enclosures/Requirements
 - 1. Security Deposit
 - 2. Performance Assurance
 - 3. Bid Form Requirements
 - 4. Bid Form Signature

- G. Offer Acceptance/Rejection
 - 1. Duration of Offer
 - 2. Acceptance of Offer

1.02 RELATED DOCUMENTS

- A. Document 0100 - Notice to Bidders
- B. Document 0300 - Bid Forms
- C. Document 0550 - General Provisions
- D. Document 0650 - Architect/Engineer's Supplementary Conditions
- E. Document 0700 - Contract Forms

2. INVITATION

2.01 BID SUBMISSION

- A. Bids will be received by the City of Myrtle Beach (herein called the “Owner/Architect/Engineer”), at the Procurement Office located on 3231 Mr. Joe White Avenue, Myrtle Beach, South Carolina before **April 16 at 2 PM**, at which time they will be publicly opened and read aloud.
- B. Bids submitted after the time and date set for the receipt will be returned to the Bidder unopened.
- C. Amendments to the submitted offer will be permitted if received in writing prior to Bid closing and if signed by the same party or parties who signed and sealed the original bid.

2.02 WORK IDENTIFIED IN THE CONTRACT DOCUMENTS

- A. The work includes all work described in the Contract Documents.
- B. Location: City of Myrtle Beach 13th Ave South.
- C. The Owner reserves the right, to reject any and/or all Bids or lines in the bids. Award will be to the lowest bid on the items accepted. The Owner shall have the right to accept Alternates in any order or combination, and to determine the low bidder on the basis of the sum of the Base Bid and alternates accepted.

2.03 CONTRACT TIME AND LIQUIDATED DAMAGES

- A. Contractor shall complete all work within 180 days. Liquidated damages of **\$250/ day** will be assessed for each day thereafter.

3. BID DOCUMENTS AND CONTRACT DOCUMENTS

3.01 DEFINITIONS

- A. Bid Documents: Contract Documents, Bid Forms, Supplements-to-Bid Forms, and Bid Securities identified herein.
- B. Contract Documents: Defined in the Agreement Form.
- C. Bid: Act of submitting a sealed offer.
- D. Bid Price: Total cost to perform the work submitted by the Bidder in the Bid Form.

3.02 AVAILABILITY

- A. Bid Documents may be obtained at Duncan Parnell, Myrtle Beach, SC.
- B. Bid Documents can be obtained by Bidders upon payment by cash or certified check. Such payment is non-refundable.
- C. Bid Documents are made available only for the purpose of submitting a bid for this project.

3.03 EXAMINATION

- A. Each Bidder must satisfy themselves of the accuracy of the estimated quantities in the Bid Schedule by examination of the site, a review of the drawings, and by reading and being thoroughly familiar with the Contract Documents including Addenda. The failure or omission of any Bidder to do any of the foregoing shall in no way relieve any Bidder from any obligation in respect to its Bid.
- B. Bid Documents may be viewed at the office of the Architect/Engineer.
- C. Upon receipt of Bid Documents, verify that documents are complete. Notify Architect/Engineer should the documents be incomplete.
- D. Immediately notify the Architect/Engineer upon finding discrepancies or omissions in the Bid documents.

3.04 QUERIES/ADDENDA

- A. Direct all questions to the Architect via email at lauren@tychwalker.com. A copy of the response will be provided to all parties requesting a copy of the bid package.
- B. Addenda may be issued during the Bidding period. All Addenda shall become part of the Contract Documents. Include any resultant cost adjustments in the Bid Price.
- C. Verbal instructions or comments are not binding on any party.
- D. Clarifications requested by Bidders must be in writing as per timeline. The reply will be in the form of an Addendum, a copy of which will be forwarded to known recipients.

3.05 PRODUCT/SYSTEM SUBSTITUTIONS

- A. Where the Bid Documents stipulate a particular product/system, substitutions will be considered unless otherwise stated in the Contract Documents. See Section 01600 Material/Product Substitution Form.
- B. Bidders shall include in their Bid, any changes required in the Work to accommodate such substitutions. A later claim by the Bidder for an addition to the Contract Time or Contract Price because of changes in Work necessitated by use of substitutions shall not be approved.

3.06 CONTRACT DOCUMENTS

- A. The Contract Documents contain the provisions required for the completion of the work. Information obtained from an officer, agent, or employee of the Owner or any other person shall not affect the risks or obligations assumed by the Contractor or relieve him from fulfilling any of the conditions of the contract.

4. SITE ASSESSMENT

4.01 SITE EXAMINATION

- A. The Bidder is responsible to inspect the project site before submitting a Bid in order to become familiar with site and all existing conditions.
- B. Contractors shall be respectful of adjacent property owners and their concerns. The City will

assist in coordinating in site investigations prior to bid opening and during construction.

5. QUALIFICATIONS

5.01 EVIDENCE OF QUALIFICATIONS

- A. Bidders must be licensed to perform work in the State of South Carolina and shall include their license number on the Bid Documents.
- B. Evaluation of Bidders will concentrate on their experience with projects of comparable scope and complexity. Bidders shall indicate prior projects that exhibit these qualities in their statement of experience. Additional attachments exhibiting such experience must be included with the bid.

5.02 SUBCONTRACTORS/SUPPLIERS/OTHERS

- A. The Owner reserves the right to reject a proposed Subcontractor.
- B. Information on subcontractors shall be furnished by the Bidder to the Owner as required in the Contract Documents.
- C. All Subcontractors must be approved in writing by the Owner prior to the performance of any work. If any portion of the General Contracting Company submitting this bid has ownership of any portion of any of the Subcontractor Companies to be used, this must be disclosed to the Owner/Architect.

6. BID SUBMISSION

6.01 SUBMISSION PROCEDURE

- A. Each Bid must be submitted in a sealed envelope, addressed to the City of Myrtle Beach, at 3231 Mr. Joe White Ave, Myrtle Beach, South Carolina 29577. If delivered by hand the Bid shall be delivered to the Procurement Office at 3231 Mr. Joe White Avenue, Myrtle Beach, South Carolina.
- B. Each sealed envelope containing a Bid must be plainly marked on the outside as Bid for the City of Myrtle Beach, South Carolina and the envelope should bear on the outside the name of the Bidder, his address, his bidder's license number and the name of the project for which the Bid is submitted.
- C. Bidders shall be solely responsible for the delivery of their Bids in the manner and time prescribed.
- D. Bids mailed shall be enclosed in another envelope. Insert the closed and sealed Bid Form in the envelope to be mailed.
- E. A summary of submitted Bids will be made available to all Bidders within seven (7) working days.

6.02 BID INELIGIBILITY

- A. Bids that are incomplete, unsigned, improperly signed or sealed, conditional, illegible, obscure, contain arithmetical errors, erasures, alterations, or irregularities of any kind, will at

- the discretion of the Owner, be declared non-responsive.
- B. Bid bonds and bids must be signed to be considered.

7. BID ENCLOSURES/REQUIREMENTS

7.01 SECURITY DEPOSIT

- A. Bids shall be accompanied by a security deposit as follows:
1. Bid Bond of a sum no less than **five (5%)** percent of the Bid Price. (Include Power of Attorney).
 2. Certified check in the amount of **five (5%)** percent of the Bid Price.
 3. Other types of security may be allowed if pre-approved in writing by the Owner.
- B. Bids shall be submitted on the required form and shall include: Bid Proposal, Non-collusion Affidavit, Bidder's Representation, Statement of License Certificate, and Statement of Experience of the Bidder, Project Superintendent, and List of Subcontractors.
- C. The Bid Bond shall name the Owner as obliged, and be signed and sealed by the Contractor as principal as well as the Surety.
- D. Bid securities will be returned to all Bidders upon receipt by the Owner of the required Insurance, Performance, and Payment Bonds from the successful Bidder.
- E. Include the cost of Bid security in the Bid Price.
- F. All Bid securities will be returned to the respective Bidders.
- G. If no contract is awarded, all Bid securities will be returned.

7.02 PERFORMANCE ASSURANCE

- A. Successful Bidder: Shall provide the stipulated insurance, along with the Performance and Payment Bonds as described in the Contract Documents.
- B. Include the cost of bonding in the Bid Price.
- C. Attorneys-in-Fact who sign bid bonds or payment bonds and performance bonds must file with each bond a certified and effective dated copy of their power of attorney.

7.03 BID FORM REQUIREMENTS

- A. Complete all requested information in the Bid Form and Appendices.
- B. All Bids shall be submitted on the required Bid Form. All blank spaces for Bid prices must be filled in, in ink or typewritten, and the Bid Form must be fully completed and executed when submitted. Only one copy of the Bid Form is required.
- C. Bidders must satisfy themselves of the accuracy of the estimated quantities in the Bid Schedule by examination of the site and a review of the Contract Documents. After Bids have been submitted, the Bidder shall not assert that there was a misunderstanding concerning the quantities or nature of the Work.

7.04 BID FORM SIGNATURE

- A. The Bid Form shall be signed by the Bidder, as follows:
1. Sole Proprietorship: Signature of sole proprietor in the presence of a witness who will

- also sign. Insert the words "Sole Proprietor" under the signature. Affix seal.
2. Partnership: Signature of all partners in the presence of a witness who will also sign. Insert the word "Partner" under each signature. Affix seal to each signature.
 3. Corporation: Signature of a duly authorized signing officer(s) in their normal signatures. Insert the officer's capacity in which the signing officer acts under each signature. Affix the corporate seal. If the Bid is signed by officials other than the President and Secretary of the company, or the President/Secretary/Treasurer of the company, a copy of the by-law resolution of the Board of Directors authorizing them to do so must also be submitted with the Bid Form.
 4. Joint Venture: Each party of the joint venture shall execute the Bid Form under their respective seals in a manner appropriate to such party as described above, similar to the requirements of a Partnership.

8. OFFER ACCEPTANCE/REJECTION

8.01 DURATION OF OFFER

- A. Bids shall remain irrevocable for a period of **thirty (30) days** after the Bid closing date.
- B. Should there be reasons why the contract cannot be awarded within the specified period; the time may be extended by mutual agreement between the owner and the successful Bidder.

8.02 ACCEPTANCE OF BID

- A. The Owner reserves the right to accept or reject any or all bids. Lowest bid may not prevail. Award of the bid will be based on the bid prices, references, past performance of bidder and any proposed subcontractor with projects of comparable scope, complexity, and time constraints.
- B. The Owner shall have the right to accept Alternates in any order or combination, and to determine the low bidder on the basis of the sum of the Base Bid and alternates accepted.
- C. After determining the lowest responsive bidder, but prior to the Notice of Award to any bidder, the City may elect to open negotiations with the selected responsive and responsible bidder in an effort to improve the bid for a period of 15 working days. In these negotiations, the City may address scope of work, unit pricing, or any other subject fairly contained within the bid documents. In the event that the apparent responsive and responsible low bidder should decline to negotiate or should negotiations commence but fail, the City shall reject all bids.
- D. The Owner may make such investigations as he deems necessary to determine the ability of the Bidder to perform the Work, and the Bidder shall furnish to the Owner all such information and data for this purpose as the Owner may request. The Owner reserves the right to reject any Bid if the evidence submitted by, or investigation of, such Bidder fails to satisfy the Owner that such Bidder is properly qualified to carry out the obligations of the Agreement and to complete the Work contemplated therein.
- E. The party to whom the contract is awarded will be required to execute the Agreement and obtain the Performance Bond, Payment Bond, and Certificate of Insurance within **ten (10) calendar days** from the date when Notice of Award is delivered to the Bidder. The Notice of Award shall be accompanied by the necessary Agreement, Bond forms, and Certificate of Insurance. In case of failure of the Bidder to execute the Agreement, the Owner may at his option consider the Bidder in default, in which case the Bid Bond accompanying the proposal shall become the property of the Owner.
- F. The Owner within ten (10) days of receipt of acceptable Performance Bond, Payment Bond, Certificate of Insurance and Agreement signed by the party to whom the Agreement was awarded shall sign the Agreement and return to such party an executed duplicate of the Agreement. Should

the Owner not execute the Agreement within such period, the Bidder may by written notice withdraw his signed Agreement. Such notice of withdrawal shall be effective upon receipt of the notice by the Owner.

END OF SECTION

SECTION 0300

Renovations to 13th Ave. South
for Facilities Maintenance
Bid # 19-B0097
For the
CITY OF MYRTLE BEACH

BIDDER'S REPRESENTATION

By the act of submitting a bid for the proposed contract, the Bidder represents that:

1. The Bidder and all subcontractors the Bidder intends to use have carefully and thoroughly reviewed the Contract Documents and have found them complete and free from ambiguities and sufficient for the purpose intended; and
2. The Bidder and all workmen, employees and subcontractors the Bidder intends to use are skilled and experienced in the type of work represented by the Contract Documents; and
3. Neither the Bidder nor any of the Bidder's employees, agents, intended suppliers or subcontractors have relied upon any verbal representations, of the Owner, or the Owner's employees or agents including architects, Architect/Engineers or consultants, in assembling the bid; and
4. The bid figure is based solely upon the Contract Documents and not upon any other oral or written representation.

By: _____

Title: _____

Subscribed and sworn to before me

this _____ day of _____, 20____.

My commission expires on: _____.

NON-COLLUSION AFFIDAVIT OF PRIME BIDDER

State of South Carolina)
County of Horry)

being first duly sworn, deposes and says that:

- (1) He is _____ of _____, the Bidder that has submitted the attached Bid:
- (2) He is fully informed respecting the preparation and contents of the attached Bid and of all pertinent circumstances respecting such Bid:
- (3) Such Bid is genuine and is not a collusive or sham Bid;
- (4) Neither the said Bidder nor any of its officers, partners, owners, agents, representatives, employees or parties in interest, including this affiant, has in any way colluded, conspired, connived or agreed, directly or indirectly with any other Bidder, firm or person to submit a collusive or sham Bid in connection with the Contract for which the attached Bid has been submitted or to refrain from bidding in connection with such Contract, or has in any manner, directly or indirectly, sought by agreement or collusion or communication or conference with any other Bidder, firm or person to fix the price or prices in the attached Bid or of any other Bidder, or to fix any overhead, profit or cost element of the Bid price or the Bid price of any other Bidder, or to secure through any collusion, conspiracy, connivance or unlawful agreement any advantage against the Owners or any person interested in the proposed Contract; and
- (5) The price or prices quoted in the attached Bid are fair and proper and are not tainted by any collusion, conspiracy, connivance or unlawful agreement on the part of the Bidder or any of its agents, representatives, owners, employees, or parties in interest, including this affiant.

(Signed) _____

(Title)

Subscribed and sworn to before me this ____ day of _____, 20__.

_____. My commission expires

on: _____ (Title) _____

STATEMENT OF LICENSE CERTIFICATE

EACH CONTRACTOR BIDDING SHALL FILL IN AND SIGN THE FOLLOWING:

This is to certify that _____ have fully complied with all the requirements of the South Carolina Licensing Board for Contractors. The Contractor's license number and date of registration shall appear on the envelope containing the bid, otherwise the bid will not be considered.

_____ was issued Certificate No. _____

on _____, 20__ by the State Board for licensing General Contractors.

Signed: _____

Title: _____

STATEMENT OF EXPERIENCE OF THE BIDDER

The bidder is requested to state below what work of similar scope and complexity he has completed, and to give references that will enable the Owner to judge his experience, skill and business standing and his ability to conduct the work as completely and as rapidly as required under the terms of the contract.

<u>Project and Location</u>	<u>Reference with Current Phone No.</u>
1) _____ _____	_____ _____
2) _____ _____	_____ _____
3) _____ _____	_____ _____
4) _____ _____	_____ _____
5) _____ _____	_____ _____
6) _____ _____	_____ _____
7) _____ _____	_____ _____

Dated: _____ Bidder: _____

Signed: _____

Title: _____

PROJECT SUPERINTENDENCE

The Undersigned states that the following employee will assume the role of project superintendent representing the Contractor on this Project. The undersigned further states that this individual, whose qualifications are presented below (attach additional sheets, if necessary), will have authority to speak for the Contractor and will not be removed from this Project or temporarily substituted for on this Project without the written consent of the Owner and Project Architect/Engineer.

Project Superintendent's Name: _____

Years of Experience: _____

Brief but Complete Description of Experience Relevant to this Project: _____

References from Owners where work of similar scope, and complexity has been accomplished under Proposed Superintendent's direct supervision.

1. _____ 2. _____ 3. _____ 4. _____ 5. _____

(Phone) (Phone) (Phone) (Phone) (Phone)

"I consent to the disclosure of my qualifications and other applicable personal data for the purpose of evaluating proposals under this solicitation."

Employee's Signature

Date

"I certify to this employee's role in this Project and that the qualifications presented herein are accurate, complete and current."

Bidder: _____

Date: _____

Signed: _____

Title: _____

LIST OF SUBCONTRACTORS

The undersigned states that the following is a full and complete list of the proposed subcontractors on this Project and the class of work to be performed by each, and that such list will not be added to nor altered without written consent of the Owner. **If any portion of the General Contracting Company submitting this bid has ownership of any portion of any of the Subcontractor Companies listed below, this must be disclosed on this form.**

Subcontractor and Address	Class of Work to be Performed
1) _____ _____	Roofing _____ Steel Erector/Installation _____
2) _____ _____	Plumbing _____ Mechanical _____
3) _____ _____	Electrical _____
4) _____ _____	
5) _____ _____	
6) _____ _____	
7) _____ _____	

Dated: _____

Bidder: _____

Signed: _____

Title: _____

BID BOND

KNOW ALL MEN BY THESE PRESENTS, that we the undersigned, _____ as PRINCIPAL, and _____ as SURETY are hereby held and firmly bound unto _____, as OWNER, in the penal sum of _____, for the payment of which, well and truly to be made, we hereby jointly and severally bind ourselves, successors and assigns.

THE CONDITION OF THE ABOVE OBLIGATION IS SUCH, that Whereas the Principal has submitted to the City of Myrtle Beach a certain BID, attached hereto and hereby made a part hereof to enter into a contract in writing, for the _____

NOW, THEREFORE,

- (a) If said BID shall be rejected, or
- (b) If said BID shall be accepted and the Principal shall execute and deliver a contract in the Form of Contract attached hereto (properly completed in accordance with said BID) and shall furnish a BOND for his faithful performance of said contract, and for the payment of all persons performing labor or furnishing materials in connection therewith, and shall in all other respects perform the agreement created by the acceptance of said BID,

then this obligation shall be void, otherwise the same shall remain in force and effect; it being expressly understood and agreed that the liability of the Surety for any and all claims hereunder shall, in no event, exceed the penal amount of this obligation as herein stated.

THE SURETY, for value received, hereby stipulates and agrees that the obligations of said Surety and its BOND shall be in no way impaired or affected by any extension of the time within which the OWNER may accept such BID; and said Surety does hereby waive notice of any such extension.

IN WITNESS WHEREOF, the Principal and the Surety have hereunto set their hands and seals, and such of them as are corporations have caused their corporate seals to be hereto affixed and these presents to be signed by their proper officers, the day and year first set forth above.

(L.S.)

Principal

Surety

By: _____

Date: _____

IMPORTANT - Surety companies executing BONDS must appear on the Treasury Department's most current list (Circular 570 as amended) and be authorized to transact business in the state where the project is located.

SECTION 0300

PROPOSAL

Proposal of _____ (hereinafter called "BIDDER"),
organized and existing under the laws of the State of _____
doing business as _____*.

To the City of Myrtle Beach, South Carolina, (hereinafter called "OWNER").

In compliance with your Advertisement for Bids, BIDDER hereby proposes to perform all WORK for the Renovations to 13th Ave. South for Facilities Maintenance in strict accordance with the CONTRACT DOCUMENTS, within the time set forth therein, and at the prices stated below.

By submission of this BID, each BIDDER certifies, and in the case of a joint BID each party thereto certifies as to his own organization, that this BID has been arrived at independently, without consultation, communication, or agreement as to any matter relating to this BID with any other BIDDER or with any competitor.

BIDDER hereby agrees to commence WORK under this contract on or before a date to be specified in the NOTICE TO PROCEED and to fully complete the PROJECT within the time constraints as set forth in Section 0200, Paragraph 2.03 - Contract Time and Liquidated Damages; Section 0650, Paragraph 1.20 - Project Schedule, and; as further stated herein. BIDDER further agrees to pay as liquidated damages, the sum of **\$250** for each consecutive calendar day thereafter as provided in Section 0200, Paragraph 2.03 and Section 0650, Paragraph 1.20.

BIDDER acknowledges receipt of the following ADDENDUM:

Addendum No. _____,	Dated: _____
Addendum No. _____,	Dated: _____
Addendum No. _____,	Dated: _____

*Insert "a corporation", "a partnership", or "an individual" as applicable.

BIDDER agrees to perform the work described in the CONTRACT DOCUMENTS for the following unit bid price.

BID SCHEDULE

Item	Description	Qty	Unit	Unit Price	Amount
Renovations to 13th Ave. South for Facilities Maintenance					

LUMP SUM PRICE

TOTAL BID: _____
(In Words)

ALTERNATE #1 DELETE Casework and Countertops

DELETE _____

ALTERNATE #1 DELETE Plywood materials and insulation at Room 121 Workshop, All Walls

DELETE _____

NOTE: Bids shall include sales tax and all other applicable taxes and fees.

Respectfully submitted:

Signature

Address

Title

Date

License Number (if applicable)

SEAL (if BID is by a corporation)

Attest: _____

SECTION 0550

CITY OF MYRTLE BEACH DEPARTMENT OF PUBLIC WORKS

GENERAL PROVISIONS

I. REQUIREMENTS

A. Definitions

Whenever used in these General Provisions or in the other Contract Documents, the following terms shall have the meanings indicated which are applicable to both the singular and plural thereof:

1. "Directed", "permitted", "reviewed", "accepted", "approved", or words of similar import mean the direction, requirements, permission, approval, or acceptance of Architect/Engineer, or Owner, unless stated otherwise.
2. "As shown", "as indicated", "as detailed", or words of similar import refer to the Drawings unless stated otherwise.
3. "Addenda", -- Written or graphic instruments issued prior to the opening of Bids which clarify, correct, or change the Contract Documents.
4. "Agreement", -- The written agreement between the Owner and Contractor outlining the work to be performed, the Contract Time, and the Contract Price.
5. "Application for Payment", -- The Periodical Estimate for Partial Payment Form which is to be used by Contractor in requesting progress or final payment and which is to include such supporting documentation as is required by the Contract Documents. A copy of the form is included with these Contract Documents.
6. "Bid", -- The offer or proposal of the Bidder submitted on the prescribed form setting forth the prices for the work to be performed.
7. "Bonds", -- Bid, performances, and payment bonds and other acceptable instruments of security.
8. "Change Order", -- A written order to Contractor signed by Owner authorizing an addition, deletion, or revision in the work or an adjustment in the Contract Price or the Contract Time, issued on or after the effective date of the Agreement.
9. "Contract Price", -- The money payable by Owner to Contractor under the Contract Documents as stated in the Agreement (subject to the approximate quantities provisions in the Instructions to Bidders in the case of Unit Price Work).
10. "Contract Time", -- The number of days or the date stated in the Agreement for the

completion of the Work.

11. "Contractor", -- The person, firm, or corporation with whom Owner has entered into the Agreement.
12. "Day", -- A calendar day of twenty-four hours measured from midnight to the next midnight.
13. "Defective", -- An adjective which when modifying the word Work refers to Work that is unsatisfactory, faulty, or deficient, or does not conform to the Contract Documents or does not meet the requirements of any inspection, reference standard, test, or approval referred to in the Contract Documents, or has been damaged prior to Architect/Engineer's recommendation of final payment.
14. "Drawings", -- The Drawings which show the character and scope of the work to be performed and which have been prepared or approved by Architect/Engineer and are referred to in the Contract Documents.
15. "Effective Date of the Agreement", -- The date indicated in the Agreement on which it becomes effective, but if no such date is indicated it means the date on which the Agreement is signed and delivered by the last of the two parties to sign and deliver.
16. "Architect/Engineer", -- City of Myrtle Beach Architect/Engineering Division.
17. "Field Order", -- A written order issued by Architect/Engineer which orders minor changes in the Work but which does not involve a change in the Contract Price or the Contract Time.
18. "Final Acceptance", -- The date when the construction of the project is complete in accordance with the Contract Documents so that the entire project can be utilized for the purposes for which it is intended and all monies due Contractor have been paid him in the final Application for Payment.
19. "General Requirements", -- Officially recognized materials and workmanship specifications of the Owner.
20. "Inspector", -- The Architect/Engineering or technical inspector duly authorized or appointed by Architect/Engineer or by Owner, limited to the particular duties entrusted to him.
21. "Major Equipment", -- The major equipment items listed by name in the Contract Documents which are to be furnished and installed under the Contract.
22. "Modification", -- (a) A written amendment of the Contract Documents signed by both parties, (b) a Change Order, or (c) a Field Order. A modification may only be issued after the effective date of the Agreement.
23. "Notice of Award", -- The written notice by Owner to the successful Bidder stating that upon compliance with the conditions precedent enumerated therein, and within the time specified, Owner will sign and deliver the Agreement.

24. "Notice to Proceed", -- A written notice given by Owner to Contractor, (with a copy to Architect/Engineer), fixing the date on which the Contract Time will commence to run and on which Contractor shall start to perform Contractor's obligation under the Contract Documents and the date on which all work scheduled under the Contract shall be completed.
25. "Owner", -- The City of Myrtle Beach, South Carolina.
26. "Project", -- The total construction of which the work to be provided under the Contract Documents may be the whole or a part, as indicated in the Contract Documents.
27. "Provide", -- As used in the Specifications means furnish and install.
28. "Shop Drawings", -- All drawings, diagrams, illustrations, schedules, and other data which are specifically prepared by or for Contractor to illustrate some portion of the Work and all illustrations, brochures, standard schedules, performance charts, instructions, diagrams, and other information prepared by a supplier and submitted by Contractor to illustrate material or equipment for some portion of the Work.
29. "Specifications", -- Those portions of the Contract Documents consisting of written technical descriptions of materials, equipment, construction systems, standards, and workmanship as applied to the Work and certain administrative details applicable thereto.
30. "Sub-Contractor", -- An individual, firm, or corporation having a direct contract with Contractor or with any other Sub-Contractor for the performance of a part of the work.
31. "Substantial Completion", -- The Work (or a specified part thereof) which has progressed to the point where, in the written opinion of Architect/Engineer, it is sufficiently complete, in accordance with the Contract Documents, so that the Work (or specified part) can be utilized for the purpose for which it was intended. The terms "substantially complete" and "substantially completed" , as applied to any Work, refer to Substantial Completion thereof.
32. "Supplier", -- A manufacturer, fabricator, supplier, distributor, materialman, or vendor.
33. "Work", -- The entire completed construction or the various separately identifiable parts thereof required to be furnished under the Contract Documents. Work is the result of performing services, furnishing labor, and furnishing and incorporating materials and equipment into the construction, all as required by the Contract Documents.

B. ABBREVIATIONS

Wherever abbreviations are used in this Contract Document, each such abbreviation shall have the following listed meaning:

UNIT OF MEASURE

CY	Cubic Yard
Ft.	Feet
Lbs.	Pounds
M	One Thousand
MFBM	One Thousand Feet Board Measure

C	Centigrade
F	Fahrenheit
HP	Horsepower
KVA	Kilovolt Ampere
BTU	British Thermal Unit
LF	Linear Feet

TYPES AND UNITS

DI	Ductile Iron
PVC	Polyvinyl Chloride
HDPE	High Density Polyethylene
MJ	Mechanical Joint
B & S	Beel and Spigot
T & G	Tongue and Groove
SS	Single Strength
DS	Double Strength
VC	Vitrified Clay
RC	Reinforced Concrete
MH	Manhole
CB	Catch basin
ES	Extra Strength

ORGANIZATIONS AND PUBLICATIONS

AASHTO	American Association of State Highway and Transportation Officials
ACI	American Concrete Institute
AIEE	American Institute of Electrical Architect/Engineers
AISC	American Institute of Steel Construction
ASA	American Standards Association, Inc.
ASME	American Society of Mechanical Architect/Engineers
ASTM	American Society for Testing and Materials
AWWA	American Waterworks Association
AWS	American Welding Society
MISS	Manufacturers Standardization Society of the Valve and Fitting Industry
NBFU	National Board of Fire Underwriters
NEC	National Electrical Code
NEMA	National Electrical Manufacturers Association
NFPA	National Fire Protection Association
PCA	Portland Cement Association
UL	Underwriters Laboratory
UBC	Uniform Building Code

C. CONTRACTOR'S BONDS

- (1) Faithful Performance Bond: As a part of the execution of this Contract, the Contractor shall furnish to the Owner, a bond payable to the City of Myrtle Beach in the form of Faithful Performance Bond set forth herein, secured by a surety company acceptable to the Owner, conditioned upon the faithful performance of all covenants and stipulations under this contract. Attorney in fact of Power of Attorney signature on bonds is

permissible. The amount of the bond shall be not less than one hundred percent (100%) of the total contract amount as set forth in the Agreement.

- (2) Labor and Material Bond: As a part of the execution of this Contract, the Contractor shall furnish to the Owner, a bond of surety company acceptable to the Owner in a sum of one hundred percent (100%) of the total contract amount, as set forth in the Agreement for the payment in full of all persons, companies or corporations who perform labor upon or furnish material to be used in the work under this Contract.
- (3) Bid Bond: 5% of total Contract.
- (4) Notification of Surety Companies: The Contractor shall advise the surety companies and other signers of the bonds listed above to familiarize themselves with all of the conditions and provisions of this Contract, and they shall waive the right of special notification of any change or modification to this Contract or of extension of time, or of decreased or increased work, or of the cancellation of the Contract or of any other act or acts by the Owner or its authorized employees and agents, under the terms of this Contract and failure to so notify the aforesaid surety companies of changes shall in no way relieve the surety companies of their obligations under this Contract.

D. CONTRACTOR'S INSURANCE

- (1) Public Liability and Property Damage.

The Contractor shall purchase and thereafter maintain for the term of this Agreement and any subsequent extensions hereto, public liability insurance to protect Contractor from claims for bodily injury and/or property damage which may result from Contractor's performance of this Agreement. The policy shall provide a combined single limit of liability of \$1,000,000 per occurrence for bodily injury and property damage with an aggregate limit of not less than \$1,000,000.

- (2) Automobile Liability.

The Contractor shall purchase and thereafter maintain for the term of this Agreement and any subsequent extensions hereto, comprehensive automobile liability insurance to protect the Contractor from claims for bodily injury and property damage which may arise from Contractor's use of motor vehicles in the performance of this Agreement. The policy must provide coverage for "ANY AUTO (CODE 1)" and Contractual Liability (endorsement CA 0025). The policy shall provide for a combined single limit of \$1,000,000 per occurrence for bodily injury and property damage.

- (3) Workers' Compensation Insurance.

Prior to beginning the work, the Contractor shall take out full compensation insurance for all persons which may be employed directly or indirectly in the performance of this Agreement. The policy must provide Employers Liability coverage in the amount of \$500,000 each accident; \$500,000 bodily injury by disease each employee and \$500,000 bodily injury by disease policy limit and shall be maintained in full force and effect during the term of this Agreement and any subsequent extensions hereto.

- (4) Excess Liability Policy.

At the option of the Contractor, the limits of the primary general liability, automobile liability and employer's liability policies may be less than stipulated herein, with an excess policy providing the additional limits required. This form of coverage must be approved by the Owner and will only be acceptable when both the primary and excess policies include the coverages and endorsements required herein.

(5) Builders Risk Insurance.

If applicable, the Owner shall provide and maintain Builders Risk coverage in an amount equal to 100% of the Project's completed value. Coverage shall include but not be limited to, fire, lightning, windstorms, hail, smoke, explosion, riot, riot attending a strike, civil commotion, aircraft, vehicles, vandalism, malicious mischief, glass breakage, falling objects, water damage, collapse, flood and earthquake. The policy shall include coverage, but not be way of limitation, for all damage or loss to the work and to appurtenances, materials and equipment to be used on the Project while same are stored on the work site or approved storage area. Coverage does not extend to any tools, equipment or materials which are not intended to become part of the Project. All losses will be adjusted with and be made payable to the Owner. The Owner shall provide the Contractor with a Certificate of Insurance reflecting the foregoing, and that coverage will remain in effect until the Project has been accepted by the Owner. The policy shall be endorsed with a "Waiver of Occupancy" to allow the Owner to use the property during the Project.

(6) Policy Endorsements.

The following clauses shall be endorsed to the policy(s) indicated below:

(a) General Liability and Automobile Liability

1. "It is understood and agreed that in consideration of the terms and conditions of this policy to which this endorsement is attached, the City of Myrtle Beach, its officials, agents and employees are recognized as additional named insureds under the policy and as such will be provided thirty (30) days written notice of non-renewal, exhaustion of aggregate limit, modifications of coverage or cancellation for any reasons and the company hereby agrees to provide such notice. Failure of the company to provide the required notice shall cause the coverage to continue in force for the benefit of the Owner, its officials, agents, and employees until proper notification as required herein is provided, the provisions of the policy or any certificate of insurance to the contrary notwithstanding."

Contractor's insurance shall be primary to any insurance or self-insurance maintained by the Owner, its officials, agents or employees, which is considered excess and non-contributing for the purpose of this Agreement".

3. "The company shall not have recourse against the Owner for payment of any premiums, deductibles or for payment of any premiums, deductibles or for assessments under this policy."

4. "Failure of any named insured to comply with the reporting requirements of the policy shall not affect the coverage provided to the Owner as an additional insured."
5. If the Contractor, to meet the obligations of the Contract, obtains any endorsement to its General Liability Policy not specifically required by this Contract, the Contractor shall be required to have the Owner, as an additional insured, covered by the same endorsements or otherwise, including, but not limited to, completed operations coverage.

(b) Workers' Compensation

1. "Underwriters have no right of recovery of subrogation against the Owner for losses which result from work performed under this Agreement."
2. The cancellation provision is hereby amended to provide that the Owner will be provided thirty **(30 days)** written notice in the event of coverage cancellation.

(7) Subcontractors.

Contractor shall not be required to name Subcontractors as additional insureds in any insurance policy required herein. Contractor will, however, secure certificates of insurance as evidence that each Subcontractor carries insurance to provide coverage under this Agreement in the same form as is required of the Contractor.

(8) Notifications of Insurance Companies.

It is the responsibility of the Contractor to notify all insurance companies to familiarize themselves with all terms and conditions of this Agreement. The insurance companies shall waive their right of notification by the Owner of any change or modification of this contract, or of decreased work or increased work, or of the cancellation of this Agreement or of any other acts by the Owner or its authorized employees or agents under the terms of this Agreement. The waiver by the insurance companies shall in no way relieve them of their obligations under this Agreement.

(9) Certificates of Insurance.

Contractor shall file with the Owner a certificate of insurance for approval by the Owner prior to the inception of any work. Renewal certificates shall be sent to the Owner 30 days prior to the expiration date of any policy required herein. The Owner reserves the right to require submission of certified copies of all insurance policies at its sole discretion.

(10) Coverage Cancellation or Unsatisfactory Coverage.

If at any time any of the foregoing policies shall be or become unsatisfactory to the Owner, as to form or coverage, or if a company issuing any such policy shall be or become unsatisfactory to the Owner, the Contractor shall, upon notice to that effect from

the Owner, promptly obtain a new policy and submit the same for approval to the Owner. Upon failure of the Contractor to furnish, deliver and maintain the insurance coverages required herein, this Agreement, at the sole discretion of the Owner, may be forthwith declared suspended, discontinued or terminated. Failure of the Contractor to take out and/or maintain any required insurance shall not relieve the Contractor from any liability under this Agreement, nor shall the insurance requirements be construed to conflict with or otherwise limit the obligations of the Contractor concerning indemnification.

(11) Hold Harmless.

Contractor agrees to protect, defend, indemnify and hold the Owner, its officers, employees and agents free and harmless from and against any and all claims, losses, fines, penalties, damages, settlements, costs, changes, attorney's fees and costs, professional fees or other expenses and liabilities of every kind and character arising in whole or in part, out of or relating to any and all claims, liens, demands, obligations, actions, proceedings, or causes of action of every kind in connection with or arising out of this Agreement and/or the performance hereof, without regard to fault or negligence of the Contractor or the Owner, that arise in whole or in part from any claim or actual action(s) of, or failure(s) to act by the Contractor, its officers, employees, subcontractors or agents. Contractor further agrees to investigate, handle, respond to, provide to, provide defense for and defend the same, regardless of fault of the Contractor or Owner or whether claims made are directly attributable to actions or inactions of the Contractor, at its sole expense and agrees to bear all other cost and expenses related thereto. The contractor shall protect, indemnify, defend and hold the Owner harmless regardless of any claimed or actual, negligence, breach of warranty of any kind, including warranties related to plans and specifications, against or by the Owner, its officers, employees and agents, professionals or Architect/Engineers. The Contractor also agrees to notify all insurers of claims made and demand defense of the Contractor and the Owner.

The Contractor also agrees to pay all attorney's fees, court fees, expert fees, and all other cost of litigation which are incurred by the Owner, which relate in whole or in part to any suit, arbitration, mediation, alternative dispute resolution, dispute, enforcement, default, declaratory judgment action, or other action in law or in equity, including appeals between Owner and Contractor, regardless of fault, which arise out of, in whole or in part, this agreement and or the performance hereof.

E. LOCATION OF EXISTING UTILITIES AND PIPING

The location of existing piping and underground utilities, as shown on the Drawings have been taken from existing record drawings, and information provided by other utilities. However, the Owner does not assume responsibility for the possibility that during construction utilities other than those shown may be different from the locations designated on the Drawings.

The Contractor shall proceed with caution in any excavation so that the exact location of underground utilities may be determined. Before excavation or boring is commenced, it shall be the duty of the Contractor to contact all utility companies to aid in locating their underground installations. The Contractor shall, at his own expense, furnish all labor and tools to verify and substantiate the indicated locations.

Any utility lines, services, poles or other structures which are damaged shall be repaired or replaced by the Contractor at his expense and the Contractor shall indemnify the Owner from any

claims resulting from such damage.

Due to the nature of the work, adjustments may be required in new construction to meet existing conditions. Such adjustments shall be made by the Contractor without additional cost to the Owner unless the scope of such adjustment(s) is approved by the Owner in the form of a Change Order.

F. LABOR PROVISIONS

The Contractor shall employ only competent and skilled workers and forepersons in the conduct of the Project. The Owner shall have the authority to order the Contractor to remove from the Project any of Contractor's employees who refuse to obey instructions relating to the carrying out of the provisions and intent of the provisions of the Contract, or who are incompetent, unfaithful, abusive, threatening or disorderly in their conduct, and any such person shall not again be employed on the Project.

G. NOTICE OF STARTING WORK

The Contractor shall notify the Architect/Engineer and Owner in writing forty-eight (48) hours before starting work at the Project Site. In case of a temporary suspension of work, he shall give reasonable notice before resuming work.

H. EFFECT OF EXTENSION OF TIME

The granting of any extension of time on account of delays which in the judgment of the Owner are avoidable delays shall in no way operate as a waiver on the part of the Owner of its rights under this Contract.

I. EXTRA WORK

If extra work is assigned in accordance with the provisions of this contract, such work shall be considered a part hereof and subject to all its terms and requirements. Any such extra work shall be in the form of a Change Order to the Contract.

J. ASSIGNMENT OF CONTRACT

The Contract may not be assigned in whole or in part except upon the written consent of the Owner.

L. DISCREPANCIES

Anything called for by one of the Contract Documents and not called for by others shall be of like effect as if required or called for by all. Any discrepancies between any parts of the Contract Documents shall be called to the attention of the Architect/Engineer by the Contractor, in writing, for a decision before proceeding with the work affected thereby.

M. LIABILITY OF OWNER'S REPRESENTATIVES AND OFFICIALS

No official or employee of the Owner, nor the Architect/Engineer, nor any authorized assistant or agent of either, shall be responsible for construction means, methods, techniques, sequences or

procedures, time of performance or for safety precautions and programs in connection with the work. The Architect/Engineer shall not be responsible for the failure of the Contractor to carry out the work in accordance with the Contract Documents. The Architect/Engineer shall not be responsible for acts or omissions of the Contractor, any Subcontractor(s), or any of their agents or employees, or any other persons performing the work.

N. EFFECT OF INSPECTION AND PAYMENT

Neither the inspection by the Architect/Engineer nor by any of his agents, nor by an inspector, nor any order, measurements, approved modification, certificate or payment of money, nor acceptance of any part or whole of work, nor any extension of time, nor any possession by the Owner or its agents, shall operate as a waiver of any provision of this Contract or of any power reserved therein to the Owner or any right to damages thereunder; nor shall the waiver of any breach of this Contract be held to be a waiver of any other or subsequent breach. All remedies shall be construed as cumulative.

II. LEGAL RELATIONS AND RESPONSIBILITY

A. LAWS TO BE OBSERVED

The Contractor shall keep himself fully informed of all applicable Federal, State, County, and City laws, ordinances and regulations which in any manner affect those engaged or employed in the work or the materials used in the work or the conduct of the work or the rights, duties, powers, or obligations of the Owner or of the Contractor or which otherwise affect the Contract, and of all orders and decrees of bodies or tribunals having any jurisdiction or authority over the same. He shall at all times observe and comply with, and shall cause all his agents, subcontractors and employees to observe and comply with, all such laws, ordinances, regulations, orders and decrees; and shall protect and indemnify the Owner, the Architect/Engineer and all of their officers, agents and employees, against any claim, loss or liability arising or resulting from or based upon the violation of any such laws, ordinance, regulation, order or decree, whether by himself or by his agents, subcontractor or employees. If any discrepancy or inconsistency is discovered in the Contract Documents for the work in relation to such laws, ordinance, regulation, orders or decree, the Contractor shall forthwith report the same to the Architect/Engineer and the Owner.

B. PROVISIONS OF LAW

It is specifically provided that this Contract is subject to all applicable laws and that the rules of law shall prevail over any provision contained in any of the Contract Documents which may be in conflict thereto or inconsistent therewith.

III. RESPONSIBILITIES AND RIGHTS OF CONTRACTORS

A. ATTENTION TO WORK

The Contractor shall direct the work using his best skill and judgment and shall give his personal attention to and shall supervise the work to the end that it shall be performed faithfully, and when he is not personally present on the work, he shall at all times be represented by a competent superintendent or foreman who shall be present at the work and who shall receive and obey all instructions or orders given under this Contract, and who shall have full authority to execute the

same, and to supply materials, tools and labor without delay and who shall be the legal representative of the Contractor. The Contractor shall be solely responsible for all construction means, methods, techniques, sequences and procedures, time of performance and for safety precautions and programs and for coordinating all portions of the construction. The Contractor shall be liable for the faithful observance of any instructions delivered to him or to his authorized representative.

B. ACCESS TO WORK

The Contractor shall at all times provide facilities for access and inspection of the work by representatives of the Owner and of such official governmental agencies having jurisdictional rights to inspect the work.

C. WORK SITE

(1) Use of Work Site. The Contractor shall confine his equipment, apparatus, the storage of materials, and operations of his workers to limits indicated by the law, ordinance, permit, Contract Documents or directions of the Owner.

The Contractors shall not load or permit any part of a structure to be loaded with weight that will endanger its safety. The Contractor shall observe and enforce the Owner's instructions regarding signs, advertisements, fires and smoke, unless such instructions are non-permissible in accordance within the jurisdiction of another authority.

(2) Use of Private Land. The Contractor shall not use any vacant lot or private land as a plant site, depository for materials, or as a spill site, or for any other purpose without the written authorization of the person(s) owning the property and the written approval of the Owner for the use of such property. A copy of the written Agreement between the property owner and the Contractor shall be provided to the Owner.

(3) The hard surfaced playground area is accessible for Contractor laydown area but must be protected to prevent damage to existing surface

D. SIGNS

The Contractor may place and maintain one sign board on the Project site. No other commercial or advertising signs will be allowed on the work site or on public property in the vicinity of the work. The layout and content of the sign shall be approved by the Owner.

E. LIABILITY OF CONTRACTOR

The Contractor shall do all of the work and furnish all labor, materials, tools and appliances, except as otherwise herein expressly stipulated, necessary or proper for performing and completing the work herein required in the manner and within the time specified in the Contract Documents. The mention of any duty or liability imposed upon the Contractor shall not be construed as a limitation or restriction or any general duty or other liability imposed upon the Contractor by this Contract, said reference to any specific duty or liability being made merely for the purpose of explanation. The Contractor shall provide all items, materials, articles, operations or methods listed, noted, mentioned or scheduled on the drawings or in any of the Contract Documents, including all labor, materials, plant, equipment, transportation and incidentals required and necessary for the completion of the work, and unless specifically shown otherwise herein, all plant, equipment and other works shall be completed in place and approved

for operation. The Contractor shall be responsible to the Owner for the acts and omissions of all his employees, and all other persons performing any of the work under a contract with the Contractor.

F. ASSUMPTION OF RISKS

The Contractor shall rebuild, replace, repair, restore, and make good all injuries, damages, re-erection, and repairs occasioned or rendered necessary by causes of any nature whatsoever, to all or any portions of the work, except as otherwise stipulated, until completion and acceptance by the Owner.

G. RESPONSIBILITY FOR DAMAGE

The Contractor shall indemnify and save harmless the Owner, its officers, employees, and agents and the Architect/Engineer from any and all loss, liability or damage and from all suits, actions, damages, or claims, of every name and description arising from the acts and omission of the Contractor, its employees, agents, representatives, or subcontractors.

H. PROTECTION OF PERSONS AND PROPERTY

The Contractor will be solely and completely responsible for conditions of the work site, including safety of all persons and property during performance of the work. This requirement will apply continuously and not be limited to normal working hours.

The Contractor shall furnish such watchmen, guards, fences, warning signs, lights and walkways, and shall take all other precautions as shall be necessary to prevent damage to persons or property. All structures and improvements in the vicinity of the work shall be protected by the Contractor, and if such property is damaged, injured or destroyed by the Contractor, his employees, Subcontractors, or agents, it shall be restored to a condition as good as when he entered upon the work.

The safety provisions of applicable laws, including but not limited to building and construction codes, shall be observed. Machinery, equipment, and all hazards shall be eliminated or guarded in accordance with OSHA standards.

Any construction inspection conducted by the Owner and/or Architect/Engineer of the contractor's performance is not intended to include review of the adequacy of the Contractor's safety measures.

I. PROTECTION OF CONTRACTOR'S WORK AND PROPERTY

The Contractor shall protect his work, supplies, and materials from damage due to the nature of the work, the action of the elements, trespassers or any cause whatsoever, until the completion and acceptance of the work.

Neither the Owner nor any of its officers, employees or agents nor the Architect/Engineer assumes any responsibility for collecting indemnity from any person or persons causing damage to the work of the Contractor.

J. PROTECTION OF EXISTING STRUCTURES

Unless otherwise indicated in the Contract Documents or unless otherwise taken care of by the Owner thereof, all utilities and all structures of any nature, whether below or above ground, that may be affected by the work shall be protected and maintained by the Contractor and shall not be disturbed or damaged by him during the progress of the work; provided that should the Contractor disturb, disconnect, or damage any utility or any structure, all expenses of whatever nature arising from such disturbance or the replacement or repair thereof shall be borne by the Contractor.

K. MAINTENANCE OF TRAFFIC

Throughout the performance of the work or in connection with this Contract, the Contractor shall construct and adequately maintain suitable and safe crossing over the trenches and such detours as are necessary to care for public and private traffic. The material excavated from trenches shall be compactly deposited along the side of the trench or elsewhere in such manner as shall give as little inconvenience as possible to the traveling public, to adjoining property owners, to other contractors or to the Owner. Where necessary or required, road detours must be approved by the Owner or other appropriate authorities at least 24 hours in advance of the proposed rerouting. MUTCD standards must be adhered to at all times.

L. PRESERVATION OF STAKES AND MARKS

The Contractor shall carefully preserve all bench marks, reference points, stakes, property pins, survey monuments and like items. In case he causes damage or disturbance, he will be charged with the resulting expense of replacement and shall be responsible for any mistakes that may be caused by their loss or disturbance.

M. APPROVAL OF CONTRACTOR'S PLAN

The approval by the Architect/Engineer or the Owner of any drawing or any method of work proposed by the Contractor shall not relieve the Contractor of any of his responsibility for any errors therein and shall not be regarded as any assumption of risk of liability by the Owner or any officer or employee thereof, and the Contractor shall have no claim under the Contract due to the failure or inefficiency of any plan or method approved. Such approval shall be considered to mean merely that the Architect/Engineer or Owner has no objection to the Contractor's using, upon his own full responsibility, the plans or methods proposed.

N. SUGGESTIONS TO CONTRACTOR

Any plan or method of work suggested by the Architect/Engineer or Owner to the Contractor, but not specified or required, if adopted or followed by the Contractor in whole or in part, shall be used at the risk and responsibility of the Contractor. The Architect/Engineer and the Owner shall assume no responsibility therefore.

O. LICENSES, PERMITS AND REGULATIONS

The Contractor shall secure all Federal, State, County and City licenses required by law. He shall obtain and pay for all necessary permits. He shall give all notices and comply with all laws, ordinances and regulations bearing on the conduct of the work as drawn and specified.

P. TAXES

Contractor shall, without additional expenses to the Owner, pay all applicable Federal, State and

Local sales and other taxes, except taxes and assessments on the real property comprising the site of the Project.

Q. CONSTRUCTION UTILITIES

The Contractor shall provide and maintain all necessary utilities, including but not limited to water, electricity, telephones, roads, fences, sanitary facilities, suitable storage places, except as may be otherwise specifically stipulated in the Contract Documents. Sanitary facilities shall be suitable for those employed on this Contract and of a type that will not create a public nuisance. He shall provide and maintain an adequate potable water supply for use of employees at the site of the work. Sanitary facilities and potable water supply shall be subject to approval of Local and State regulatory agencies.

R. COORDINATION

The Contractor shall coordinate his schedule with all other contractors or employees of the Owner who may be working in the vicinity of the work site. He shall conduct his operation as to interfere to the least possible extent with the work of such contractors or employees.

S. SUBCONTRACTORS

The Contractor shall notify the Owner in writing of the names of all Subcontractors he proposed to employ on the Contract and shall not employ any Subcontractors until the Owner's approval in writing covering such Subcontractors has been obtained. Such approval shall not be unreasonably withheld.

The Contractor agrees to be fully and directly responsible to the Owner for all acts and omissions of his Subcontractors and of any other person employed directly or indirectly by the Contractor or Subcontractors, and this Contract obligation shall be in addition to the liability imposed by law upon the Contractor.

Nothing contained in the Contract Documents shall create any contractual relationship between Subcontractor and the Owner. It shall be further understood that the Owner will have no direct relations with any Subcontractor. Any such necessary relations between the Owner and the Subcontractor shall be handled through the Contractor.

The Contractor agrees to bind every Subcontractor by all terms of the Contract Documents as far as applicable to the Subcontractor's work.

T. UNSATISFACTORY SUBCONTRACTORS

Should any Subcontractor fail to perform in accordance with the provisions of this Contract, the Contractor shall be notified in writing to take proper corrective action, or the Owner may require that the Contractor terminate the Subcontractor.

U. REMOVAL OF CONDEMNED MATERIALS AND STRUCTURES

The Contractor shall remove from the work site all rejected or condemned materials or structures of any kind brought to the work site or incorporated in the work. Upon his failure to do so, or to make satisfactory progress in so doing within forty-eight (48) hours after the service of a written notice from the Architect/Engineer or Owner, the rejected or condemned material or work may be

removed by the Owner and the cost of such removal shall be subtracted from monies that may be due or may become due to the Contractor on account of or by virtue of this Contract. No such rejected or condemned material shall again be offered for use by the Contractor under this Contract.

V. ERRORS AND OMISSIONS

If the Contractor, in the course of the work, finds any errors or omissions in the Contract Documents or in the layout as given by survey points and instructions, or if he finds any discrepancy between the Contract Documents and physical conditions of the work site he shall immediately notify the Architect/Engineer, in writing for correction. Any work done after such discovery, until authorized, will be done at the Contractor's risk.

W. PROOF OF COMPLIANCE WITH CONTRACT

In order that the Architect/Engineer and the Owner may determine whether the Contractor has complied with the requirements of the Contract Documents, compliance with which is not readily ascertainable through inspection and tests of the work and materials, the Contractor shall, at any time requested, submit to the Architect/Engineer and the Owner properly authenticated documents or other satisfactory proof as to his compliance with such requirements.

X. CLEANING UP

The Contractor shall not allow the work site to become littered with trash and waste materials, but shall maintain the same in a neat and orderly condition throughout the term of the Contract. The Contractor shall dispose of any such materials in accordance with all applicable laws. On or before completion of the work, the Contractor shall thoroughly clean all pits, pipes, chambers, or conduits which are a part of the work or premises which he has entered upon, shall bear down and remove all temporary structures built by him and shall remove rubbish of all kinds from any of the grounds he has occupied and leave them in a neat and clean condition.

Y. FINAL GUARANTY

All workmanship and materials shall be guaranteed by the Contractor for a period of one year from the date of final acceptance by the Owner, unless otherwise stipulated in the Contract Documents.

If, within said guaranty period, repair or changes are required in connection with the work, which, in the opinion of the owner, is rendered necessary as the result of use of materials, equipment or workmanship which are inferior, defective or not in accordance with the terms of the Contract, the Contractor shall promptly upon receipt of written notice from the Owner, and without expense to the Owner: (a) place in satisfactory condition all of such work, correct all defects therein; and (b) make good all damage to the building, site, equipment or contents thereof, which in the opinion of the Owner, is the result of the use of materials, equipment or workmanship which are inferior, defective, or not in accordance with the terms of the Contract; and (c) make good any work or material, or the equipment and contents of building structure or site disturbed in fulfilling any such guarantee.

If the Contractor fails to comply within ten (10) days after receipt of written notice with the terms of this guaranty, the Owner may have the defects corrected, and the Contractor shall be liable for all expenses incurred; provided, however, that in case of an emergency where in the opinion of the Owner, delay would cause serious loss or damage, repairs may be made without notice being given to the Contractor and the Contractor shall pay the cost thereof.

Z. PATENTS

1. Except as otherwise provided in these Contract Documents, Contractor shall assume all costs arising from the use of patented materials, equipment, devices, or processes used on or incorporated in the work, and agrees to indemnify and save harmless Owner, Architect/Engineer, and their duly authorized representatives or employees, from all suits at law, or actions of every nature for, or on account of the use of, any patented materials, equipment, devices, or processes.
2. Should Contractor, his agents, servants, or employees, be enjoined from furnishing or using any invention, article, material, or appliance supplied or required to be supplied or used under this Contract, Contractor shall promptly offer other articles, materials, or appliances in lieu thereof, of equal efficiency, quality, finish, suitability, and market value, for review by Architect/Engineer. If Architect/Engineer should disapprove the offered substitutes and should elect, in lieu of a substitution, to have supplied, and to retain and use, any such invention, article, material, or appliance as may by this Contract be required to be supplied, Contractor shall pay such royalties and secure such valid licenses as may be requisite and necessary for Owner and officers, agents, and employees, or any of them, to use such invention, article, material, or appliance without being disturbed or in any way interfered with by any proceeding in law or equity on account thereof. Should Contractor neglect or refuse to make any approved substitution promptly, or to pay such royalties and secure such licenses as may be necessary, then in that event Architect/Engineer shall have the right to make such substitution, or Owner may pay such royalties and secure such licenses and charge the cost thereof against any money due Contractor from Owner, or recover the amount thereof from him and his sureties notwithstanding that final payment under this Contract may have been made.

AA. LEGAL RESPONSIBILITY OF CONTRACTOR IN PERFORMING WORK

The Contractor shall be required to comply with all Local, State, and Federal laws or regulatory requirements applicable to the performance of this Contract, to include any laws promulgated or enacted during the Contract Time. Lack of knowledge of such laws or regulations shall not relieve the Contractor of this duty. Any losses resulting to the Owner because of the failure of the Contractor to comply with this duty shall be borne by the Contractor.

BB. WARRANTY OF TITLE

No material, supplies, or equipment to be installed or furnished under this Contract shall be purchased subject to any chattel mortgage or under a conditional sale, lease-purchase or other agreement by which an interest therein or in any part thereof is retained by the seller or supplier. The Contractor shall warrant good title to all materials supplied and equipment installed or incorporated in the work and upon completion of all work, shall deliver the same together with all improvements and appurtenances constructed or placed thereon by him to the Owner free from

any claims, liens or charges. Neither the Contractor nor any person, firm or corporation furnishing any material or labor for any work covered by this Contract shall have any right to a lien upon any improvement or appurtenance thereon. Nothing contained in this paragraph, however, shall defeat or impair the right of persons furnishing materials or labor to recover under any bond given by the Contractor for their protection or any rights under any law permitting such persons to look to funds due the Contractor in the hands of the Owner. The provisions of this paragraph shall be inserted in all subcontracts and material contracts and notice of its provisions shall be given to all persons furnishing materials for the work when no formal contract is entered into for such materials.

IV. RESPONSIBILITIES AND RIGHTS OF OWNER

A. RIGHTS-OF-WAY

The Owner will provide all necessary rights-of-way and easements.

B. AUTHORITY OF THE ARCHITECT/ARCHITECT/ENGINEER

All work performed under this Contract shall be in accordance with the Contract Documents and in a good workmanlike manner. To prevent disputes and determine acceptability and fitness of the several kinds of work and materials which are to be paid for under this Contract the Architect/Architect/Engineer shall: (a) decide all questions relative to the true construction meaning, and intent of the Contract Documents; (b) decide all questions which may arise relative to the classifications and measurements of quantities and materials and the fulfillment of this Contract; (c) and have the authority to reject or condemn all work or material which does not conform to the terms of this Contract. The Architect/Architect/Engineer's estimate and decision in all matters shall be a condition precedent to an appeal to the Owner for other compensation under this Contract, and a condition precedent to any liability on the part of the Owner to the Contractor on account of this Contract.

D. INSPECTION

The Architect/Engineer, Owner, and their representatives shall at all times have access to the work whenever it is in preparation or progress, and the Contractor shall provide proper facilities for such access and for inspection.

If the Contract Documents, the Architect/Engineer's instructions, laws, or ordinances require any work to be specifically tested or approved, the Contractor shall give the Architect/Engineer and the Owner timely notice of the date and time fixed for the inspection or test.

If any work for which inspection is required in accordance with the Contract is covered without the approval and consent of the Architect/Engineer, the work shall be uncovered for inspection and restored at the Contractor's expense. Any work for which inspection is not specifically required by the Contract may be uncovered for inspection by the Architect/Engineer. If such work is found to be in accordance with the Contract Documents, the Owner will pay the cost of re-examination and replacement. If such work is not in accordance with the Contract Documents, the Contractor shall pay such cost.

Properly authorized inspectors shall be considered to be the representatives of the Owner, limited to the duties and power entrusted to them. Inspectors shall be authorized to inspect materials

and workmanship of those portions of the work to which they are assigned, either individually or collectively, and under instructions of the Architect/Engineer and Owner are to report any and all deviations from the Contract Documents which may come to their notice. Any inspector shall have the right to order the work stopped if, in his judgment, such action is necessary to (a) allow proper inspection, (b) avoid irreparable damage to the work, or (c) avoid subsequent condemnation of work which could not be readily replaced or restored to an acceptable condition. Such stoppage shall be for a period reasonably necessary for a determination by the Architect/Engineer that the work will in fact proceed in due fulfillment of all Contract requirements.

E. RETENTION OF DEFECTIVE WORK

If any portion of the work performed or material furnished under this Contract shall prove defective, and if the imperfection in the same shall not be of sufficient magnitude or importance to make the work dangerous or wholly undesirable, or if the removal of such work is impracticable or will create conditions which are dangerous or undesirable, the Architect/Engineer, with the approval of the Owner, shall have the right and authority to retain such work instead of requiring the defective work to be removed and reconstructed. The Architect/Engineer shall recommend to the Owner such deductions therefore in the payments due or to become due the Contractor as may be just and reasonable, and the Owner may make such deductions as are reasonable.

F. CHANGES IN WORK

The Owner shall have the right to order additions to, omissions from, or corrections, alterations and modifications in the line, grade, form dimensions, plan or kind or amount of work or materials herein contemplated, or any part thereof, either before or after the beginning of construction. Changes involving an increase or decrease in the cost of the work, the time permitted for the work, or inconsistencies within the Contract Documents, shall be approved in accordance with terms set forth in "Alterations, Omissions and Extra Work" of these General Provisions, and such order will be binding upon the Contractor. Such alterations shall in no way affect, vitiate, or make void this Contract or any part thereof, except that which is necessarily affected by such alterations.

In any case of neglect or refusal by the Contractor to perform any extra work which may be authorized by the Owner or to make satisfactory progress in the execution of the same, the Owner may employ any person or persons to perform such work and the Contractor shall not in any way interfere with the person or persons so employed.

G. ADDITIONAL DRAWINGS

The Owner may furnish, through the Architect/Engineer, additional drawings during the progress of the work as are necessary to make clear or to define in greater detail the intent of the Contract Documents. The Contractor shall make his work conform to all such drawings.

H. EMERGENCY PROTECTION

In the event of any emergency which threatens loss, damage or injury to persons or property, and which requires immediate action to remedy, the Owner, with or without notice to the Contractor, may provide suitable protection to the said property and persons by causing such work to be

performed and such material to be furnished as shall provide such protection as the Owner may consider necessary and adequate. The cost and expense of such work and material so furnished shall be borne by the Contractor, and if the same shall not be paid on presentation of the bills therefore, such costs shall be deducted from any amounts due or to become due the Contractor.

The performance of such emergency work under the direction of the Owner shall in no way relieve the Contractor from any damages or liability which may arise during or after such precautions have been taken by the Owner.

I. SUSPENSION OF WORK

The Owner may at any time suspend the work, or any part thereof by giving written notice to the Contractor. The work shall resume by the Contractor on a date fixed in a written notice from the Owner to the Contractor. If such stoppage is due to no fault of the Contractor, and not otherwise authorized by other provisions of the Contract Documents, the Owner shall reimburse the Contractor for reasonable expenses and adjust the time allowed for Contract completion; provided that there shall be no reimbursement if the period of suspension occurs after expiration of the time allowed for completion of the work, exclusive of any extension of time.

J. RIGHT OF OWNER TO TERMINATE CONTRACT

In the event that any of the provisions of the Contract Documents are violated by the Contractor or by any of his Subcontractors, the Owner may serve written notice upon the Contractor and the Surety of its intention to terminate this Contract. Such notice shall contain the reasons for intention to terminate this Contract. Unless within ten (10) days after the serving of such notice upon the Contractor, such violation shall cease or satisfactory arrangements for correction be made in writing, the Contract shall cease and terminate. In event of such termination, the Owner shall immediately serve notice thereof upon the Surety and the Contractor, and the Surety shall have the right to perform the Contract. If the Surety does not commence performance thereof within thirty (30) days from the date of the mailing to such Surety of said notice of termination, the Owner may take over the work and prosecute the same to completion by contract or force account at the expense of the Contractor, and his Surety shall be liable to the Owner for any excess cost to the Owner.

Where the Contractor has failed to complete minor items of work within the time set for completion of the Contract, but limited to cases where the value of such minor work does not exceed five percent (5%) of the total construction cost of the work, the Owner shall have the right, without terminating this Contract, of completing said items of work and then deducting from the sums due the Contractor under this Contract, the total cost incurred in completing such minor items of work. In such cases, the Owner may complete such minor items of work by force account or by employing some other Contractor. If the Owner adopts this procedure, it shall deliver to the Contractor a written statement, describing the items not completed, or imperfectly completed, and shall in such statement, demand that the Contractor complete the work in conformity with the Contract and within a time to be fixed by the Owner. If the Contractor neglects to comply within the time stated, the Owner may proceed, as herein above set forth. The time within which the Contractor shall be required to complete the items set forth in such statement will depend on the amount of time required for the performance of said work, but shall not in any event be less than ten (10) days, nor more than thirty (30) days.

K. PLACING PORTIONS OF WORK IN SERVICE

If desired by the Owner, portions of the work may be placed in service as completed, and the Contractor shall give proper access to the work for this purpose. Use and operation shall not constitute an acceptance of the total Project.

V. WORKMANSHIP, MATERIALS AND EQUIPMENT

A. WORKMANSHIP

All workmanship shall be of the highest quality, performed by persons skilled in the applicable trades, and shall be subject to the inspection, approval, or rejection by the Owner in accordance with the requirements and intent of the Contract Documents. The Owner or Architect/Engineer shall have the right to order the Contractor to correct or replace unacceptable workmanship. Any other portions of the work disturbed or damaged by such correction or replacement shall be made good at the Contractor's expense.

B. INTERPRETATION OF SPECIFICATIONS AND DRAWINGS

The Technical Specifications and the Drawings are intended to be explanatory of each other. Any work indicated on the Drawings and not in the Technical Specifications, or vice versa, shall be brought to the attention of the Architect/Engineer for verification of the actual intent. Contradictions of this nature not brought to the attention of the Architect/Engineer for correction or verification, and acted upon by the Contractor shall be considered "At the Contractor's Risk", and if necessary, corrected by the Contractor at his expense. All work shown on the Drawings, the dimensions of which are not labeled, shall be determined by the Architect/Engineer. Should it appear that the work to be done, or any of the matters relative thereto, is not sufficiently detailed or explained in these Contract Documents, including the Drawings, the Contractor shall apply to the Architect/Engineer for such further explanations as may be necessary and shall conform thereto as part of this Contract. In the event of any doubt or question arising respecting the true meaning of the Contract Documents, reference shall be made to the Owner and the decisions thereon shall be final.

C. GENERAL QUALITY OF MATERIALS

Materials and equipment shall be new and of a quality equal to that specified or approved. Whenever under this Contract it is provided that the Contractor shall furnish materials or manufactured articles, or shall do work for which no detailed specifications are set forth, the materials or manufactured articles shall be approved by the Owner upon recommendation of the Architect/Engineer. In general, the work performed shall be in full conformity and harmony with the intent to secure the best standard of construction and equipment of the work as a whole or in part.

D. MATERIALS AND EQUIPMENT SPECIFIED BY NAME

Except as hereinafter otherwise provided, whenever any material or equipment is indicated or specified by patent or proprietary name, or by the name of the manufacturer, such specification shall be considered as used for the purpose of describing the material or equipment desired and shall be considered as followed by the words, "or approved equal", and the Contractor may offer any material or equipment which shall be approved by the Owner and Architect/Engineer and be

equal in every respect to that specified; provided, that written approval is obtained from the Owner prior to incorporation into the work.

E. APPROVAL OF MATERIALS AND EQUIPMENT

All materials and equipment offered to be furnished for the work are subject to inspection and approval or rejection by the Architect/Engineer or Owner. Approval shall be obtained prior to purchase and delivery of materials and equipment to the work site.

F. DRAWINGS OF EQUIPMENT AND FABRICATED MATERIALS

As soon as possible after execution of the Contract, the Contractor shall submit to the Architect/Engineer a complete listing of the manufacturers of each item of equipment or assembly fabricated off the site which he proposes to furnish on the Project, together with sufficient information, including shop assembly and detail drawings, manufacturers' specifications and performance data to demonstrate clearly that the materials and equipment to be furnished comply with the provisions and intent of the Contract Documents. If the information shows any deviation from the Contract Documents, the Contractor shall, by a statement in writing accompanying the submittal, advise the Architect/Engineer of the deviation and reason. The Contractor shall also submit to the Architect/Engineer shop drawings showing details of structural steel and concrete reinforcing steel, banding details, piping details, and of other items necessary for the proper installation of material into the completed work.

All drawings and details described herein, when submitted, shall bear the stamp of the Contractor and initials of his authorized representative indicating that the Contractor has reviewed and approved such drawings as meeting his interpretation of the requirements of the Contract.

The Submittal shall be made in triplicate plus the number of copies that the Contractor desires to be returned to him. Upon review, the Architect/Engineer will return all but three copies, which will be stamped or marked either approved, approved subject to minor designated changes, or disapproved. In the latter case an explanation will be given as to why the material or equipment is unsatisfactory.

The Contractor shall make any indicated corrections on the drawings returned and shall resubmit corrected drawings until final approval. Approval by the Architect/Engineer of shop drawings and other data submitted by the Contractor shall not relieve the Contractor from responsibility for errors or omissions therein, or for furnishing the materials and equipment of proper dimension, size, quantity, quality, and all performance characteristics to meet the requirements and intent of the Contract Documents.

The Contractor shall have no claim for damages or extension of time on account of any delay in the work resulting from the reasonable and timely rejection of material, revision and resubmittal of drawings and other data for approval.

G. SUBSTITUTIONS

If the Contractor proposes to substitute any equipment, facilities or processes in place of those specified in the Contract Documents, the Contractor shall prepare and submit to the Architect/Engineer detailed drawings showing any modifications, including, but not limited to structures, reinforcing steel, piping, electrical and mechanical work, to adapt the Drawings to the alternate equipment or facilities. The Architect/Engineer, with the Owner, will review such

Drawings and may approve, reject, or indicate thereon changes necessary to comply with the project requirements.

H. SAMPLES

Whenever requested by the Architect/Engineer or Owner, or when called for by the Contract Documents, sample or test specimens of the materials to be used or offered for use in the work shall be obtained or prepared by and at the expense of the Contractor. The samples shall be representative in all respects of the material offered or intended to be used, shall be supplied in such quantities and sizes as may be required for proper examination and tests, and shall be delivered to the Architect/Engineer freight prepaid along with identification as to their sources and types or grades. All samples shall be submitted and approved before shipment of the material to the work site.

No materials or equipment of which samples are required to be submitted for approval shall be incorporated into the work until such approval has been given by the Architect/Engineer.

Substitutions and Product Options

Written requests for changes in products, materials, equipment and methods of construction required by the Contract Documents shall be submitted to the Owner prior to bidding in accordance with the timeline provided and using the Material Substitution Request form provided As Exhibit L and in accordance with *The Project Manual, Division 1, Section 01600, Product Requirements Section 1.6*.

I. TESTS

Unless otherwise stipulated in the Contract Documents, all testing required shall be provided by and at the sole expense of the Contractor. All laboratory tests required shall be made by a testing laboratory approved by the Owner.

All tests shall be performed in accordance with specific procedures identified in the Contract Documents, or if not therein specified, they shall be performed in accordance with applicable recognized standard practice. Reports of tests provided by the Contractor shall be promptly submitted to the Architect/Engineer and the Owner, or if provided by the Architect/Engineer, copies shall be promptly submitted to the Contractor.

The Contractor shall give the Architect/Engineer and the Owner sufficient notice of the time and place of any test to be made at the point of manufacture, assembly, or fabrication in order that the Architect/Engineer or the Owner may witness the test.

J. MATERIAL TESTS

All materials incorporated in the work shall be subject to inspection and test as follows: All tests, except as noted, shall be made by a laboratory, employed and paid for by the Contractor. The laboratory shall be approved by the Owner prior to being retained by the Contractor. Samples at the place of manufacture shall be taken by a representative of the laboratory. Samples of construction materials from the site of the work, such as sand, gravel, concrete cylinders, and pipes for which laboratory tests are required, shall be taken, assembled or prepared on the site of the work by representatives of the laboratory or Owner. Signed copies of test

reports on laboratory forms or letterheads shall be delivered to the Architect/Engineer as soon as available.

K. STORAGE OF MATERIALS & EQUIPMENT

Materials shall be stored so as to ensure the preservation of their quality and fitness for the work and to allow access for proper inspection.

L. OPERATING AND MAINTENANCE DOCUMENTATION

Before final acceptance of the work, the Contractor shall deliver to the Architect/Engineer a complete set of suitable operating and maintenance instructions and parts list documentation for each piece of equipment or equipment assembly. These instructions and lists shall be assembled in an orderly arrangement and shall be accompanied by a tabulation of the information provided for each item of equipment.

M. COMPLIANCE WITH STATE SAFETY CODE

All necessary machinery guards, railings, and other protective devices and equipment shall be provided as specified by the OSHA, or other regulatory agencies or departments.

VI. PROSECUTION OF WORK

A. EQUIPMENT AND METHODS

The work under the Contract shall be prosecuted with all materials, tools, machinery, apparatus and labor, and by such methods as are necessary to complete the work. If at any time, any part of the Contractor's plant or equipment or any of his methods of execution of the work appear to the Owner or the Architect/Engineer to be unsafe, inefficient or inadequate to insure the required quality or rate of progress of the work, he may order the Contractor to increase or improve his facilities or methods and the Contractor shall comply promptly with such orders; but neither compliance with such orders nor failure of the Architect/Engineer or Owner to issue such orders shall relieve the Contractor from his obligation to secure the degree of safety, the quality of the work and the rate of progress required. The Contractor alone shall be responsible for the safety, adequacy and efficiency of his plant, equipment and methods.

If the Contractor fails to promptly comply with the order of the Owner or Architect/Engineer issued in accordance with this Paragraph, the Owner shall have the right to terminate the Contract.

B. TIME OF COMPLETION

The Contractor shall promptly begin the work under the Contract, and all portions of the project made the subject of this Contract shall begin and be so prosecuted that they shall be completed and ready for full use within the time specified elsewhere in the Contract Documents.

C. AVOIDABLE DELAYS

Avoidable delays in the prosecution or completion of the work shall include all delays which might have been avoided by the exercise of care, prudence, foresight or diligence on the part of

the Contractor.

Delays in the prosecution of parts of the work, which may in themselves be unavoidable but do not necessarily prevent or delay the prosecution of other parts of the work nor the whole work within the time herein specified, will be deemed avoidable delays within the meaning of this Contract.

D. UNAVOIDABLE DELAYS

Unavoidable delays in the prosecution or completion of the work under this Contract shall include all delays which may result through causes beyond the control of the Contractor and which he could not have prevented by the exercise of care, prudence, foresight or diligence. Orders issued by the Owner changing the amount of work to be done, the quantity of materials to be furnished, or the manner in which the work is to be prosecuted, failure of the Owner to provide rights-of-way and unforeseen delays in the completion of other contractors under contract with the Owner will be considered unavoidable delays, so far as they necessarily interfere with the Contractor's completion of the whole of the work. Delays due to adverse weather conditions, unless of an extreme nature such as hurricanes, floods, or tornados will not be regarded as unavoidable delays as the Contractor should understand that such conditions are to be expected and plan his work accordingly.

E. NOTICE OF DELAYS

Whenever the Contractor anticipates or experiences any delay in the prosecution of the work he shall immediately notify the Owner and Architect/Engineer, in writing, of such delay and its cause in order that the Owner may take immediate steps to prevent, if possible, the occurrence or continuance of the delay, or, if this cannot be done, may determine whether the delay is to be considered avoidable or unavoidable, how long it continues, and to what extent the prosecution and completion of the work is to be delayed thereby.

After the completion of any part or the whole of the work, the Owner, in approving the amount due the Contractor, will assume that any and all delays which have occurred in its prosecution and completion have been avoidable delays, except such delays as shall have been called to the attention of the Owner at the time of their occurrence and later found by the Owner to have been unavoidable. The Contractor will make no claims that any delay not called to the attention of the Owner at the time of its occurrence has been an unavoidable delay.

F. EXTENSION OF TIME

- (1) UNAVOIDABLE DELAYS: For delays which are unavoidable, as determined by the Owner, the Contractor will be allowed, upon Contractor application, an extension of time beyond the time specified for completion elsewhere in the Contract Documents, proportionate to the length of such unavoidable delay. No liquidation damages or Architect/Engineering and inspection costs as are charged in the case of extensions of time for avoidable delays, will be assessed for unavoidable delays.
- (2) AVOIDABLE DELAYS: If the work called for under this Contract is not finished and completed in all parts and in accordance with all requirements, within the time specified for completion in the Contract Documents (including extensions of time granted because of unavoidable delay), or if at any time it shall appear to the Owner that the Contractor will be unable to finish and complete the work, the Owner may grant the Contractor such extensions of time as the Owner deems in its best interest.

If such extension of time for Avoidable Delay is not granted, the provisions of the Contract Document, at the discretion of Owner, may be followed. However, at the option of the Owner and where the delay may be of such a duration not to inflict serious injury to the operations of the Owner in regard to the project, the Owner may assess liquidated damages for each calendar day delay exceeding the contract completion date. The sum of liquidated damages on a per day basis will be stipulated in the Contract Documents.

G. UNFAVORABLE WEATHER AND OTHER CONDITIONS

During unfavorable weather and other unfavorable conditions, the Contractor shall pursue only such portions of the work as shall not be damaged thereby. No portions of the work whose satisfactory quality or efficiency will be affected by an unfavorable condition shall be constructed while these conditions exist unless by special means or precautions approved by the Owner and Architect/Engineer.

VII. PAYMENTS AND CONTRACT COMPLETION

A. PROGRESS ESTIMATES AND PAYMENTS

Immediately upon execution and delivery of the Contract and before the first partial payment is made, the Contractor shall deliver to the Owner an estimated construction progress schedule in form satisfactory to the Owner, showing the proposed dates of commencement and completion of each of the various subdivisions of work required under the Contract Documents and the anticipated amount of each monthly payment that will become due the Contractor in accordance with the progress schedule.

No payments under the Contract will be made except upon the presentation by the Contractor of a Periodical Estimate for Payment approved by the Architect/Engineer. Payment forms, supplied by the Owner, shall show that the work covered by the payments has been completed and the payments therefore are due in accordance with the Contract. Such payment forms shall be submitted to the Architect/Engineer, by the Contractor, by the 25th day of a calendar month to permit review. Upon presentation of certified copies of purchase bills and freight bills, the Owner will include in such monthly estimate, payments for materials that will eventually be incorporated in the work, providing that such material is suitably stored on the work site or other Owner approved site, at the time of submission of the estimate. Such materials, when so paid for by the Owner, will become the property of the Owner and, in case of default on the part of the Contractor, the Owner may use or cause to be used by others these materials in construction of the work. However, the Contractor shall be responsible for safeguarding such materials against loss or damage of any nature whatsoever, and in case of any loss or damage, the Contractor shall replace such lost or damaged materials at no cost to the Owner.

Except as otherwise provided, the first estimate shall be of the value of the work performed and materials delivered and suitably and safely stored at the work site or other Owner approved site. Every subsequent estimate, except the final estimate, shall be for the value of the work performed and materials delivered and suitably stored since the preceding estimate was made; and provided, also, that materials delivered for the Project for which payment is included in the estimate, shall not be removed from the work site or approved storage site without the written consent of the Owner.

The estimates shall be signed by the Architect/Engineer and approved by the Owner, and after such approval, the Owner, subject to the foregoing provisions, will pay or cause to be paid to the Contractor, in the manner provided by law, an amount equal to ninety percent (90%) of the estimated value of the work performed and the full value of the materials furnished, delivered, unused and suitably and safely stored as provided above.

B. ALTERATIONS, OMISSIONS AND EXTRA WORK

The Owner reserves the right to increase or decrease by 15% the quantity of any item or portion of the work, or to omit portions of the work as may be deemed necessary or advisable by the Owner and, also, to make such alterations or deviations, additions to, or omissions as may be deemed necessary during the progress of the work. Upon written order of the Owner, the Contractor shall proceed with the work as increased, decreased or altered.

The Architect/Engineer is authorized to order, on behalf of the Owner, minor changes in the work which do not involve extra cost or an extension of time to the Contract and which does not change the character of the work. The Architect/Engineer is not authorized to order any other changes, alterations, omissions, additions, or extra work unless the same is approved by a written Change Order properly authorized in writing by the Owner. No claim of Contractor for extra compensation because of any change, alteration, omission, addition or extra work shall be paid or be payable unless a written order to the same change is signed by the Owner.

All adjustments, if any, in the Contract Price to be paid to Contractor because of any such change, alteration, deletion, addition, or extra work shall be made only to the extent and in the manner provided in the Contract Documents. Such alteration shall in no way affect, vitiate, or make void this Contract or any part thereof, except that such is necessarily affected by such alterations and is clearly the evident intention of the parties to this Contract. Any such work performed by the Contractor prior to execution of the Change Order by the Owner shall be at the risk of the Contractor. In case of neglect or refusal by the Contractor to perform any extra work which may be authorized by the Owner, the Owner may employ any person or persons to perform such work and the Contractor shall not in any way interfere with the person or persons so employed.

When any changes decrease the amount of work to be done, such changes shall not constitute a basis or reason for any claim by Contractor for extra compensation or damages on account of any anticipated profits which he thereby loses on the omitted work, and Contractor shall not be entitled to any compensation or damages therefore.

C. OWNER'S RIGHT TO WITHHOLD CERTAIN AMOUNTS

The Owner may withhold from payments to the Contractor, in addition to the retained percentage, such an amount or amounts as may be necessary to cover:

- (1) Payments that may be earned or due for just claims for labor or materials furnished in and about the work.
- (2) Defective work not remedied.
- (3) Failure of the Contractor to make proper payments to a subcontractor.
- (4) Reasonable doubt that this Contract can be completed for the balance then unpaid.

- (5) Damage to another Contractor, where there is evidence thereof.
- (6) The Contractor's failure to resolve bodily injury or property damage claims of any person or entity.

The Owner will have the right to act as agent for the Contractor in disbursing such funds as have been withheld, pursuant to this Paragraph, to the party or parties who are entitled to payment there from. The Owner shall render to the Contractor a proper accounting of all such funds disbursed in behalf of the Contractor.

The Owner also reserves the right to refuse payment of the final estimate due to the Contractor until it is satisfied that all subcontractors, material suppliers, and employees of the Contractor have been paid in full.

D. UNIT PRICE CONSTRUCTION ITEMS

No work shall be performed by the Contractor on any unit price items beyond the quantity as set forth in the Contract, unless specifically approved by the Owner and directed by the Architect/Engineer in writing to do so. It is anticipated that the quantities as set forth for such unit price items are reasonable and that said quantities will not be exceeded by more than 10%. The Contractor shall carefully study the Contract Documents to determine the extend and scope of the work included under lump sum items in the Contract. It may be that work under some of such unit price items is in addition to similar work to be performed under lump sum items and paid for thereunder.

E. COMPENSATION FOR EXTRA WORK AND WORK OMITTED

Whenever corrections, additions, or modifications in the work under this Contract change the amount of work to be performed or the amount of compensation due the Contractor, the Owner will have prepared a written Change Order, setting forth the extra work to be performed or work omitted. Such a Change Order will also set forth the method of computing the added or reduced compensation to be due the Contractor. The method of computing the added or reduced compensation to be due the Contractor. The method of computing the added or reduced compensation will be determined under one or more of the following methods as selected by the Owner:

- (1) By Unit Price contained in the Contractor's original Proposal and incorporated in the Contract with a change in quantity.
- (2) By a supplemental schedule of prices contained in the Contractor's original Proposal and incorporated in the Contract.
- (3) By an acceptable lump sum of the following five items as full and proper compensation:
 - (a) The necessary reasonable cost to the Contractor of the material required for the work as furnished and delivered by the Contractor at the site of the work.
 - (b) The necessary cost to the Contractor of the labor required to incorporate all of said material into the work and to finish the work in accordance with directions.

- (c) The necessary reasonable cost to the Contractor for the use of equipment used for the work.
- (d) The cost of Workers' Compensation, insurance premiums, State Unemployment and Federal Social Security payments on the labor included in Item (b).
- (e) Fifteen percent (15%) of the sum of items (a), (b), (c), and (d), which shall be considered as covering all other expenses and profit.

Under method (3) described above, in order that a proper determination may be made by the Architect/Engineer of the cost of labor and materials incorporated into extra work, the Contractor shall furnish weekly an itemized statement of material and labor supplied, together with the cost vouchers for quantities and prices of such labor, materials or work. In the event the Contractor fails to comply with the above provisions, no claim for compensation shall be made against the Owner.

F. ACCEPTANCE OF WORK

The work will be accepted in writing by the Owner when completed in accordance with the terms of the Contract Documents as verified by the Architect/Engineer. Such acceptance, however, will be predicated upon the approval of State and/or Federal regulatory agencies having concurrent jurisdiction on the work or worksite.

G. FINAL ESTIMATE AND PAYMENT

The Contractor shall, as soon as practicable after the final acceptance of the work under this Contract, submit a final estimate for payment.

Such final estimate shall be checked, approved and signed by the Architect/Engineer and the Owner. After such approval, the Owner shall pay or cause to be paid to the Contractor the entire sum found to be due after deducting therefrom all previous payments and mounts as the terms of the Contract prescribe.

Neither the final payment nor any part of the retained percentage shall become due until the Contractor shall deliver to the Owner a complete release of all claims or liens arising out of this Contract and an affidavit that, so far as he has knowledge or information, the release includes all the labor and materials for which a lien or claim could be filed. The Contractor may, if a Subcontractor refuses to furnish a release in full, furnish a bond satisfactory for the full amount of the Subcontractor's lien to the Owner indemnifying the Owner against any claim or lien. If any claim or lien remains unsatisfied after all payments are made, the Contractor shall reimburse the Owner all money that it may be compelled to pay in discharging such lien, including all costs and reasonable attorney's fees.

END OF GENERAL PROVISIONS OF CONTRACT

SECTION 0650

ARCHITECT/ENGINEER'S SUPPLEMENTARY CONDITIONS

1.01 PROJECT DESCRIPTION: Renovations to 13th Ave. South for Facilities Maintenance

1.02 DEFINITIONS:

- A. Owner: City of Myrtle Beach
Post Office Drawer 2468
Myrtle Beach, S.C. 29578
- B. Architect: Tych & Walker Architects, LLP
PO Box 509
Pawleys Island, SC 29585

1.03 SCOPE OF WORK:

Paint exterior CMU walls, repair/redo exterior hardcoat stucco system, install new ACMU at front elevation of building, reroof the entire building (several areas to be alternates) to include multiple types of roofing – this work is to be done by a single source contractor. Other work includes pool wall recoating and pool deck refacing, interior paint at pool area, site grading to improve the water flow to existing drainage system, miscellaneous plumbing/mechanical/electrical work and flashing.

Note the building may be partially occupied during the work. General Contractor to be responsible for security of premises throughout the duration of the project, and the protection of existing conditions.

1.04

1.04 PLANS & SPECIFICATIONS: The Successful Contractor will receive two (2) sets of exhibits and specifications to complete the work.

1.05 CONSTRUCTION STAKE OUT:

- A. Alignment and Control: The Architect/Engineer will provide a base line for construction alignment and a bench mark for the elevation datum.
- B. Stake Out: The Contractor shall furnish and perform all construction stake out from the Control Points furnished, and shall be totally responsible to construct the work in accordance with the plans and specifications. The Architect/Engineer's checking of grade and offset stake out shall in no way relieve the Contractor of this responsibility.

1.06 WORK SCHEDULE: The Contractor shall, upon notice of award, or as otherwise requested, furnish the Architect/Engineer a job schedule showing the various components of work and the anticipated beginning and completion date for each particular phase of the project.

1.08 REQUIRED RECORDS ON SALES AND USE TAX: In order that the Owner may substantiate

a refund claim for sales and use taxes, the Contractors shall furnish certified statements in triplicate, setting forth the cost of construction materials, supplies and fittings, and equipment which becomes a part of, or are annexed to any building or structure being erected, altered, or repaired under contract, with the Owner and the amount of sales and/or use taxes paid thereon.

1.09 EXISTING CONDITIONS: The Contractor, in submitting a proposal and in signing this contract, acknowledges that he has thoroughly investigated the existing conditions and has examined the plans and specifications, understanding clearly their requirements and the requirements necessary to construct all to completion the improvements contracted for; that he is fully prepared to sustain all losses and damages incurred by the actions of elements; is prepared to provide all necessary tools, appliances, machinery, skilled and unskilled workmen, and all necessary materials to successfully complete the work.

1.12 PROJECT SCHEDULE: The Contractor is hereby made aware that time is of the essence in that the timely completion of the work is essential. The Contractor is also made aware that the Owner has priorities in the completion of the work. All that work shown in the Contract Documents must be completed and accepted within **180 days**. In the event that the Contractor does not complete the project in the prescribed time, he agrees to pay liquidated damages in the sum of **\$250** for each consecutive calendar day thereafter.

1.13 ENVIRONMENTAL REGULATIONS: Contractor is responsible for ensuring that his forces comply with environmental regulations on site. Should construction forces violate laws, ordinances or regulations causing delays or adverse consequences on the site, the Contractor shall be held responsible for said actions.

1.14 UNIT PRICES: Unit prices in the bid package are to be used only in paying for items by the unit installed, constructed, and completed for periodic payment purposes and for preparing change orders. This contract will be awarded as a **lump sum**.

1.15 CONSTRUCTION STAGING AREA: The Construction Staging Area for this Project will be located at the discretion of the Contractor with prior written consent by the Owner.

1.16 RESOLUTION OF CLAIMS AND DISPUTES: The Architect/Engineer will review claims and take one or more of the following preliminary actions within ten (10) calendar days of receipt of a claim: (1) Request additional supporting data from the claimant; (2) Submit a schedule to the parties indicating when the Architect/Engineer expects to take action; (3) Reject the claim in whole or in part, stating the reason for rejection; (4) Recommend approval of claim by the other party or (5) Suggest a compromise. The Architect/Engineer may also, but is not obligated to, notify the surety, if any, of the nature and amount of the claim.

If a claim has been resolved, the Architect/Engineer will prepare or obtain appropriate documentation.

If a claim has not been resolved, the party making the claim shall, within ten (10) days after the Architect/Engineer's preliminary response, take one (1) or more of the following actions: (1) Submit additional supporting data requested by the Architect/Engineer; (2) Modify the initial claim or (3) Notify the Architect/Engineer that the initial claim stands.

If a claim has not been resolved after consideration of the foregoing and of further evidence presented by the parties or requested by the Architect/Engineer, the Architect/Engineer will notify the parties in writing that the Architect/Engineer's decision will be made within seven (7) days, which decision shall be final and binding on the parties but subject to resolution through the South Carolina judicial system. Upon expiration of such time period, the Architect/Engineer will render to the parties the Architect/Engineer's written decision relative to the claim, including any change in Contract Sum or Contract Time or both. If there is a surety and there appears to be a possibility of a Contractor's default, the Architect/Engineer may, but is not obligated to, notify the surety and request the surety's assistance in resolving the controversy.

When functioning as interpreter and judge under the preceding paragraphs, the Architect/Engineer will not show partiality to Owner or Contractor and will not be liable in connection with any interpretation or decision rendered in good faith in such capacity.

1.17 SALES TAX: The sales tax within the City of Myrtle Beach is 9%.

1.18 PERMITS: The building permit issued by the City of Myrtle Beach is a **NO COST** permit. All Contractors and Subcontractor's must obtain a Business License from the City of Myrtle Beach

1.19 WORKING HOURS: will be 8am -8pm. Any exceptions will require prior approval from the Architect/Engineer.

1.20 EXISTING EQUIPMENT: The Owner will be responsible for moving all moveable equipment and supplies. Any fixed equipment will remain in place and must be protected by the General Contractor.

1.21 ON SITE ARCHITECT/ENGINEERING: Any on site Architect/Engineering and or structural inspection will be the responsibility of the Owner / Design Team.

END OF SECTION

AGREEMENT

**FOR
City of Myrtle Beach
Bid # 19-B0097**

This AGREEMENT, made this _____ day of _____, 20____, by and between City of Myrtle Beach, hereinafter called "OWNER", and _____ doing business as (an individual,) or (a partnership,) or (a corporation) hereinafter called "CONTRACTOR".

WITNESSETH: That for and in consideration of the payments and agreements hereinafter mentioned:

1. The CONTRACTOR will commence and complete the construction of: Renovations to 13th Ave. South for Facilities Maintenance, herein after called "PROJECT".
2. The CONTRACTOR will furnish all of the material, supplies, tools, equipment, labor and other services necessary for the construction and completion of the PROJECT described herein.
3. The CONTRACTOR will commence the work required by the CONTRACT DOCUMENTS within Ten (10) calendar days after the date of the NOTICE TO PROCEED and will complete the same within **180 days calendar days**, or unless the period for completion is extended otherwise by the CONTRACT DOCUMENTS.
4. The CONTRACTOR agrees to perform all of the WORK described in the CONTRACT DOCUMENTS and comply with the terms therein for the sum of \$_____ or as shown in the BID schedule.
5. The term "CONTRACT DOCUMENTS" means and includes the following:
 - A. Notice to Bidders
 - B. Instructions to Bidders
 - C. Proposal
 - D. Bid Bond
 - E. Agreement
 - F. General Provisions
 - G. Architect/Engineer's Supplementary Conditions
 - H. Contract Forms - Payment/Performance Bonds
 - Insurance Certificates
 - Tentative Notice of Award
 - Notice of Award
 - Notice to Proceed
 - Change Orders
 - I. GENERAL REQUIREMENTS prepared or issued by The City of Myrtle Beach.
 - J. TECHNICAL SPECIFICATIONS prepared or issued by The City of Myrtle Beach.
 - K. ADDENDA:

No. _____, dated _____
No. _____, dated _____
No. _____, dated _____

L. CONTRACT DRAWINGS prepared by Tych & Walker Architects, LLP.

6. The OWNER will pay to the CONTRACTOR in the manner and at such times and in such amounts as required by the CONTRACT DOCUMENTS.
7. This Agreement shall be binding upon all parties hereto and their respective heirs, executors, administrators, successors, and assigns.
8. CONTRACTOR agrees to commence WORK under the contract on or before a date specified in the NOTICE TO PROCEED and to fully complete the PROJECT within **180 days calendar days**. CONTRACTOR further agrees to pay as liquidated damages, the sum of **\$250** for each consecutive calendar day thereafter as provided in the Contract Document.

IN WITNESS WHEREOF, the parties hereto have executed, or caused to be executed by their duly authorized officials, this Agreement in four (4) counter parts, each of which shall be deemed an original on the date first above written.

CITY OF MYRTLE BEACH:

BY: _____
Name: _____
Title: _____

(SEAL)

ATTEST: _____
TITLE: _____

BY: _____
Name: _____
Title: _____

(SEAL)
ATTEST: _____
TITLE: _____

NOTICE OF AWARD

To: _____

PROJECT Description: Renovations to 13th Ave. South for Facilities Maintenance

The OWNER has considered the BID submitted by you for the above described WORK in response to its Notice to Bidders dated _____ and Instruction to Bidders.

You are hereby notified that your BID has been accepted for items in the amount of \$ _____.

You are required by the Instruction to Bidders to execute the Agreement and furnish the required CONTRACTOR'S Performance BOND, Payment BOND, and certificates of insurance within ten (10) calendar days from the date of this Notice to you.

If you fail to execute said Agreement and to furnish said BONDS within ten (10) days from the date of this Notice, said OWNER will be entitled to consider all your rights arising out of the OWNER'S acceptance of your BID as abandoned and as a forfeiture of your BID BOND. The OWNER will be entitled to such other rights as may be granted by law.

You are required to return an acknowledged copy of this NOTICE OF AWARD to the OWNER.

Dated this _____ day of _____, 20 ____.

Owner: **The City of Myrtle Beach**
Owner

By _____

Title _____

ACCEPTANCE OF NOTICE

Receipt of the above NOTICE OF AWARD is hereby acknowledged

by _____

this the _____ day of _____, 20 ____.

By _____ Title _____

PAYMENT BOND

KNOW ALL MEN BY THESE PRESENTS: that

(Name of Contractor)

(Address of Contractor)

a _____ hereinafter called Principal, and
(Corporation, Partnership or Individual)

(Name of Surety)

(Address of Surety)

hereinafter called Surety, are held and firmly bound unto _____

(Name of Owner)

(Address of Owner)

hereinafter called OWNER, in the penal sum of _____ Dollars,
(\$ _____) in lawful money of the United States, for the payment of which sum well and truly to be made, we bind ourselves, successors, and assigns, jointly and severally, firmly by these presents.

THE CONDITION OF THIS OBLIGATION is such that whereas, the Principal entered into a certain contract with the OWNER, dated the _____ day of _____, 20_____, a copy of which is hereto attached and made a part hereof for the construction of:

NOW, THEREFORE if the Principal shall promptly make payment to all persons, firms, SUBCONTRACTORS, and corporations furnishing materials for or performing labor in the prosecution of the WORK provided for in such contract, and any authorized extension or modification thereof, including all amounts due for materials, lubricants, oil, gasoline, coal and coke, repairs on machinery, equipment and tools, consumed or used in connection with the construction of such WORK whether by SUBCONTRACTOR or otherwise, then this obligation shall be void; otherwise to remain in full force and effect.

PROVIDED, FURTHER, that the said Surety for value received hereby stipulates and agrees that no change, extension of time, alteration or addition to the terms of the contract or to the WORK to be performed thereunder or the SPECIFICATIONS accompanying the same shall in any wise affect its obligation on this BOND, and it does hereby waive notice of any such change, extension of time, alteration or addition to the terms of the contract or to the WORK or to the SPECIFICATIONS.

PROVIDED, FURTHER, that no final settlement between the OWNER and the CONTRACTOR shall abridge the right of any beneficiary hereunder, whose claim may be unsatisfied.

IN WITNESS WHEREOF, this instrument is executed in four (4) counterparts, each one of which shall be deemed an original, this the _____ day of _____, 20____.

ATTEST:

(Principal) Secretary

[SEAL]

Principal

By _____(S)

(Address)

Witness as to Principal

(Address)

Surety

ATTEST:

By _____
Attorney-in-Fact

Witness as to Surety

(Address)

(Address)

NOTE: Date of BOND must not be prior to date of Contract.
If CONTRACTOR is Partnership, all partners should execute BOND.

IMPORTANT: Surety companies executing BONDS must appear on the Treasury Department's most current list (Circular 570 as amended) and be authorized to transact business in the State where the PROJECT is located.

PERFORMANCE BOND

KNOW ALL MEN BY THESE PRESENTS: that

(Name of Contractor)

(Address of Contractor)

a _____ hereinafter called Principal,
and

(Corporation, Partnership, or Individual)

(Name of Surety)

(Address of Surety)

hereinafter called SURETY, are held and firmly bound unto _____

(Name of Owner)

(Address of Owner)

hereinafter called OWNER, in the sum of _____

_____ Dollars,(\$ _____)

in lawful money of the United States, for the payment of which sum well and truly to be made, we

bind ourselves, successors, and assigns, jointly and severally, firmly by these presents.

THE CONDITION OF THIS OBLIGATION is such that whereas, the Principal entered into a

certain contract with the OWNER, dated the _____ day of _____,
20____,

a copy of which is hereto attached and made a part hereof for the construction of:

NOW, THEREFORE, if the Principal shall well, truly and faithfully perform its duties, all the undertakings, covenants, terms, conditions, and agreements of said contract during the original term thereof, and any extensions thereof which may be granted by the OWNER, with or without notice to the Surety and during the one year guaranty period, and if he shall satisfy all claims and demands incurred under such contract, and shall fully indemnify and save harmless the OWNER from all costs and damages which it may suffer by reason of failure to do so, and shall reimburse and repay the OWNER all outlay and expense which the OWNER may incur in making good any default, then this obligation shall be void; otherwise to remain in full force and effect.

PROVIDED, FURTHER, that the said surety, for value received hereby stipulates and agrees that no change, extension of time, alteration or addition to the terms of the contract or to WORK to be performed thereunder or the SPECIFICATIONS accompanying the same shall in any wise affect its obligation on this BOND, and it does hereby waive notice of any such change, extension of time, alteration or addition to the terms of the contract or to the WORK or to the SPECIFICATIONS.

PROVIDED, FURTHER, that no final settlement between the OWNER and the CONTRACTOR shall abridge the right of any beneficiary hereunder, whose claim may be unsatisfied.

IN WITNESS WHEREOF, this instrument is executed in four (4) counterparts, each one of which shall be deemed an original, this the _____ day of _____, 20

ATTEST:

Principal

(Principal) Secretary By _____(s)

[SEAL]

(Witness as to Principal) _____
(Address)

(Address) _____

Surety

ATTEST:

(Surety) Secretary [SEAL]

By _____

Witness as to Surety _____
Attorney-in-Fact

(Address) _____
(Address)

NOTE: Date of Bond must not be prior to date of Contract.
If CONTRACTOR is Partnership, all partners should execute BOND.

IMPORTANT: Surety companies executing BONDS must appear on the Treasury Department's most current list (Circular 570 as amended) and be authorized to transact business in the state where the PROJECT is located.

NOTICE TO PROCEED

To: _____

Date: _____

Project: Renovations to 13th Ave. South
for Facilities Maintenance

You are hereby notified to commence WORK in accordance with the Agreement dated _____, 20_____, on or before _____, 20_____, and you are to complete the work within _____180____ consecutive calendar days thereafter.
The date of completion of all WORK is therefore _____, 20_____.

The City of Myrtle Beach
Owner

By _____

Title _____

ACCEPTANCE OF NOTICE

Receipt of the above NOTICE TO PROCEED
is hereby acknowledged by:

_____ this the _____ day of _____, 20_____.

By _____

Title _____

MATERIAL/PRODUCT SUBSTITUTION REQUEST

BID #19-B0097
Renovations to 13th Ave. South
for Facilities Maintenance

Date: _____

We hereby submit for your review the following PRODUCT SUBSTITUTION of the specified material for the above listed project.

Section: _____

Paragraph: _____

Specified Material: _____

Attached is complete technical data of the PRODUCT SUBSTITUTION. Included is complete information on changes to the Project Manual Documents required by the proposed PRODUCT SUBSTITUTION for its proper installation.

A request constitutes a representation that Trade Contractor:

- Has investigated proposed product and determined that it meets or exceeds quality level of specified product.
- Will provide same warranty for Substitution as for specified product.
- Will coordinate installation and make changes to other Work which may be required for the Work to be complete with no additional cost to Owner.
- Waives claims for additional costs or time extension which may subsequently become apparent.
- Will reimburse Owner and Architect/Engineer for review or redesign services associated with re-approval by authorities having jurisdiction or additional time expended by Architect/Engineer to review information.

It is understood that if the Architect approves an approved substitution prior to receipt of bids in accordance with the project timeline, such approval will be set forth in an addendum. Bidders shall not rely upon approvals made in any other manner. If substitution requests are not addressed in the addendum, the substitution request shall be considered not approved. Architect's decision of approval or disapproval of proposed substitution shall be final without dispute.

THE UNDERSIGNED Trade Contractor states that the function, appearance, and quality of the PRODUCT SUBSTITUTION are equivalent or superior to the specified item. In addition, I, as the Trade Contractor will assume all responsibility for any impact or delay the review and evaluation of the alternate product may cause. Your approval of the Substitute Product in no way will relieve me as the Trade Contractor of my responsibilities to conform with all requirements of the Contract Documents.

Submitted By: _____

SECTION 01100
SUMMARY

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Contract description.
- B. Work by Owner.
- C. Owner supplied products.
- D. Contractor's use of site and premises.
- E. Future work.
- F. Work sequence.
- G. Owner occupancy.
- H. Specification Conventions.
- I. Liquidated Damages
- J. Construction Timeline
- K. Construction Rain Delays

1.2 CONTRACT DESCRIPTION

- A. Work of the Project includes extensive renovations to the existing facility.
- B. Perform Work of Contract under a stipulated sum contract with Owner in accordance with Conditions of Contract.
- C. Work of each separate Contract is identified in the following and on Drawings.

1.3 WORK BY OWNER

- A. The Owner will award contracts for supply and installation of fixtures, furnishings and security equipment commencing during and at the completion of construction.
- B. The Owner will perform all sitework, if required.
- C. Work under this contract includes:
 - 1. Refer *The Project Manual, Division 1, Section 01200, Price and Payment Procedures, 1.2 Allowances* for construction related fees.
- D. Items noted NIC (Not in Contract), movable cabinets, furnishings, minor equipment, will be furnished and installed by Owner before the project is occupied.

1.4 OWNER SUPPLIED PRODUCTS

- A. Owner's Responsibilities:
1. Arrange for and deliver Owner-reviewed Shop Drawings, Product Data, and Samples, to Contractor.
 2. Arrange and pay for 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.
- B. 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.
 5. The Contractor will be responsible for final connections to all workstation that are indicated on the Electrical floor plans.
- C. Products furnished to site and installed by Owner:
1. All items by Security Technology Systems, Inc. – Division 17
- D. Items furnished by Owner for installation by Contractor:
1. Not Applicable

1.5 CONTRACTOR'S USE OF SITE AND PREMISES

- A. Limit use of site and premises to allow:
1. Owner occupancy.
 2. Work by Others and Work by Owner.
 3. Use of site and premises by the public is to be limited and controlled.

1.6 WORK SEQUENCE

- A. Construct Work in accordance with scheduling requirements as defined in *The Project Manual, Division 1, Section 01323, Network Analysis Schedule*.
- B. It is understood that the General Contractor will be fully responsible for coordination of Owner provided items to include technology (data), furniture, and security system.**
1. **All networking cabling and wireless access control will be provided by Owner (this work will be paid for directly by the Owner).**

1.7 OWNER OCCUPANCY

- A. The Owner will not occupy the site during the entire period of construction.

1.8 SPECIFICATION CONVENTIONS

- A. These specifications are written in imperative mood and streamlined form. This imperative language is directed to the Contractor, unless specifically noted otherwise.

The words "shall be" are included by inference where a colon (:) is used within sentences or phrases.

1.9 CONSTRUCTION TIMELINE

- A. Substantial Completion: 180 calendar days after the issuance of the Notice to Proceed
- B. Final Completion: 30 calendar days after issuance of Substantial Completion

1.10 CONSTRUCTION RAIN DELAYS

- A. For the purpose of this contract, a total of five calendar days per month (non cumulative) shall be anticipated as adverse weather at the job site, and such time shall not be considered justification for an extension time. If in any month adverse weather develops beyond five days, the contractor shall be allowed to claim additional days to compensate for the excess weather delays, only to the extent of the impact on the approved construction schedule. The remedy for this condition is for an extension of time only, not money.
- B. Adverse weather due to rain accumulation shall be based on actual rain measured at the local airport. In order to qualify as an adverse weather, rain day in excess of the anticipated five calendar days, the local airport rain gauge must register at least one-tenth an inch of precipitation on the date in question.

END OF SECTION

SECTION 01200
PRICE AND PAYMENT PROCEDURES

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Cash allowances.
- B. Contingency Allowance
- C. Testing and inspection allowances.
- D. Schedule of values.
- E. Defect assessment.
- F. Unit Prices
- G. Alternates.

1.2 CASH ALLOWANCES

- A. Costs Included in Cash Allowances: Cost of product to Contractor or Subcontractor, less applicable trade discounts.
- B. Costs Not Included in Cash Allowances But Included in Contract Sum/Price: Handling at site, including unloading, uncrating, and storage; protection of products from elements and from damage.
- C. Architect/Engineer Responsibilities:
 - 1. Consult with Contractor for consideration and selection of products, suppliers, and installers.
 - 2. Select products in consultation with Owner and transmit decision to Contractor.
 - 3. Prepare Change Order.
 - 4. Assist to obtain proposals from suppliers and installers and offer recommendations. All proposals will be delivered and/or copied to the office of the Architect prior to final decisions.
- D. Contractor Responsibilities:
 - 1. Assist Architect/Engineer in selection of products, suppliers and installers.
 - 2. Upon notification of selection by Architect/Engineer, execute purchase agreement with designated supplier and installer. The Contractor shall not execute any agreements with an allowance supplier or subcontractor without written approval from the Architect.
 - 3. Arrange for and process shop drawings, product data, and samples. Arrange for delivery.
 - 4. Promptly inspect products upon delivery for completeness, damage, and defects. Submit claims for transportation damage.

- E. Differences in costs that are approved by Architect will be adjusted by Change Order. Any amounts remaining at close out will be refunded to the Owner.
- F. Allowances Schedule: The Architect reserves the right to assign a contract or purchase order to the General Contractor/Subcontractor. The General Contractor shall not issue a contract on the allowance without the prior approval of the Architect. The Owner will have no financial responsibility to the General Contractor if the above referenced procedures are not followed.

1.	<u>Special Inspections</u>	To include structural steel, exterior diaphragms and other items defined on Structural Drawings	\$1,500.00
2.	<u>Roofing and Roof Monitoring Services</u>	The stipulated sum for the roof monitoring services for periodic inspections will be provided by: Shepard & Associates, LLC 3547 Dreher Shoals Rd, Suite 6 Irmo, SC 29063 803-407-8284	\$4,500.00
3.	<u>Steel Doors & Frames, Wood Doors, Hardware</u>	Include the stipulated sum/price for the doors/frames as specified in Section 08111 Standard Steel Doors and Frames, 08212 Wood Doors and 08710 Door Hardware. Installation of all doors and frames is to be included as part of the General Contractor's base bid.	\$22,000.00
4.	<u>Owner Contingency</u>	A stipulated sum/price for use by the Owner to address unforeseen conditions. Written approval from the Architect must be obtained prior to any authorized allocation of funds.	\$5,000.00
<u>ALLOWANCE TOTAL</u>			<u>\$33,000.00</u>

1.3 ROOF MONITORING ALLOWANCES

- A. Costs Included in Roof Monitoring Allowances: Cost of engaging testing and inspecting agency; execution of tests and inspecting; and reporting results.
- B. Costs Not Included in Testing and Inspecting Allowance But Included in Contract Sum/Price:
 - 1. Costs of incidental labor and facilities required to assist testing or inspecting agency.

2. Costs of testing services used by Contractor separate from Contract Document requirements.
 3. Costs of retesting upon failure of previous tests as determined by Architect/Engineer.
- C. Payment Procedures:
1. Submit one copy of inspecting or testing firm's invoice with next application for payment.
 2. Pay invoice on approval by Architect/Engineer.
- 1.4 SCHEDULE OF VALUES
- A. Submit printed schedule on AIA Form G703 - Continuation Sheet for G702. Contractor's standard form or electronic media printout will be considered.
 - B. Submit Schedule of Values in duplicate within fifteen days after date established in Notice to Proceed.
 - C. Format: Utilize Table of Contents of this Project Manual. Identify each line item with number and title of major specification Section. Identify site mobilization, bonds and insurance as separate line items. Architect will require a breakdown of major items, i.e. rough-in electric below slabs, above slabs, fixtures, trim etc.
 - D. Include in each line item, amount of Allowances specified in this section.
 - E. Contractor overhead and profit shall be displayed as a separate line item and not incorporated within each line item.
 - F. Revise schedule to list approved Change Orders, with each Application For Payment.
- 1.5 APPLICATIONS FOR PAYMENT
- A. Submit three copies of each application on **AIA Form G702 - Application and Certificate for Payment and AIA G703 - Continuation Sheet for G702**. Contractor's electronic media driven form can be approved upon review of compliance.
 - B. Content and Format: Utilize Schedule of Values for listing items in Application for Payment.
 - C. Submit updated construction schedule with each Application for Payment.
 - D. Payment Period: Submit at intervals stipulated in the Agreement.
 - E. Submit with transmittal letter as specified for Submittals in Section 01330 - Submittal Procedures.
 - F. Substantiating Data: When Architect/Engineer requires substantiating information, submit data justifying dollar amounts in question. Include the following with Application for Payment:
 1. Partial release of liens from major subcontractors and vendors.
 2. Affidavits attesting to off-site stored products.
 3. Construction progress schedules, revised and current as specified in Section 01323 Network Analysis Schedules.

1.6 CHANGE PROCEDURES

- A. Submittals: Submit name of individual authorized to receive change documents, and be responsible for informing others in Contractor's employ or Subcontractors of changes to the Work.
- B. The Architect/Engineer will advise of minor changes in the Work not involving adjustment to Contract Sum/Price or Contract Time by issuing supplemental instructions on AIA Form G710.
- C. The Architect/Engineer may issue a Proposal Request or Notice of Change including a detailed description of proposed change with supplementary or revised Drawings and specifications, a change in Contract Time for executing the change. Contractor will prepare and submit estimate within ten days.
- D. Contractor may propose changes by submitting a request for change to Architect/Engineer, describing proposed change and its full effect on the Work. Include a statement describing reason for the change, and effect on Contract Sum/Price and Contract Time with full documentation and a statement describing effect on Work by separate or other Contractors. Document requested substitutions in accordance with Section 01600 - Product Requirements.
- E. Stipulated Sum/Price Change Order: Based on Proposal Request or Notice of Change and Contractor's fixed] price quotation or Contractor's request for Change Order as approved by Architect/Engineer.
- F. Unit Price Change Order: For contract unit prices and quantities, the Change Order will be executed on fixed unit price basis. For unit costs or quantities of units of work which are not pre-determined, execute Work under Construction Change Directive. Changes in Contract Sum/Price or Contract Time will be computed as specified for Time and Material Change Order.
- G. Construction Change Directive: Architect/Engineer may issue directive, on AIA Form G713 Construction Change Directive signed by Owner, instructing Contractor to proceed with change in the Work, for subsequent inclusion in a Change Order. Document will describe changes in the Work, and designate method of determining any change in Contract Sum/Price or Contract Time. Promptly execute change.
- H. Time and Material Change Order: Submit itemized account and supporting data after completion of change, within time limits indicated in Conditions of the Contract. Architect/Engineer will determine change allowable in Contract Sum/Price and Contract Time as provided in Contract Documents.
- I. Maintain detailed records of work done on Time and Material basis. Provide full information required for evaluation of proposed changes, and to substantiate costs for changes in the Work.
- J. Document each quotation for change in cost or time with sufficient data to allow evaluation of quotation.
- K. Change Order Forms: AIA G701 Change Order.
- L. Execution of Change Orders: Architect/Engineer will issue Change Orders for signatures of parties as provided in Conditions of the Contract.

- M. Correlation Of Contractor Submittals:
 - 1. Promptly revise Schedule of Values and Application for Payment forms to record each authorized Change Order as separate line item and adjust Contract Sum/Price.
 - 2. Promptly revise progress schedules to reflect change in Contract Time, revise sub-schedules to adjust times for other items of work affected by the change, and resubmit.
 - 3. Promptly enter changes in Project Record Documents.

1.7 DEFECT ASSESSMENT

- A. Replace the Work, or portions of the Work, not conforming to specified requirements.
- B. If, in the opinion of the Architect/Engineer, it is not practical to remove and replace the Work, the Architect/Engineer will direct appropriate remedy or adjust payment.
- C. The defective Work may remain, but unit sum/price will be adjusted to new sum/price at discretion of Architect/Engineer.
- D. Defective Work will be partially repaired to instructions of Architect/Engineer, and unit sum/price will be adjusted to new sum/price at discretion of Architect/Engineer.
- E. Individual specification sections may modify these options or may identify specific formula or percentage sum/price reduction.
- F. Authority of Architect/Engineer to assess defects and identify payment adjustments is final.
- G. Non-Payment For Rejected Products: Payment will not be made for rejected products for any of the following:
 - 1. Products wasted or disposed of in a manner that is not acceptable.
 - 2. Products determined as unacceptable before or after placement.
 - 3. Products not completely unloaded from transporting vehicle.
 - 4. Products placed beyond lines and levels of required Work.
 - 5. Products remaining on hand after completion of the Work.
 - 6. Loading, hauling, and disposing of rejected products.

1.8 UNIT PRICES (For Work beyond the Scope of Work defined in the Contract Documents)

- A. Authority: Measurement methods are delineated in individual specification sections.
- B. Measurement methods delineated in individual specification sections complement criteria of this section. In event of conflict, requirements of individual specification section govern.
- C. Take measurements and compute quantities. Architect/Engineer will verify measurements and quantities.
- D. Unit Quantities: Quantities and measurements indicated in Bid Form are for contract purposes only. Quantities and measurements supplied or placed in the Work shall determine payment. Actual quantities provided shall determine payment.
 - 1. When actual Work requires more or fewer quantities than those quantities indicated, provide required quantities at unit sum/prices contracted.

2. When actual Work requires 25 percent or greater change in quantity than those quantities indicated, Owner or Contractor may claim for Contract Price adjustment.
- E. Payment Includes: Full compensation for required labor, products, tools, equipment, plant and facilities, transportation, services and incidentals; erection, application or installation of item of the Work; overhead and profit.
- F. Final payment for Work governed by unit prices will be made on basis of actual measurements and quantities accepted by Architect/Engineer multiplied by unit sum/price for Work incorporated in or made necessary by the Work.
- G. Measurement Of Quantities:
 1. Weigh Scales: Inspected, tested and certified by applicable South Carolina.
 2. Weights and Measures department within past year.
 3. Platform Scales: Of sufficient size and capacity to accommodate conveying vehicle.
 4. Metering Devices: Inspected, tested and certified by applicable South Carolina department within past year.
 5. Measurement by Weight: Concrete reinforcing steel, rolled or formed steel or other metal shapes will be measured by handbook weights. Welded assemblies will be measured by handbook or scale weight.
 6. Measurement by Volume: Measured by cubic dimension using mean length, width and height or thickness.
 7. Measurement by Area: Measured by square dimension using mean length and width or radius.
 8. Linear Measurement: Measured by linear dimension, at item centerline or mean chord.
 9. Stipulated Sum/Price Measurement: Items measured by weight, volume, area, or linear means or combination, as appropriate, as completed item or unit of the Work.
- H. Unit Price Schedule: the unit prices will be reviewed and finalized prior to execution of a contract.
 1. Division 2 Site Construction: Imported Fill: fill that is brought to site and compacted.
 2. Division 2 Site Construction: Mucking out area that is determined by the geotechnical engineer.

1.9 ALTERNATES

- A. Alternates quoted on Bid Forms will be reviewed and accepted or rejected at Owner's option. Accepted Alternates will be identified in Owner-Contractor Agreement. **The Owner shall have the right to accept Alternates in any order or combination, and to determine the low bidder on the basis of the sum of the Base Bid and alternates accepted.**
- B. Coordinate related work and modify surrounding work.
- C. Schedule of Alternates:
 1. See Section 00300 Proposal.

END OF SECTION

SECTION 01300
ADMINISTRATIVE REQUIREMENTS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Coordination and project conditions.
- B. Field engineering.
- C. Preconstruction meeting.
- D. Site mobilization meeting.
- E. Progress meetings.
- F. Pre-installation meetings.
- G. Cutting and patching.
- H. Special procedures.
- I. Composite above ceiling drawing submittal.

1.2 COORDINATION AND PROJECT CONDITIONS

- A. Coordinate scheduling, submittals, and Work of various sections of Project Manual to ensure efficient and orderly sequence of installation of interdependent construction elements, with provisions for accommodating items installed later.
- B. Verify utility requirements and characteristics of operating equipment are compatible with building utilities. Coordinate work of various sections having interdependent responsibilities for installing, connecting to, and placing in service, operating equipment.
- C. Coordinate space requirements, supports, and installation of mechanical and electrical Work indicated diagrammatically on Drawings. Follow routing shown 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. Have all pertinent subcontractors review and sign off on all related shop drawings.
- D. In finished areas except as otherwise indicated, conceal pipes, ducts, and wiring within construction. Coordinate locations of fixtures and outlets with finish elements.
- E. Coordinate completion and clean-up of Work of separate sections in preparation for Substantial Completion.
- F. After Owner occupancy of premises, coordinate access to site for correction of defective Work and Work not in accordance with Contract Documents, to minimize disruption of Owner's activities.

1.3 FIELD ENGINEERING

- A. Employ Land Surveyor registered in State of North Carolina and acceptable to Architect/Engineer.
- B. Locate and protect survey control and reference points. Promptly notify Architect/Engineer of discrepancies discovered.
- C. Control datum for survey is that shown on Drawings.
- D. Verify set-backs and easements; confirm drawing dimensions and elevations.
- E. Provide field engineering services. Establish elevations, lines, and levels, utilizing recognized engineering survey practices.
- F. Submit copy of site drawing and certificate signed by Land Surveyor certifying elevations and locations of the Work are in conformance with Contract Documents.
- G. Maintain complete and accurate log of control and survey work as Work progresses.
- H. On completion of foundation walls and major site improvements, prepare certified survey illustrating dimensions, locations, angles, and elevations of construction and site work.
- I. Protect survey control points prior to starting site work; preserve permanent reference points during construction.
- J. Promptly report to Architect/Engineer loss or destruction of reference point or relocation required because of changes in grades or other reasons.
- K. Replace dislocated survey control points based on original survey control. Make no changes without prior written notice to Architect/Engineer.

1.4 PRECONSTRUCTION MEETING

- A. Owner will schedule meeting after Notice of Award.
- B. Attendance Required: Owner, Architect/Engineer, and Contractor.
- 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 parties in Contract, and Architect/Engineer.
 - 6. Procedures and processing of field decisions, submittals, substitutions, applications for payments, proposal request, Change Orders, and Contract closeout procedures.
 - 7. Scheduling.
 - 8. Scheduling activities of Geotechnical Engineer.

- D. The Contractor shall record minutes and distribute copies within two days after meeting to participants, with two copies to Architect/Engineer, and those affected by decisions made.

1.5 SITE MOBILIZATION MEETING

- A. Architect/Engineer will schedule meeting at Project site prior to Contractor occupancy.
- B. Attendance Required: Architect/Engineer, Special Consultants, and Contractor, Contractor's Superintendent, and major Subcontractors.
- C. Agenda:
 - 1. Use of premises by Owner and Contractor.
 - 2. Owner's requirements and partial occupancy.
 - 3. Construction facilities and controls provided by Owner.
 - 4. Temporary utilities provided by Owner.
 - 5. Survey and building layout.
 - 6. Security and housekeeping procedures.
 - 7. Schedules.
 - 8. Application for payment procedures.
 - 9. Procedures for testing.
 - 10. Procedures for maintaining record documents.
 - 11. Requirements for start-up of equipment.
 - 12. Inspection and acceptance of equipment put into service during construction period.
- D. The Contractor shall record minutes and distribute copies within two days after meeting to participants, with two copies to Architect/Engineer, Owner, and those affected by decisions made.

1.6 PROGRESS MEETINGS

- A. Schedule and administer meetings throughout progress of the Work at maximum bi-monthly intervals.
- B. Make arrangements for meetings, prepare agenda with copies for participants, and preside at meetings.
- C. Attendance Required: Job superintendent, major subcontractors and suppliers, Architect/Engineer, as appropriate to agenda topics for each meeting.
- D. Agenda:
 - 1. Review minutes of previous meetings.
 - 2. Review of Work progress.
 - 3. Field observations, problems, and decisions.
 - 4. Identification of problems impeding planned progress.
 - 5. Review of submittals schedule and status of submittals.
 - 6. Review of off-site fabrication and delivery schedules.
 - 7. Maintenance of progress schedule.
 - 8. Corrective measures to regain projected schedules.
 - 9. Planned progress during succeeding work period.
 - 10. Coordination of projected progress.
 - 11. Maintenance of quality and work standards.
 - 12. Effect of proposed changes on progress schedule and coordination.

- 13. Other business relating to Work.
 - E. The Contractor shall record minutes and distribute copies within two days after meeting to participants, with two copies to Architect/Engineer, and those affected by decisions made.
- 1.7 PRE-INSTALLATION MEETINGS
- A. When required in individual specification sections, convene pre-installation meetings at Project site prior to commencing work of specific section.
 - B. Require attendance of parties directly affecting, or affected by, Work of specific section.
 - C. Notify Architect/Engineer seven days in advance of meeting date.
 - D. Prepare agenda and preside at meeting:
 - 1. Review conditions of installation, preparation and installation procedures.
 - 2. Review coordination with related work.
 - E. The Contractor shall record minutes and distribute copies within two days after meeting to participants, with two copies to Architect/Engineer, Owner and those affected by decisions made.

PART 2 PRODUCTS - Not Used

PART 3 EXECUTION

3.1 CUTTING AND PATCHING

- A. Employ skilled and experienced installer to perform cutting and patching.
- B. Submit written request in advance of cutting or altering elements affecting:
 - 1. Structural integrity of element.
 - 2. Integrity of weather-exposed or moisture-resistant elements.
 - 3. Efficiency, maintenance, or safety of element.
 - 4. Visual qualities of sight exposed elements.
 - 5. Work of Owner or separate contractor.
- C. Execute cutting, fitting, and patching including excavation and fill, to complete Work, and to:
 - 1. Fit the several parts together, to integrate with other Work.
 - 2. Uncover Work to install or correct ill-timed Work.
 - 3. Remove and replace defective and non-conforming Work.
 - 4. Remove samples of installed Work for testing.
 - 5. Provide openings in elements of Work for penetrations of mechanical and electrical Work.
- D. Execute work by methods to avoid damage to other Work, and to provide proper surfaces to receive patching and finishing.

- E. Cut masonry and concrete materials using masonry saw or core drill.
- F. Restore Work with new products in accordance with requirements of Contract Documents.
- G. Fit Work tight to pipes, sleeves, ducts, conduit, and other penetrations through surfaces.
- H. Maintain integrity of wall, ceiling, or floor construction; completely seal voids.
- I. At penetrations of fire rated walls, partitions, ceiling, or floor construction, completely seal voids with fire rated material in accordance with Section 07840, to full thickness of penetrated element.
- J. Refinish surfaces to match adjacent finishes. For continuous surfaces, refinish to nearest intersection; for assembly, refinish entire unit.
- K. Identify hazardous substances or conditions exposed during the Work to Architect/Engineer for decision or remedy.

3.2 SPECIAL PROCEDURES

- A. Materials: As specified in product sections; match existing with new products and salvaged products for patching and extending work.
- B. Employ skilled and experienced installer to perform alteration work.
- C. Cut, move, or remove items as necessary for access to alterations and renovation Work. Replace and restore at completion.
- D. Remove unsuitable material not marked for salvage, including rotted wood, corroded metals, and deteriorated masonry and concrete. Replace materials as specified for finished Work.
- E. Remove debris and abandoned items from area and from concealed spaces.
- F. Prepare surface and remove surface finishes to permit installation of new work and finishes.
- G. Close openings in exterior surfaces to protect existing work from weather and extremes of temperature and humidity.
- H. Finish surfaces as specified in individual product sections.

3.3 COMPOSITE ABOVE CEILING DRAWING SUBMITTAL

- A. Submit and obtain approval prior to any field work commencement.
- B. Submit as defined in Section 15010-3.3 coordination with other trades.
- C. The submittal shall clearly note elevation points of installed item from finish floor.
- D. The submittal must be signed off by all major subcontractors that will have work that is above the ceiling, to indicate coordination of clearances and fits of any and all items. No

work shall commence in this area without approved submittal. Any work performed is at this risk of the General Contractor.

END OF SECTION

SECTION 01323
NETWORK ANALYSIS SCHEDULES

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. References.
- B. Quality assurance.
- C. Format.
- D. Schedules.
- E. Submittals.
- F. Review and evaluation.
- G. Updating schedules.
- H. Distribution.

1.2 REFERENCES

- A. The Use of CPM in Construction - A Manual for General Contractors and the Construction Industry, Washington, D.C., The Associated General Contractors of America (AGC).

1.3 QUALITY ASSURANCE

- A. Scheduler: Contractor's personnel specializing in CPM scheduling with two years minimum experience in scheduling construction work of complexity comparable to this Project, and having use of computer facilities capable of delivering detailed graphic printout within 48 hours of request.
- B. Contractor's Administrative Personnel: Five years minimum experience in using and monitoring CPM schedules on comparable projects.

1.4 FORMAT

- A. Listings: Reading from left to right, in ascending order for each activity. Identify each activity with applicable specification section number.
- B. Diagram Sheet Size: 24 inches high x 36 inches wide.
- C. Scale and Spacing: To allow for notations and revisions.

1.5 SCHEDULES

- A. Prepare network analysis diagrams and supporting mathematical analyses using Critical Path Method, under concepts and methods outlined in AGC's "The Use of CPM in Construction - A Manual for General Contractors and the Construction Industry".
- B. Illustrate order and interdependence of activities and sequence of work; how start of given activity depends on completion of preceding activities, and how completion of activity may restrain start of subsequent activities.
- C. Illustrate complete sequence of construction by activity, identifying work of separate floors. Indicate dates for submittals including dates for Owner furnished items and return of submittals; dates for procurement and delivery of critical products; and dates for installation and provision for testing. Include legend for symbols and abbreviations used.
- D. Mathematical Analysis: Tabulate each activity of detailed network diagrams, using calendar dates, and identify for each activity:
 - 1. Preceding and following event numbers.
 - 2. Activity description.
 - 3. Estimated duration of activity, in maximum fifteen day intervals.
 - 4. Earliest start date.
 - 5. Earliest finish date.
 - 6. Actual start date.
 - 7. Actual finish date.
 - 8. Latest start date.
 - 9. Latest finish date.
 - 10. Total and free float; accrue float time to Owner and to Owner's benefit.
 - 11. Monetary value of activity, keyed to Schedule of Values.
 - 12. Percentage of activity completed.
 - 13. Responsibility.
- E. Analysis Program: Capable of compiling monetary value of completed and partially completed activities, of accepting revised completion dates, and recomputation of scheduled dates and float.
- F. Required Sorts: List activities in sorts or groups:
 - 1. By preceding work item or event number from lowest to highest.
 - 2. By longest float, then in order of early start.
 - 3. By responsibility in order of earliest possible start date.
 - 4. In order of latest allowable start dates.
 - 5. In order of latest allowable finish dates.
 - 6. Contractor's periodic payment request sorted by Schedule of Values listings specifications sections.
 - 7. Listing of basic input data generating report.
 - 8. Listing of activities on critical path.
- G. Prepare sub-schedules for each stage of Work identified in Section 01100 - Summary.
- H. Coordinate contents with schedule of values in Section 01330 - Submittal Procedures.

1.6 SUBMITTALS

- A. Within ten days after date established in Notice to Proceed, submit proposed preliminary network diagram defining planned operations for first sixty days of Work, with general outline for remainder of Work.
- B. Participate in review of preliminary and complete network diagrams jointly with Architect/Engineer.
- C. Within twenty days after joint review of proposed preliminary network diagram, submit draft of proposed complete network diagram for review. Include written certification that major Subcontractors have reviewed and accepted proposed schedule.
- D. Within ten days after joint review, submit complete network analysis consisting of network diagrams and mathematical analysis.
- E. Submit updated network schedules with each Application for Payment every thirty days.
- F. Submit number of opaque reproductions Contractor requires, plus two copies Architect/Engineer will retain.
- G. Submit under transmittal letter from specified in Section 01330 – Submittal Procedures.

1.7 REVIEW AND EVALUATION

- A. Participate in joint review and evaluation of network diagrams and analysis with Architect/Engineer at each submittal.
- B. Evaluate project status to determine work behind schedule and work ahead of schedule.
- C. After review, revise network diagrams and analysis incorporating results of review, and resubmit within ten days.

1.8 UPDATING SCHEDULES

- 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. Update diagrams to graphically depict current status of Work.
- C. Identify activities modified since previous submittal, major changes in Work, and other identifiable changes.
- D. Indicate changes required to maintain Date of Substantial Completion.
- E. Submit sorts required to support recommended changes.
- F. Prepare narrative report to define problem areas, anticipated delays, and impact on schedule. Report corrective action taken or proposed and its effect.

1.9 DISTRIBUTION

- A. Following joint review, distribute copies of updated schedules to Contractor's project site file, to Subcontractors, suppliers, Architect/Engineer, and other concerned parties.
- B. Instruct recipients to promptly report, in writing, problems anticipated by projections shown in schedules.

PART 2 PRODUCTS - Not Used

PART 3 EXECUTION - Not Used

END OF SECTION

SECTION 01330
SUBMITTAL PROCEDURES

PART 1 GENERAL

1.1 SEQUENCING OF SUBMITTALS

- A. Throughout the specifications, several items will be required to be submitted simultaneously in order for proper review to occur. Review time for Architect will only commence once each required submittal piece has been received. Reference list at the end of section for these requirements.

1.2 SECTION INCLUDES

- A. Submittal procedures.
- B. Contractor's Use of Architect's CADD Files.
- C. Construction progress schedules.
- D. Proposed products list.
- E. Product data.
- F. Shop drawings.
- G. Samples.
- H. Design data.
- I. Test reports.
- J. Certificates.
- K. Manufacturer's instructions.
- L. Manufacturer's field reports.
- M. Erection drawings.
- N. Construction photographs.

1.3 SUBMITTAL PROCEDURES

- A. Transmit each submittal with Architect/Engineer accepted form attached electronically.
- B. Sequentially number transmittal forms. Mark revised submittals with original number and sequential alphabetic suffix.
- C. Identify Project, Contractor, subcontractor and supplier; pertinent drawing and detail number, and specification section number, appropriate to submittal.

- D. Apply Contractor's stamp, signed or initialed certifying that review, approval, verification of products required, field dimensions, adjacent construction Work, and coordination of information is in accordance with requirements of the Work and Contract Documents.
- E. Schedule submittals to expedite Project, and deliver to Architect/Engineer electronically. Coordinate submission of related items.
- F. For each submittal for review, allow thirty working days excluding delivery time to and from Contractor.
- G. Identify variations from Contract Documents and product or system limitations which may be detrimental to successful performance of completed Work.
- H. Allow space on submittals for Contractor and Architect/Engineer review stamps.
- I. When revised for resubmission, identify changes made since previous submission.
- J. Distribute copies of reviewed submittals as appropriate. Instruct parties to promptly report inability to comply with requirements.
- K. Submittals not requested will not be recognized or processed.
- L. The Architect will take the following actions upon receipt of submittal:
 - 1. Check each submittal for Contractor's signature. If a submittal does not bear the Contractor's signature, return submittal without review for resubmittal by the Contractor.
 - 2. Log in the submittal and distribute to appropriate consultant, if applicable.
 - 3. Check the submittal to make sure it is in the proper form, and that all information required to be filled in by the Contractor has been completed.
 - 4. Review the submittal for conformance with the requirements of the Contract Documents.
 - ~~5.~~ Architect shall keep on file one copy, and will return one copy electronically to the Contractor.
 - 6. Stamp each item in the submittal, and indicate Architect's Action (+/-). Make sure consultant has indicated recommended action (+/-) as well, if applicable.
 - 7. If a resubmittal appears to be the result of a misunderstanding of a requirement of the Contract Documents, add notes of guidance to expedite a correct resubmittal wherever practicable.
 - 8. Fill in date of review.
 - 9. Sign full name of reviewer. If consultant reviewed the submittal, make sure his signature appears as well.
 - 10. Note the distribution of the reviewed submittal.
 - 11. Log the submittal out.
 - 12. Return the submittal electronically to the Contractor.

1.4 CONTRACTOR'S USE OF ARCHITECT'S CADD FILES

- A. CADD Drawings: CADD files on electronic media are available to the Contractor from the Architect at fees stipulated and in accordance with the "CADD File Letter of Agreement" attached at the end of this Section. Only architectural plan files will be available; detail sheet files will not be available. Consultant drawings are not made available on electronic media, including but not limited to Structural, Plumbing/Fire Protection, Mechanical and Electrical.

- B. CADD files are provided as available information only and are not to be considered Contract Documents as defined by the Contract for Construction.
- C. Contractor shall submit written request for CADD files, accompanied by signed copy of the attached CADD File Letter of Agreement prior to release of these documents.

1.5 CONSTRUCTION PROGRESS SCHEDULES

- A. Submit initial schedules within twenty days after date established in Notice to Proceed. After review, resubmit required revised data within ten days.
- B. Submit revised Progress Schedules with each Application for Payment.
- C. Distribute copies of reviewed schedules to Project site file, subcontractors, suppliers, and other concerned parties.
- D. Instruct recipients to promptly report, in writing, problems anticipated by projections indicated in schedules.
- E. Submit computer generated network analysis diagram as specified in Section 01323 - Network Analysis Schedules.
- F. Show complete sequence of construction by activity, identifying Work of separate stages and other logically grouped activities. Indicate early and late start, early and late finish, float dates, and duration.
- G. Indicate estimated percentage of completion for each item of Work at each submission.
- H. Submit separate schedule of submittal dates for shop drawings, product data, and samples, including Owner furnished products and products identified under Allowances, and dates reviewed submittals will be required from Architect/Engineer. Indicate decision dates for selection of finishes.
- I. Indicate delivery dates for Owner furnished products and products identified under Allowances.
- J. Revisions To Schedules:
 - 1. Indicate progress of each activity to date of submittal, and projected completion date of each activity.
 - 2. Identify activities modified since previous submittal, major changes in scope, and other identifiable changes.
 - 3. Prepare narrative report to define problem areas, anticipated delays, and impact on Schedule. Report corrective action taken, or proposed, and its effect including effect of changes on schedules of separate contractors.

1.6 PROPOSED PRODUCTS LIST

- A. Within fifteen days after date of Notice to Proceed, submit list of major products proposed for use, with name of manufacturer, trade name, and model number of each product.
- B. For products specified only by reference standards, give manufacturer, trade name, model or catalog designation, and reference standards.

1.7 PRODUCT DATA

- A. Product Data: Submit to Architect/Engineer for review for limited purpose of checking for conformance with information given and design concept expressed in Contract Documents. All submittal information to be submitted electronically.
- B. Submit number of copies Contractor requires. All submittal information to be submitted electronically.
- C. Mark each copy to identify applicable products, models, options, and other data. Supplement manufacturers' standard data to provide information specific to this Project.
- D. Indicate product utility and electrical characteristics, utility connection requirements, and location of utility outlets for service for functional equipment and appliances.
- E. After review, produce copies and distribute in accordance with SUBMITTAL PROCEDURES article and for record documents described in Section 01700 - Execution Requirements.

1.8 SHOP DRAWINGS

- A. Shop Drawings: Submit to Architect/Engineer for review for limited purpose of checking for conformance with information given and design concept expressed in Contract Documents. All submittal information to be submitted electronically.
- B. Indicate special utility and electrical characteristics, utility connection requirements, and location of utility outlets for service for functional equipment and appliances.
- C. When required by individual specification sections, provide shop drawings signed and sealed by professional engineer responsible for designing components shown on shop drawings.
 - 1. Include signed and sealed calculations to support design from an engineer registered in the State of South Carolina.
 - 2. Submit drawings and calculations in form suitable for submission to and approval by authorities having jurisdiction.
 - 3. Make revisions and provide additional information when required by authorities having jurisdiction.
- D. After review, produce copies and distribute in accordance with SUBMITTAL PROCEDURES article and for record documents described in Section 01700 - Execution Requirements.

1.9 SAMPLES

- A. Samples: Submit to Architect/Engineer for review for limited purpose of checking for conformance with information given and design concept expressed in Contract Documents.
- B. Samples For Selection as Specified in Product Sections:
 - 1. Submit to Architect/Engineer for aesthetic, color, or finish selection.
 - 2. Submit samples of finishes from full range of manufacturers' standard colors, in custom colors selected, textures, and patterns for Architect/Engineer selection.

- C. Submit samples to illustrate functional and aesthetic characteristics of Products, with integral parts and attachment devices. Coordinate sample submittals for interfacing work.
 - D. Include identification on each sample, with full Project information.
 - E. Submit number of samples specified in individual specification sections; Architect/Engineer will retain one sample.
 - F. Reviewed samples which may be used in the Work are indicated in individual specification sections.
 - G. Samples will not be used for testing purposes unless specifically stated in specification section.
 - H. After review, produce duplicates and distribute in accordance with SUBMITTAL PROCEDURES article and for record documents purposes described in Section 01700 - Execution Requirements.
- 1.10 DESIGN DATA
- A. Submit for Architect/Engineer's knowledge as contract administrator or for Owner. All submittal information to be submitted electronically.
 - B. Submit for information for limited purpose of assessing conformance with information given and design concept expressed in Contract Documents.
- 1.11 TEST REPORTS
- A. Submit for Architect/Engineer's knowledge as contract administrator and to the Owner. All submittal information to be submitted electronically.
 - B. Submit test reports for information for limited purpose of assessing conformance with information given and design concept expressed in Contract Documents.
- 1.12 CERTIFICATES
- A. When specified in individual specification sections, submit certification by manufacturer, installation/application subcontractor, or Contractor to Architect/Engineer, in quantities specified for Product Data. All submittal information to be submitted electronically.
 - B. Indicate material or product conforms to or exceeds specified requirements. Submit supporting reference data, affidavits, and certifications as appropriate.
 - C. Certificates may be recent or previous test results on material or Product, but must be acceptable to Architect/Engineer.
- 1.13 MANUFACTURER'S INSTRUCTIONS
- A. When specified in individual specification sections, submit printed instructions for delivery, storage, assembly, installation, start-up, adjusting, and finishing, to Architect/Engineer for delivery to Owner in quantities specified for Product Data. All submittal information to be submitted electronically.

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

1.14 MANUFACTURER'S FIELD REPORTS

- A. Submit reports for Architect/Engineer's benefit as contract administrator or for Owner. All submittal information to be submitted electronically.
- B. Submit report in duplicate within five days of observation to Architect/Engineer for information.
- C. Submit for information for limited purpose of assessing conformance with information given and design concept expressed in Contract Documents.

1.15 ERECTION DRAWINGS

- A. Submit drawings for Architect/Engineer's benefit as contract administrator and to the Owner. All submittal information to be submitted electronically.
- B. Submit for information for limited purpose of assessing conformance with information given and design concept expressed in Contract Documents.
- C. Data indicating inappropriate or unacceptable Work may be subject to action by Architect/Engineer or Owner.

PART 2 PRODUCTS - Not Used

PART 3 EXECUTION - Not Used

ATTACHMENTS:

SA Form
CADD File Letter of Agreement

The following is a list of submittals (but not limited to) required within the Project Manual; refer to each section for specific requirements. The list is for information only and does not override the specification section requirements of each.

SUBMITTAL ACTION

CONTRACTOR'S SUBMITTAL

for use by contractor

DATE OF SUBMITTAL _____

SUBMITTAL NUMBER _____
provide separate form for each Section

SPECIFICATION SECTION NUMBER _____

FORM OF SUBMITTAL
P Prints **Cx** Calculations
S Sepia or other **L** Letter
 transparency
CC Catalog cuts **C** Certificate
Sa Sample **M** Maint. mat.
 or extra

T Test of Inspect.
 _____ Other _____

SUBMITTED BY: _____
 _____ MAIL _____ HAND _____ EXPRESS

ITEM (a, b, c, etc.)	NO OF COPIES	FORM	SECTION PARAGRAPH NO. OR DWG. & DET. REF. NO.	DESCRIPTION OF SUBMITTAL	SOURCE (NAME OF MNF., FABRICATOR, OF GEN. CONTR.

THIS SUBMITTAL DEVIATES FROM THE REQUIREMENTS OF THE CONTRACT DOCUMENTS IN THE FOLLOWING WAYS: _____

ATTACH ANOTHER SHEET IF REQUIRED _____
 I/WE HAVE CHECKED, COORDINATED, AND APPROVED THIS SUBMITTAL. THIS SUBMITTAL, EXCEPT FOR THE DEVIATIONS NOTED ABOVE, IS IN CONFORMANCE WITH THE CONSTRUCTION DOCUMENTS.

CONTRACTOR APPROVAL BY: _____
 FULL SIGNATURE, NOT INITIALS

ARCHITECT'S REVIEW

SA

FROM: **TYCH & WALKER ARCHITECTS, LLP**
 P.O. Box 509
 38 Blackgum Road, Unit B
 Pawleys Island, SC 29585
 (843) 651-7151

PROJECT: **Renovations to 13th. Avenue South**
Myrtle Beach, SC

PROJECT NO. **TWA-2017-01**

NOTE: UPPER PORTION OF BOX
 DENOTES CONSULTANT'S ACTION;
 LOWER PORTION DENOTES
 ARCHITECT'S ACTION.

ACTION	REQ'D. OF CONTRACTOR	ARCHITECT'S ACTION/CONSULTANT'S ACTION
+ DO NOT RESUBMIT (OK)	-- REVISE AND RESUBMIT (RR)	+ CONFORMS (C)
	-- MAKE NEW CONFORM. SUBMITTAL (NS)	+ CONFORMS NOTE COMMENTS (CC)
		-- REJECTED (R)

ARCHITECTS REVIEW IS ONLY FOR CONFORMANCE WITH DESIGN CONCEPT AND INFORMATION IN THE CONTRACT DOCUMENTS
 Contractor shall inform Architect of deviations in writing. Request substitutions only by specified procedures, not by the submittal process. Marks and comments shall not relieve the Contractor from responsibility for deviations there from, nor from any responsibility for errors and omissions in his submittal. Approval of a specific item does not include approval of the assembly of which the item is a component. Contractor is responsible for details and accuracy, for confirming quantities, dimensions and fit, for fabrication process, for the means, methods, sequences and techniques of assembly and construction, for safe performance of the work, and for the coordination of the work of all trades. Contractor shall not fabricate or install unless positive action is granted by the Architect.

TYCH & WALKER ARCHITECTS, LLP
 reviewed by: _____ Date: _____
 Consultant reviewed by: _____ Date: _____

SECTION 01400
QUALITY REQUIREMENTS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Quality control and control of installation.
- B. Tolerances.
- C. References.
- D. Labeling.
- E. Mock-up requirements.
- F. Testing and inspection services.
- G. Manufacturers' field services.
- H. Examination.
- I. Preparation.

1.2 QUALITY CONTROL AND 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. When manufacturers' instructions conflict with Contract Documents, request clarification from Architect/Engineer 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. Perform Work by persons qualified to produce required and specified quality.
- F. Verify field measurements are as indicated on Shop Drawings or as instructed by manufacturer.
- G. Secure products in place with positive anchorage devices designed and sized to withstand stresses, vibration, physical distortion, or disfigurement.

1.3 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. When manufacturers' tolerances conflict with Contract Documents, request clarification from Architect/Engineer before proceeding.
- C. Adjust products to appropriate dimensions; position before securing products in place.

1.4 REFERENCES

- A. For products or workmanship specified by association, trade, or other consensus standards, comply with requirements of standard, except when more rigid requirements are specified or are required by applicable codes.
- B. Conform to reference standard by date of issue current on date of Contract Documents, except where specific date is established by code.
- C. Obtain copies of standards where required by product specification sections.
- D. When specified reference standards conflict with Contract Documents, request clarification from Architect/Engineer before proceeding.
- E. Neither contractual relationships, duties, nor responsibilities of parties in Contract nor those of Architect/Engineer shall be altered from Contract Documents by mention or inference otherwise in reference documents.

1.5 LABELING

- A. Attach label from agency approved by authority having jurisdiction for products, assemblies, and systems required to be labeled by applicable code.
- B. Label Information: Include manufacturer's or fabricator's identification, approved agency identification, and the following information, as applicable, on each label.
 - 1. Model number.
 - 2. Serial number.
 - 3. Performance characteristics.

1.6 MOCK-UP REQUIREMENTS

- A. Tests will be performed under provisions identified in this section and identified in respective product specification sections.
- B. Assemble and erect specified items with specified attachment and anchorage devices, flashings, seals, and finishes.
- C. Accepted mock-ups shall be comparison standard for remaining Work.
- D. Where mock-up has been accepted by Architect/Engineer and is specified in product specification sections to be removed; remove mock-up and clear area when directed to do so by Architect/Engineer.

1.7 TESTING AND INSPECTION SERVICES

- A. The Owner **will select the** independent firm to perform testing and inspection, complete, as described in this section and elsewhere in the contract documents. The

General Contractor shall coordinate this work and pay for as defined within the allowance. See Section 01200 Price and Payment Procedures, Allowances.

- B. Documents affecting work of this section include, but are not necessarily limited to, General Conditions, Supplementary Conditions, and section in Division 1 of these specifications.
- C. Requirements for testing may be described in various sections of these specifications.
- D. Prior to start of Work, submit testing laboratory name, address, and telephone number, and names of full time registered Engineer specialist and responsible officer.
- E. The independent firm will perform tests, inspections and other services specified in individual specification sections and as required by Architect/Engineer.
 - 1. Laboratory: Authorized to operate at Project location in State of North Carolina.
 - 2. Laboratory Staff: Maintain full time registered Engineer on staff to review services.
 - 3. Testing Equipment: Calibrated at reasonable intervals with devices of accuracy traceable to National Bureau of Standards or accepted values of natural physical constants.
- F. Testing, inspections and source quality control may occur on or off project site. Perform off-site testing as required by Architect/Engineer or Owner.
- G. Reports will be submitted by independent firm to Architect/Engineer, Contractor, and authority having jurisdiction, in duplicate, indicating observations and results of tests and indicating compliance or non-compliance with Contract Documents.
 - 1. Submit final report indicating correction of Work previously reported as non-compliant.
- H. Cooperate with independent firm; furnish samples of materials, design mix, equipment, tools, storage, safe access, and assistance by incidental labor as requested.
 - 1. Notify Architect/Engineer and independent firm 24 hours prior to expected time for operations requiring services.
 - 2. Make arrangements with independent firm and pay for additional samples and tests required for Contractor's use.
- I. Testing and employment of testing agency or laboratory shall not relieve Contractor of obligation to perform Work in accordance with requirements of Contract Documents.
 - 1. Laboratory is not authorized to release, revoke, alter or enlarge on requirements of contract documents, approve or accept any portion of the work, perform any duties of contractor.
- J. Re-testing or re-inspection required because of non-conformance to specified requirements shall be performed by same independent firm on instructions by Architect/Engineer. Payment for re-testing or re-inspection will be charged to Contractor by deducting testing charges from Contract Sum/Price.
- K. Agency Responsibilities:
 - 1. Test samples of mixes submitted by Contractor.
 - 2. Provide qualified personnel at site. Cooperate with Architect/Engineer 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/Engineer and Contractor of observed irregularities or non-conformance of Work or products.
 6. Perform additional tests required by Architect/Engineer.
 7. Attend preconstruction meetings and progress meetings.
- L. Agency Reports: After each test, promptly submit two copies of report to Architect/Engineer, Contractor, and authority having jurisdiction. When requested by Architect/Engineer, provide interpretation of test results. Include the following:
1. Date issued.
 2. Project title and number.
 3. Name of inspector.
 4. Date and time of sampling or inspection.
 5. Identification of product and specifications section.
 6. Location in Project.
 7. Type of inspection or test.
 8. Date of test.
 9. Results of tests.
 10. Conformance with Contract Documents.
- M. Limits On Testing Authority:
1. Agency or laboratory may not release, revoke, alter, or enlarge on requirements of Contract Documents.
 2. Agency or laboratory may not approve or accept any portion of the Work.
 3. Agency or laboratory may not assume duties of Contractor.
 4. Agency or laboratory has no authority to stop the Work.
- N. Testing:
Testing laboratory inspection, sampling and/or testing is required for, but is not necessarily limited to, the following:
Division 2 - Soils and Base Compaction Control: All related Sections
Section 03200 - Concrete Reinforcement: Placement of Reinforcement
Section 03300 - Cast-in-Place Concrete: Placement of Concrete
1. SOIL INSPECTING AND TESTING
 - a. Make required inspections and tests including, but not necessarily limited to:
 - b. Visually inspect on-site and imported fill and backfill, making such tests and retests as are necessary to determine compliance with the Contract requirements and suitability for the proposed purpose.
 - c. Make field density tests on samples from in-place material as required.
 - d. As pertinent, inspect and test the scarifying and recompacting of cleaned subgrade; inspect the progress of excavating, filling and grading; make density tests at fills and backfills; and verify compliance with provisions of the contract documents and governmental agencies having jurisdiction.
 - e. Make and distribute necessary reports and certificates.
 2. CONCRETE INSPECTING AND TESTING
 - a. Portland Cement:

- 1) Secure from the cement manufacturer Certificates of Compliance delivered directly to the concrete producer for further delivery directly to the testing laboratory.
 - 2) Require the Certificates of Compliance to positively identify the cement as to production lot, bin or silo number, dating and routing of shipment, and compliance with the specific standards.
 - 3) If so required by the Architect, promptly provide such other specific physical and chemical data as requested.
 - b. Aggregate:
 - 1) Provide one test unless character of materials changes, material is substituted, or additional test is required by the Architect.
 - 2) Sample from conveyor belts or batching gates at the ready-mix plant:
 - 3) Sieve analysis to determine compliance with specified standards and grading.
 - 4) Specific gravity test for compliance with specified standards.
 - c. Laboratory Design Mix:
 - 1) After approval of aggregate, and whenever character or source of materials is changed, provide mix design in accordance with ACI 613.
 - 2) Provide designs for all mixes prepared by a licensed civil engineer.
3. QUALITY CONTROL CONCRETE TESTING DURING CONSTRUCTION
- a. Sampling and testing for quality control during placement of concrete shall include sampling fresh concrete (ASTM C 172), except modified for slump to comply with (ASTM C 94) and shall further include the following:
 - 1) Slump: ASTM C143; one test for each concrete load at point of discharge; and one test for each set of compressive strength test specimens.
 - 2) Air Content: ASTM C 173; volumetric method for normal weight concrete; ASTM C 231 pressure for normal weight concrete; one for each set of compressive strength test specimens.
 - 3) Concrete Temperature: Test hourly when air temperature is 40 degrees F (4 degrees C) and below, and when 80 degrees F (27 degrees C) and above; and each time a set of compression test specimens is made.
 - 4) Compression Test Specimen: ASTM C 31; one set of 6 standard cylinders for each compressive strength test, unless otherwise directed. Mold and store cylinders for laboratory cured test specimens except when field-cure test specimens are required.
 - 5) Compressive Strength Tests: ASTM C 39; one set for each 100 cu. yds. or fraction thereof, of each concrete class placed in any one day or for each 5,000 sq. ft. or fraction thereof of surface area placed; 2 specimens tested at 7 days, 2 specimens tested at 28 days, and two specimens retained in reserve for later testing if required.
 - b. When frequency of testing will provide less than 5 strength tests for a given class of concrete, conduct testing from at least 5 randomly selected batches or from each batch if fewer than 5 are used.
 - c. When total quantity of a given class of concrete is less than 50 cu. yds, strength test may be waived by Architect if, in his judgment, adequate evidence of satisfactory strength is provided.

- d. Strength level of concrete will be considered satisfactory if averages of sets of three consecutive strength test results equal or exceed specified compressive strength, and no individual strength test result falls below specified compressive by more than 500 psi.
- e. Test results will be reported in writing directly to Architect/Engineer and Contractor no later than one day after tests are made. Reports of compressive strength tests shall contain the project identification name and number, date of concrete placement, name of concrete testing service, concrete type and class, location of concrete batch in structure, design compressive strength at 28 days, concrete mix proportions and materials; compressive breaking strength and type of break for both 7-day tests and 28-day tests.
- f. The testing service will make additional tests of in-place concrete when test results indicate specified concrete strengths and other characteristics have not been attained in the structure, as directed by Architect/Engineer. Testing service may conduct tests to determine adequacy of concrete by cored cylinders complying with ASTM C42, or by other methods as directed. Contractor shall pay for such tests conducted, and any other additional testing as may be required, when unacceptable concrete is verified.

4. CONCRETE REINFORCEMENT INSPECTING AND TESTING

- a. Prior to use, test all reinforcement steel bars for compliance with the specified standards:
 - 1) Materials identified by mill test reports and certified by the testing laboratory does not require additional testing. Require the supplier to furnish mill test reports to the testing laboratory for certification.
 - 2) Tag identified steel at the supplier's shop. When steel arrives at the job site without such tags, test it as identified steel.
 - 3) Unidentified steel:
 - a) Have the testing laboratory select samples consisting of two pieces, each 18 mg. in size.
 - b) Have the testing laboratory make one tensile test and one bend test for each
 - 4) 2-1/2 tons or fraction thereof of each size of unidentified steel.
 - 5) Provide continuous inspection for all welding of reinforcement steel.

1.8 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, start-up of equipment, test, adjust and balance of equipment and as applicable, and to initiate instructions when necessary.
- B. Submit qualifications of observer to Architect/Engineer 30 days in advance of required observations.
- C. Report observations and site decisions or instructions given to applicators or installers that are supplemental or contrary to manufacturers' written instructions.

- D. Refer to Section 01330 - Submittal Procedures, MANUFACTURERS' FIELD REPORTS article.

1.9 WAIVER OF INSPECTION AND/OR TESTS

- A. Specified inspections and/or tests may be waived only by the specific approval of the Architect/Engineer and such waivers will be expected to result in credit to the Owner, equal to normal cost of such inspection and/or test.

PART 2 PRODUCTS - Not Used

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify existing site conditions and substrate surfaces are acceptable for subsequent Work. Beginning new Work means acceptance of existing conditions.
- B. Verify existing 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. Verify utility services are available, of correct characteristics, and in correct locations.

3.2 PREPARATION

- A. Clean substrate surfaces prior to applying next material or substance.
- B. Seal cracks or openings of substrate prior to applying next material or substance.
- C. Apply manufacturer required or recommended substrate primer, sealer, or conditioner prior to applying new material or substance in contact or bond.

END OF SECTION

SECTION 01500
TEMPORARY FACILITIES AND CONTROLS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Temporary Utilities:
 - 1. Temporary electricity.
 - 2. Temporary lighting for construction purposes.
 - 3. Temporary heating.
 - 4. Temporary cooling.
 - 5. Temporary ventilation.
 - 6. Telephone service.
 - 7. Facsimile service.
 - 8. Temporary water service.
 - 9. Temporary sanitary facilities.

- B. Construction Facilities:
 - 1. Field offices and sheds.
 - 2. Vehicular access.
 - 3. Parking.
 - 4. Progress cleaning and waste removal.
 - 5. Project identification.
 - 6. Traffic regulation.
 - 7. Fire prevention facilities.

- C. Temporary Controls:
 - 1. Barriers.
 - 2. Enclosures and fencing.
 - 3. Security.
 - 4. Water control.
 - 5. Dust control.
 - 6. Erosion and sediment control.
 - 7. Noise control.
 - 8. Pest control.
 - 9. Pollution control.
 - 10. Rodent control.

- D. Removal of utilities, facilities, and controls.

1.2 TEMPORARY ELECTRICITY

- A. Provide and pay for power service required from utility source as needed for construction operation.

- B. Provide temporary electric feeder from electrical service at location as directed by Architect/Engineer. Do not disrupt Owner's use of service.

- C. Complement existing power service capacity and characteristics as required for construction operations.

- D. Provide power outlets, with branch wiring and distribution boxes located as required for construction operations. Provide flexible power cords as required for portable construction tools and equipment.
- E. Provide main service disconnect and over-current protection at convenient location.
- F. Permanent convenience receptacles may be utilized during construction.

1.3 TEMPORARY LIGHTING FOR CONSTRUCTION PURPOSES

- A. Provide and maintain incandescent lighting for construction operations to achieve minimum lighting level of 2 watt/sq ft.
- B. Provide and maintain 1 watt/sq ft lighting to exterior staging and storage areas entire site after dark for security purposes.
- C. Provide and maintain 0.25 watt/sq ft HID lighting to interior work areas after dark for security purposes.
- D. Provide branch wiring from power source to distribution boxes with lighting conductors, pigtails, and lamps for specified lighting levels.
- E. Maintain lighting and provide routine repairs.
- F. Permanent building lighting may not be utilized during construction.

1.4 TEMPORARY HEATING

- A. Provide and pay for heating devices and heat as needed to maintain specified conditions for construction operations.
- B. Prior to operation of permanent equipment for temporary heating purposes, verify installation is approved for operation, equipment is lubricated and filters are in place. Provide and pay for operation, maintenance, and regular replacement of filters and worn or consumed parts.
- C. Maintain minimum ambient temperature of 50 degrees F in areas where construction is in progress, unless indicated otherwise in product sections.

1.5 TEMPORARY COOLING

- A. Provide and pay for cooling devices and cooling as needed to maintain specified conditions for construction operations. Provide separate metering and reimburse Owner for cost of energy used.
- B. Prior to operation of permanent equipment for temporary cooling purposes, verify installation is approved for operation, equipment is lubricated and filters are in place. Provide and pay for operation, maintenance, and regular replacement of filters and worn or consumed parts.
- C. Maintain maximum ambient temperature of 80 degrees F in areas where construction is in progress, unless indicated otherwise in specifications.

1.6 TEMPORARY VENTILATION

- A. Ventilate enclosed areas to achieve curing of materials, to dissipate humidity, and to prevent accumulation of dust, fumes, vapors, or gases.

1.7 TELEPHONE SERVICE

- A. Provide, maintain, and pay for telephone service to field office at time of project mobilization.

1.8 TEMPORARY WATER SERVICE

- A. Provide and pay for suitable quality water service as needed to maintain specified conditions for construction operations. Connect to existing water source.
- B. Extend branch piping with outlets located so water is available by hoses with threaded connections. Provide temporary pipe insulation to prevent freezing.

1.9 TEMPORARY SANITARY FACILITIES

- A. Provide and maintain required facilities and enclosures. Existing facility use is not permitted. Provide facilities at time of project mobilization.

1.10 FIELD OFFICES AND SHEDS

- A. If not used provide the following:
 - 1. Office: Weather tight, with lighting, electrical outlets, heating, cooling and ventilating equipment, and equipped with sturdy furniture drawing rack, and drawing display table.
 - 2. Provide space for Project meetings, with table and chairs to accommodate 6 persons.
 - 3. Locate offices and sheds minimum distance of 20 feet from existing and new structures.
 - 4. When permanent facilities are enclosed with operable utilities, relocate offices and storage into building, with written agreement of Owner, and remove temporary buildings.
 - 5. Construction: Portable or mobile buildings, or buildings constructed with floors raised above ground, securely fixed to foundations with steps and landings at entrance doors.
 - a. Construction: Structurally sound, secure, weather tight enclosures for office and storage spaces. Maintain during progress of Work; remove when no longer needed.
 - b. Temperature Transmission Resistance of Floors, Walls, and Ceilings: Compatible with occupancy and storage requirements.
 - c. Exterior Materials: Weather resistant, finished in one color acceptable to Architect/Engineer.
 - d. Interior Materials in Offices: Sheet type materials for walls and ceilings, pre-finished or painted; resilient floors and bases.
 - e. Lighting for Offices: 50 ft C at desk top height, exterior lighting at entrance doors.
 - f. Interior Materials in Storage Sheds: As required to provide specified conditions for storage of products.

- B. Environmental Control:
 - 1. Heating, Cooling, and Ventilating for Offices: Automatic equipment to maintain comfort conditions.
 - 2. Storage Spaces: Heating and ventilation as needed to maintain products in accordance with Contract Documents; lighting for maintenance and inspection of products.
- C. Storage Areas And Sheds: Size to storage requirements for products of individual Sections, allowing for access and orderly provision for maintenance and for inspection of products to requirements of Section 01600 - Product Requirements.
- D. Preparation: Fill and grade sites for temporary structures sloped for drainage away from buildings.
- E. Installation:
 - 1. Install office spaces ready for occupancy fifteen days after date fixed in Notice to Proceed.
 - 2. Employee Residential Occupancy: Not allowed on Owner's property.
- F. Removal: At completion of Work remove buildings, foundations, utility services, and debris. Restore areas.

1.11 VEHICULAR ACCESS

- A. Construct temporary access roads from public thoroughfares to serve construction area, of width and load bearing capacity to accommodate unimpeded traffic for construction purposes as indicated on Civil Drawings.
- B. Construct temporary bridges and culverts to span low areas and allow unimpeded drainage.
- C. Extend and relocate vehicular access as Work progress requires, provide detours as necessary for unimpeded traffic flow.
- D. Location approved by Architect/Engineer.
- E. Provide unimpeded access for emergency vehicles. Maintain 20 feet wide driveways with turning space between and around combustible materials.
- F. Provide and maintain access to fire hydrants and control valves free of obstructions.
- G. Provide means of removing mud from vehicle wheels before entering streets.
- H. Use designated existing on-site roads for construction traffic.

1.12 PARKING

- A. Construct temporary gravel surface parking areas to accommodate construction personnel. Refer to Civil Drawings for parking area for personnel. Final location to be determined at pile construction meeting.
- B. Locate as approved by Architect/Engineer.

- C. When site space is not adequate, provide additional off-site parking.
- D. Use of designated existing on-site streets and driveways used for construction traffic is permitted. Tracked vehicles not allowed on paved areas.
- E. Use of existing parking facilities used by construction personnel is not permitted.
- F. Do not allow heavy vehicles or construction equipment in parking areas.
- G. Do not allow vehicle parking on existing pavement.
- H. Permanent Pavements And Parking Facilities:
 - 1. Prior to Substantial Completion, bases for permanent roads and parking areas may be used for construction traffic.
 - 2. Avoid traffic loading beyond paving design capacity. Tracked vehicles not allowed.
 - 3. Use of permanent parking structures is not permitted.
- I. Maintenance:
 - 1. Maintain traffic and parking areas in sound condition free of excavated material, construction equipment, products, mud, snow, and ice.
 - 2. Maintain existing and permanent paved areas used for construction; promptly repair breaks, potholes, low areas, standing water, and other deficiencies, to maintain paving and drainage in original, or specified, condition.
- J. Removal, Repair:
 - 1. Remove temporary materials and construction before Substantial Completion.
 - 2. Remove underground work and compacted materials to depth of 2 feet; fill and grade site as specified.
 - 3. Repair existing facilities damaged by use, to original condition.
- K. Mud From Site Vehicles: Provide means of removing mud from vehicle wheels before entering streets.
- L. Establish temporary parking surface for Department of Special Needs Building "A" at corner of Dozier and Church streets with an ADA accessible path to their building entry.

1.13 PROGRESS CLEANING AND WASTE REMOVAL

- A. Maintain areas free of waste materials, debris, and rubbish. Maintain site in 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 spaces.
- C. Broom and vacuum clean interior areas prior to start of surface finishing, and continue cleaning to eliminate dust.
- D. Collect waste materials, debris, and rubbish. The material shall be sorted in separate dumpster bins as provided by Georgetown County. Georgetown County will remove dumpsters and replace dumpsters weekly. The Contractor shall coordinate with Georgetown County concerning quantity and timing. It is the intent that the Contractor recycle as much construction waste as possible. There will be no landfill fee.

- E. Open free-fall chutes are not permitted. Terminate closed chutes into appropriate containers with lids.

1.14 PROJECT IDENTIFICATION

- A. Project Identification Sign:
 - 1. One painted sign, 32 sq ft area, bottom 6 feet above ground.
 - 2. Content:
 - a. Project title, logo and name of Owner as indicated on Contract Documents.
 - b. Names and titles of authorities.
 - c. Names and titles of Architect/Engineer and Consultants.
 - d. Name of Prime Contractor and major Subcontractors.
 - 3. Graphic Design, Colors, Style of Lettering: Designated by Architect/Engineer.
- B. Project Informational Signs:
 - 1. Painted informational signs of same colors and lettering as Project Identification sign, or standard products; size lettering for legibility at 100 feet distance.
 - 2. Provide sign at each field office, storage shed, and directional signs to direct traffic into and within site. Relocate as Work progress requires.
 - 3. No other signs are allowed except those required by law.
- C. Design sign and structure to withstand 60 miles/hr wind velocity.
- D. Sign Painter: Experienced as professional sign painter for minimum three years.
- E. Finishes, Painting: Adequate to withstand weathering, fading, and chipping for duration of construction.
- F. Show content, layout, lettering, color, foundation, structure, sizes, and grades of members.
- G. Sign Materials:
 - 1. Structure and Framing: New, wood, structurally adequate.
 - 2. Sign Surfaces: Exterior grade plywood with medium density overlay, minimum 3/4 inches thick, standard large sizes to minimize joints.
 - 3. Rough Hardware: Galvanized.
 - 4. Paint and Primers: Exterior quality, two coats; sign background of color as selected.
 - 5. Lettering: Exterior quality paint, contrasting colors as selected.
- H. Installation:
 - 1. Install project identification sign within 15 days after date fixed by Notice to Proceed.
 - 2. Erect at designated location.
 - 3. Erect supports and framing on secure foundation, rigidly braced and framed to resist wind loadings.
 - 4. Install sign surface plumb and level, with butt joints. Anchor securely.
 - 5. Paint exposed surfaces of sign, supports, and framing.
- I. Maintenance: Maintain signs and supports clean, repair deterioration and damage.

- J. Removal: Remove signs, framing, supports, and foundations at completion of Project and restore area.

1.15 TRAFFIC REGULATION

- A. Haul Routes:
 - 1. Consult with authority having jurisdiction, establish public thoroughfares to be used for haul routes and site access.
 - 2. Confine construction traffic to designated haul routes.
 - 3. Provide traffic control at critical areas of haul routes to regulate traffic, to minimize interference with public traffic.
- B. Removal:
 - 1. Remove equipment and devices when no longer required or at Substantial Completion.
 - 2. Repair damage caused by installation.
 - 3. Remove post settings to depth of 2 feet.

1.16 FIRE PREVENTION FACILITIES

- A. Prohibit smoking with buildings under construction and demolition. Designate area on site where smoking is permitted. Provide approved ashtrays in designated smoking areas.
- B. Establish fire watch for cutting and welding and other hazardous operations capable of starting fires. Maintain fire watch before, during, and after hazardous operations until threat of fire does not exist.
- C. Standpipes: Install minimum one standpipe for use during construction before building reaches 40 feet in height.
- D. Portable Fire Extinguishers: NFPA 10; 10 pound capacity, 4A-60B: C UL rating.
 - 1. Provide one fire extinguisher at each stair on each floor of buildings under construction and demolition.
 - 2. Provide minimum one fire extinguisher in every construction trailer and storage shed.
 - 3. Provide minimum one fire extinguisher on roof during roofing operations using heat producing equipment.

1.17 BARRIERS

- A. Provide barriers to prevent unauthorized entry to construction areas and to protect existing facilities and adjacent properties from damage from construction operations and demolition.
- B. Provide barricades and covered walkways required by authorities having jurisdiction for public rights-of-way and for public access to existing building.
- C. Provide protection for plants designated to remain. Replace damaged plants.
- D. Protect non-owned vehicular traffic, stored materials, site, and structures from damage.

1.18 ENCLOSURES AND FENCING

- A. Construction: Commercial grade chain link fence.
- B. Provide 6 feet high fence around construction site; equip with vehicular and pedestrian gates with locks as defined in units of construction on Civil Drawings.
- C. Exterior Enclosures:
 - 1. Provide temporary insulated 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.

1.19 SECURITY

- A. Security Program:
 - 1. Protect Work existing premises from theft, vandalism, and unauthorized entry.
 - 2. Initiate program at project mobilization.
 - 3. Maintain program throughout construction period until Owner occupancy.
- B. Entry Control:
 - 1. Restrict entrance of persons and vehicles into Project site.
 - 2. Allow entrance only to authorized persons with proper identification.
 - 3. Maintain log of workers and visitors, make available to Owner on request.

1.20 WATER CONTROL

- A. Grade site to drain. Maintain excavations free of water. Provide, operate, and maintain pumping equipment.
- B. Protect site from puddling or running water. Provide water barriers as required to protect site from soil erosion.

1.21 DUST CONTROL

- A. Execute Work by methods to minimize raising dust from construction operations and in conformance with Town of Ocean Isle Beach ordinance or NC regulations.
- B. Provide positive means to prevent air-borne dust from dispersing into atmosphere.

1.22 EROSION AND SEDIMENT CONTROL

- A. Plan and execute construction by methods to control surface drainage from cuts and fills, from borrow and waste disposal areas. Prevent erosion and sedimentation.
- B. Minimize surface area of bare soil exposed at one time.
- C. Provide temporary measures including berms, dikes, and drains, and other devices to prevent water flow.

- D. Construct fill and waste areas by selective placement to avoid erosive surface silts or clays.
 - E. Periodically inspect earthwork to detect evidence of erosion and sedimentation; promptly apply corrective measures.
- 1.23 NOISE CONTROL
- A. Provide methods, means, and facilities to minimize noise from and noise produced by construction operations.
- 1.24 PEST CONTROL
- A. Provide methods, means, and facilities to prevent pests and insects from damaging the Work and entering facility.
- 1.25 POLLUTION CONTROL
- A. 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.
 - B. Comply with pollution and environmental control requirements of authorities having jurisdiction.
- 1.26 RODENT CONTROL
- A. Provide methods, means, and facilities to prevent rodents from accessing or invading premises.
- 1.27 REMOVAL OF UTILITIES, FACILITIES, AND CONTROLS
- A. Remove temporary utilities, equipment, facilities, and materials prior to Substantial Completion inspection.
 - B. Remove underground installations to minimum depth of 2 feet. Grade site as indicated on Drawings.
 - C. Clean and repair damage caused by installation or use of temporary work.
 - D. Restore existing facilities used during construction to original condition. Restore permanent facilities used during construction to specified condition.

PART 2 PRODUCTS - Not Used

PART 3 EXECUTION - Not Used

END OF SECTION

SECTION 01600
PRODUCT REQUIREMENTS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Products.
- B. Product delivery requirements.
- C. Product storage and handling requirements.
- D. Product options.
- E. Product substitution procedures.
- F. Equipment electrical characteristics and components.

1.2 PRODUCTS

- A. Furnish products of qualified manufacturers suitable for intended use. Furnish products of each type by single manufacturer unless specified otherwise.
- B. Do not use materials and equipment removed from existing premises, except as specifically permitted by Contract Documents.
- C. Furnish interchangeable components from same manufacturer for components being replaced.

1.3 PRODUCT DELIVERY REQUIREMENTS

- A. Transport and handle products in accordance with manufacturer's instructions.
- B. Promptly inspect shipments to ensure products comply with requirements, quantities are correct, and products are undamaged.
- C. Provide equipment and personnel to handle products by methods to prevent soiling, disfigurement, or damage.

1.4 PRODUCT STORAGE AND HANDLING REQUIREMENTS

- A. Store and protect products in accordance with manufacturers' instructions.
- B. Store with seals and labels intact and legible.
- C. Store sensitive products in weather tight, climate controlled, enclosures in an environment favorable to product.
- D. For exterior storage of fabricated products, place on sloped supports above ground.

- E. Provide bonded off-site storage and protection when site does not permit on-site storage or protection.
- F. Cover products subject to deterioration with impervious sheet covering. Provide ventilation to prevent condensation and degradation of products.
- G. Store loose granular materials on solid flat surfaces in well-drained area. Prevent mixing with foreign matter.
- H. Provide equipment and personnel to store products by methods to prevent soiling, disfigurement, or damage.
- I. Arrange storage of products to permit access for inspection. Periodically inspect to verify products are undamaged and are maintained in acceptable condition.
- J. Material Moisture and Mold Control: Comply with recommendations contained in Associated General Contractors (AGC) document "Managing the Risk of Mold in the Construction of Buildings." Prepare and submit plan for protecting materials from water damage, including the following:
 - 1. Indicate delivery, checking and storage operations affected by water damage control efforts.
 - 2. Indicate procedures for protecting porous materials from water damage, and how damaged materials will be handled.
 - 3. Indicate sequencing of work that requires water, such as sprayed fire-resistive materials, plastering, and terrazzo grinding, and describe plans for dealing with water from these operations. Show procedures for verifying that wet work has dried sufficiently to permit installation of related finish materials.
 - 4. Describe protocol for dealing with large and unexpected water intrusion into completed portions of building. Indicate procedures for investigation of cause and effects, and methods for dealing with both.

1.5 PRODUCT OPTIONS

- A. Products Specified by Reference Standards or by Description Only: Any product meeting those standards or description.
- B. Products Specified by Naming One or More Manufacturers: Products of one of manufacturers named and meeting specifications, no options or substitutions allowed.
- C. Products Specified by Naming One or More Manufacturers with Provision for Substitutions: Submit request for substitution for any manufacturer not named in accordance with the following article.

1.6 PRODUCT SUBSTITUTION PROCEDURES

- A. Substitutions may be considered by the Architect when a product becomes unavailable through no fault of Contractor.
- B. Document each request with complete data substantiating compliance of proposed Substitution with Contract Documents.
- C. A request constitutes a representation that Contractor:

1. Has investigated proposed product and determined that it meets or exceeds quality level of specified product.
 2. Will provide same warranty for Substitution as for specified product.
 3. Will coordinate installation and make changes to other Work which may be required for the Work to be complete with no additional cost to Owner.
 4. Waives claims for additional costs or time extension which may subsequently become apparent.
 5. Will reimburse Owner and Architect/Engineer for review or redesign services associated with re-approval by authorities having jurisdiction or additional time expended by Architect/Engineer to review information.
- D. Substitutions will not be considered when they are indicated or implied on Shop Drawing or Product Data submittals, without separate written request, or when acceptance will require revision to Contract Documents.
- E. Substitution Submittal Procedure:
1. Submit three copies of request for Substitution for consideration. Limit each request to one proposed Substitution.
 2. Submit Shop Drawings, Product Data, and certified test results attesting to proposed product equivalence. Burden of proof is on proposer.
 3. Architect/Engineer will notify Contractor in writing of decision to accept or reject request. The architect decision will be final.
 4. Architect/Engineer will notify the Contractor if redesign services or additional review services will be charged to the Contractor.

PART 2 PRODUCTS

2.1 EQUIPMENT ELECTRICAL CHARACTERISTICS AND COMPONENTS

- A. Wiring Terminations: Furnish terminal lugs to match branch circuit conductor quantities, sizes, and materials indicated. Include lugs for terminal box.
- B. Cord and Plug: Furnish minimum 6 foot cord and plug including grounding connector for connection to electric wiring system. Cord of longer length is specified in individual specification sections.

PART 3 EXECUTION - Not Used

END OF SECTION

SECTION 01700
EXECUTION REQUIREMENTS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Closeout procedures.
- B. Final cleaning.
- C. Starting of systems.
- D. Demonstration and instructions.
- E. Testing, adjusting and balancing.
- F. Protecting installed construction.
- G. Project record documents.
- H. Operation and maintenance data.
- I. Manual for materials and finishes.
- J. Manual for equipment and systems.
- K. Spare parts and maintenance products.
- L. Product warranties and product bonds.
- M. Maintenance service.
- N. Moisture and Mold Control

1.2 CLOSEOUT PROCEDURES

- A. Submit written certification that Contract Documents have been reviewed, Work has been inspected, and that Work is complete in accordance with Contract Documents and ready for Architect/Engineer's review.
- B. Provide submittals to Architect/Engineer required by authorities having jurisdiction.
- C. Submit final Application for Payment identifying total adjusted Contract Sum, previous payments, and sum remaining due.

1.3 FINAL CLEANING

- A. Execute final cleaning prior to final project assessment.

- B. Clean interior and exterior glass, surfaces exposed to view; remove temporary labels, stains and foreign substances, polish transparent and glossy surfaces, vacuum carpeted and soft surfaces.
- C. Clean equipment and fixtures to sanitary condition with cleaning materials appropriate to surface and material being cleaned.
- D. Replace filters of operating equipment. Filters shall be MERV rated.
- E. Clean debris from roofs, gutters, downspouts, and drainage systems.
- F. Clean site; sweep paved areas, rake clean landscaped surfaces.
- G. Remove waste and surplus materials, rubbish, and construction facilities from site.

1.4 STARTING OF SYSTEMS

- A. Coordinate schedule for start-up of various equipment and systems.
- B. Notify Architect/Engineer seven days prior to start-up of each item.
- C. Verify each piece of equipment or system has been checked for proper lubrication, drive rotation, belt tension, control sequence, and for conditions which may cause damage.
- D. Verify tests, meter readings, and specified electrical characteristics agree with those required by equipment or system manufacturer.
- E. Verify wiring and support components for equipment are complete and tested.
- F. Execute start-up under supervision of applicable manufacturer's representative or Contractors' personnel in accordance with manufacturers' instructions.
- G. When specified in individual specification Sections, require manufacturer to provide authorized representative to be present at site to inspect, check, and approve equipment or system installation prior to start-up, and to supervise placing equipment or system in operation.
- H. Submit a written report in accordance with Section 01330 - Submittal Procedures that equipment or system has been properly installed and is functioning correctly.

1.5 DEMONSTRATION AND INSTRUCTIONS

- A. Demonstrate operation and maintenance of products to Owner's personnel two weeks prior to date of final inspection. The demonstration will be documented by the Contractor with a full sign-in sheet of all in attendance.
- B. Demonstrate Project equipment and instruct in classroom environment located at project site and instructed by qualified manufacturer's representative who is knowledgeable about the Project.
- C. For equipment or systems requiring seasonal operation, perform demonstration for other season within six months.

- D. Utilize operation and maintenance manuals as basis for instruction. Review contents of manual with Owner's personnel in detail to explain all aspects of operation and maintenance.
- E. Demonstrate start-up, operation, control, adjustment, trouble-shooting, servicing, maintenance, and shutdown of each item of equipment at scheduled time, at designated location.
- F. Prepare and insert additional data in operations and maintenance manuals when need for additional data becomes apparent during instruction.
- G. Required instruction time for each item of equipment and system is specified in individual sections.

1.6 TESTING, ADJUSTING AND BALANCING

- A. Owner will appoint and employ services of independent firm to perform testing, adjusting, and balancing. Contractor shall pay for services.
- B. Reports will be submitted by independent firm to Architect/Engineer indicating observations and results of tests and indicating compliance or non-compliance with requirements of Contract Documents.

1.7 PROTECTING INSTALLED CONSTRUCTION

- A. Protect installed Work and provide special protection where specified in individual specification sections.
- B. Provide temporary and removable protection for installed products. Control activity in immediate work area to prevent damage.
- C. Provide protective coverings at walls, projections, jambs, sills, and soffits of openings.
- D. Protect finished floors, stairs, and other surfaces from traffic, dirt, wear, damage, or movement of heavy objects, by protecting with durable sheet materials.
- E. Prohibit traffic or storage upon waterproofed or roofed surfaces. When traffic or activity is necessary, obtain recommendations for protection from waterproofing or roofing material manufacturer.
- F. Prohibit traffic from landscaped areas.
- G. Protect elevator cabs. They will not be allowed for use during construction.

1.8 PROJECT RECORD DOCUMENTS

- A. Maintain on site one set of the following record documents; record actual revisions to the Work:
 - 1. Drawings.
 - 2. Specifications.
 - 3. Addenda.
 - 4. Change Orders and other modifications to the Contract.

5. Reviewed Shop Drawings, Product Data, and Samples.
 6. Manufacturer's instruction for assembly, installation, and adjusting.
- B. Ensure entries are complete and accurate, enabling future reference by Owner.
- C. Store record documents separate from documents used for construction.
- D. Record information concurrent with construction progress, not less than weekly.
- E. Specifications: Legibly mark and record at each product section description of actual products installed, including the following:
1. Manufacturer's name and product model and number.
 2. Product substitutions or alternates utilized.
 3. Changes made by Addenda and modifications.
- F. Record Drawings and Shop Drawings: Legibly mark each item to record actual construction including:
1. Measured depths of foundations in relation to finish first main 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.
- G. Submit documents to Architect/Engineer with claim for final Application for Payment.

1.9 OPERATION AND MAINTENANCE DATA

- A. Submit data bound in 8-1/2 x 11 inch (A4) text pages, three D side ring binders with durable plastic covers.
- B. Prepare binder cover with printed title "OPERATION AND MAINTENANCE INSTRUCTIONS", title of project, and subject matter of binder when multiple binders are required.
- C. Internally subdivide binder contents with permanent page dividers, logically organized as described below; with tab titling clearly printed under reinforced laminated plastic tabs.
- D. Drawings: Provide with reinforced punched binder tab. Bind in with text; fold larger drawings to size of text pages.
- E. Contents: Prepare Table of Contents for each volume, with each product or system description identified, typed on white paper, in three parts as follows:
1. Part 1: Directory, listing names, addresses, and telephone numbers of Architect/Engineer, Contractor, Subcontractors, and major equipment suppliers.
 2. Part 2: Operation and maintenance instructions arranged by system and subdivided by specification section. For each category, identify names, addresses, and telephone numbers of Subcontractors and suppliers. Identify the following:
 - a. Significant design criteria.
 - b. List of equipment.
 - c. Parts list for each component.

- d. Operating instructions.
 - e. Maintenance instructions for equipment and systems.
 - f. Maintenance instructions for special finishes, including recommended cleaning methods and materials, and special precautions identifying detrimental agents.
3. Part 3: Project documents and certificates, including the following:
- a. Shop drawings and product data.
 - b. Air and water balance reports.
 - c. Certificates.
 - d. Originals of warranties and bonds.

1.10 MANUAL FOR MATERIALS AND FINISHES

- A. Submit two copies of preliminary draft or proposed formats and outlines of contents before start of Work. Architect/Engineer will review draft and return one copy with comments.
- B. For equipment, or component parts of equipment put into service during construction and operated by Owner, submit documents within ten days after acceptance.
- C. Submit one copy of completed volumes fifteen days prior to final inspection. Draft copy be reviewed and returned after final inspection, with Architect/Engineer comments. Revise content of document sets as required prior to final submission.
- D. Submit two sets of revised final volumes in final form within ten days after final inspection.
- E. Building Products, Applied Materials, and Finishes: Include product data, with catalog number, size, composition, and color and texture designations.
- F. Instructions for Care and Maintenance: Include manufacturer's recommendations for cleaning agents and methods, precautions against detrimental agents and methods, and recommended schedule for cleaning and maintenance.
- G. Moisture Protection and Weather Exposed Products: Include product data listing applicable reference standards, chemical composition, and details of installation. Include recommendations for inspections, maintenance, and repair.
- H. Additional Requirements: As specified in individual product specification sections.
- I. Include listing in Table of Contents for design data, with tabbed fly sheet and space for insertion of data.

1.11 MANUAL FOR EQUIPMENT AND SYSTEMS

- A. Submit two copies of preliminary draft or proposed formats and outlines of contents before start of Work. Architect/Engineer will review draft and return one copy with comments.
- B. For equipment, or component parts of equipment put into service during construction and operated by Owner, submit documents within ten days after acceptance.

- C. Submit one copy of completed volumes fifteen days prior to final inspection. Draft copy be reviewed and returned after final inspection, with Architect/Engineer comments. Revise content of document sets as required prior to final submission.
- D. Submit two sets of revised final volumes in final form within ten days after final inspection.
- E. Each Item of Equipment and Each System: Include description of unit or system, and component parts. Identify function, normal operating characteristics, and limiting conditions. Include performance curves, with engineering data and tests, and complete nomenclature and model number of replaceable parts.
- F. Panelboard Circuit Directories: Provide electrical service characteristics, controls, and communications; typed.
- G. Include color coded wiring diagrams as installed.
- H. 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 special operating instructions.
- I. Maintenance Requirements: Include routine procedures and guide for preventative maintenance and trouble shooting; disassembly, repair, and reassembly instructions; and alignment, adjusting, balancing, and checking instructions.
- J. Include servicing and lubrication schedule, and list of lubricants required.
- K. Include manufacturer's printed operation and maintenance instructions.
- L. Include sequence of operation by controls manufacturer.
- M. Include original manufacturer's parts list, illustrations, assembly drawings, and diagrams required for maintenance.
- N. Include control diagrams by controls manufacturer as installed.
- O. Include Contractor's coordination drawings, with color coded piping diagrams as installed.
- P. Include charts of valve tag numbers, with location and function of each valve, keyed to flow and control diagrams.
- Q. Include list of original manufacturer's spare parts, current prices, and recommended quantities to be maintained in storage.
- R. Include test and balancing reports as specified in Section 01400 - Quality Requirements.
- S. Additional Requirements: As specified in individual product specification sections.
- T. Include listing in Table of Contents for design data, with tabbed dividers and space for insertion of data.

1.12 SPARE PARTS AND MAINTENANCE PRODUCTS

- A. Furnish spare parts, maintenance, and extra products in quantities specified in individual specification sections.
- B. Deliver to Project site and place in location as directed by Owner; obtain receipt prior to final payment.

1.13 PRODUCT WARRANTIES AND PRODUCT BONDS

- A. Obtain warranties and bonds executed in duplicate by responsible subcontractors, suppliers, and manufacturers, within ten days after completion of applicable item of work.
- B. Execute and assemble transferable warranty documents and bonds from subcontractors, suppliers, and manufacturers.
- C. Verify documents are in proper form, contain full information, and are notarized.
- D. Co-execute submittals when required.
- E. Include Table of Contents and assemble in three D side ring binder with durable plastic cover.
- F. Submit prior to final Application for Payment.
- G. Time Of Submittals:
 - 1. For equipment or component parts of equipment put into service during construction with Owner's permission, submit documents within ten days after acceptance.
 - 2. Make other submittals within ten 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 ten days after acceptance, listing date of acceptance as beginning of warranty or bond period.
- H. For Roofing Warranty – 20 year NDL (no dollar limit)

1.14 MAINTENANCE SERVICE

- A. Furnish service and maintenance of components indicated in specification sections for one year from date of Substantial Completion during warranty period.
- B. Examine system components at frequency consistent with reliable operation. Clean, adjust, and lubricate as required.
- C. Include systematic examination, adjustment, and lubrication of components. Repair or replace parts whenever required. Use parts produced by manufacturer of original component.
- D. Do not assign or transfer maintenance service to agent or Subcontractor without prior written consent of Owner.

1.15 MOISTURE AND MOLD CONTROL

- A. General: Coordinate requirements in Contractor's approved Material and Mold Control Plan as describe in Section 01600 "Product Requirements". Avoid trapping water in finished work. Document visible signs of mold that may appear during construction. Comply with recommendations contained in Associated General Contractors (AGC) document "Managing the Risk of Mold in the Construction of Buildings," including the following:
1. Exposed Phase of Construction
 - a. Protect porous materials from water damage.
 - b. Protect stored and installed material from flowing or standing water.
 - c. Keep porous and organic materials from coming into prolonged contact with concrete.
 - d. Remove standing water from decks.
 - e. Keep deck openings covered or dammed.
 - f. Use dunnage to create space between concrete decks and stored drywall.
 2. Partially Enclosed Phase of Construction:
 - a. Do not load or install drywall or other porous materials or components, or items with high organic content, into partially enclosed building.
 - b. Keep interior spaces reasonably clean and protected from water damage.
 - c. Periodically collect and remove waste containing cellulose or other organic matter.
 - d. Discard or replace water-damaged material.
 - e. Do not install material that is wet.
 - f. Discard, replace or clean stored or installed material that begins to grow mold.
 - g. Perform work in a sequence that allows any wet materials adequate time to dry before enclosing the material in drywall or other interior finishes.
 3. Controlled Phase of Construction:
 - a. Control moisture and humidity inside building by maintaining effective dry-in conditions.
 - b. Utilize permanent HVAC system to control humidity.

PART 2 PRODUCTS - Not Used

PART 3 EXECUTION - Not Used

END OF SECTION

SECTION 01730 - CUTTING AND PATCHING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section includes procedural requirements for cutting and patching.

1.3 QUALITY ASSURANCE

- A. Structural Elements: Do not cut and patch structural elements in a manner that could change their load-carrying capacity or load-deflection ratio.
- B. Operational Elements: Do not cut and patch operating elements and related components in a manner that results in reducing their capacity to perform as intended or that result in increased maintenance or decreased operational life or safety.
- C. Miscellaneous Elements: Do not cut and patch miscellaneous elements or related components in a manner that could change their load-carrying capacity, which results in reducing their capacity to perform as intended, or that result in increased maintenance or decreased operational life or safety.

1.4 WARRANTY

- A. Existing Warranties: Remove, replace, patch, and repair materials and surfaces cut or damaged during cutting and patching operations, by methods and with materials so as not to void existing warranties.

PART 2 PRODUCTS

2.1 MATERIALS

- A. General: Comply with requirements specified in other Sections.
- B. In-Place Materials: Use materials identical to in-place materials. For exposed surfaces, use materials that visually match in-place adjacent surfaces to the fullest extent possible.
 - 1. If identical materials are unavailable or cannot be used, use materials that, when installed, will match the visual and functional performance of in-place materials.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine surfaces to be cut and patched and conditions under which cutting and patching are to be performed.
 - 1. Compatibility: Before patching, verify compatibility with and suitability of substrates, including compatibility with in-place finishes or primers.
 - 2. Proceed with installation only after unsafe or unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Temporary Support: Provide temporary support of Work to be cut.
- B. Protection: Protect in-place construction during cutting and patching to prevent damage. Provide protection from adverse weather conditions for portions of Project that might be exposed during cutting and patching operations.
- C. Existing Utility Services: Where existing operational services/systems are required to be removed, relocated, or abandoned, bypass such services/systems before cutting to minimize interruption to occupied areas.

3.3 PERFORMANCE

- A. General: Employ skilled workers to perform cutting and patching. Proceed with cutting and patching at the earliest feasible time, and complete without delay.
- B. Cutting: Cut in-place construction by sawing, drilling, breaking, chipping, grinding, and similar operations, including excavation, using methods least likely to damage elements retained or adjoining construction.
- C. Patching: Patch construction by filling, repairing, refinishing, closing up, and similar operations following performance of other Work. Patch with durable seams that are as invisible as possible. Provide materials and comply with installation requirements specified in other Sections.
 - 1. Inspection: Where feasible, test and inspect patched areas after completion to demonstrate integrity of installation.
- D. Cleaning: Clean areas and spaces where cutting and patching are performed.

END OF SECTION 01730

SECTION 03300
CAST-IN-PLACE CONCRETE

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Cast-in-place concrete floor slabs on grade and footings.
- B. Control, and construction joint devices associated with concrete work, including joint sealants.
- C. Equipment pads
- D. Sidewalks

1.2 RELATED SECTIONS

- A. Section 01400 - Quality Requirements: Testing Laboratory Services.
- B. Division 2 – All related sections for sitework and earthwork
- C. Section 03200 - Concrete Reinforcement.
- D. Section 07900 - Joint Sealers
- E. Section 09686 – Sheet Carpet.
- F. Section 09650 - Resilient Flooring.
- G. Division 15 - Mechanical: Mechanical items for casting into concrete.
- H. Division 16 - Electrical: Electrical items for casting into concrete.

1.3 REFERENCES

- A. American Concrete Institute:
 - 1. ACI 117 - Specifications for Tolerances for Concrete Construction Materials.
 - 2. ACI 301 - Specifications for Structural Concrete.
 - 3. ACI 305 - Hot Weather Concreting.
 - 4. ACI 306.1 - Standard Specification for Cold Weather Concreting.
 - 5. ACI 308.1 - Standard Specification for Curing Concrete.
 - 6. ACI 318 - Building Code Requirements for Structural Concrete.
- B. ASTM International:
 - 1. ASTM B221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes.
 - 2. ASTM C31/C31M - Standard Practice for Making and Curing Concrete Test Specimens in the Field.
 - 3. ASTM C33 - Standard Specification for Concrete Aggregates.
 - 4. ASTM C39 - Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens.
 - 5. ASTM C42/C42M - Standard Test Method for Obtaining and Testing Drilled Cores and Sawed Beams of Concrete.

6. ASTM C94/C94M - Standard Specification for Ready-Mixed Concrete.
7. ASTM C143/C143M - Standard Test Method for Slump of Hydraulic Cement Concrete.
8. ASTM C150 - Standard Specification for Portland Cement.
9. ASTM C172 - Standard Practice for Sampling Freshly Mixed Concrete.
10. ASTM C173/C173M - Standard Test Method for Air Content of Freshly Mixed Concrete by the Volumetric Method.
11. ASTM C231 - Standard Test Method for Air Content of Freshly Mixed Concrete by the Pressure Method.
12. ASTM C260 - Standard Specification for Air-Entraining Admixtures for Concrete.
13. ASTM C330 - Standard Specification for Lightweight Aggregates for Structural Concrete.
14. ASTM C494/C494M - Standard Specification for Chemical Admixtures for Concrete.
15. ASTM C618 - Standard Specification for Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use as a Mineral Admixture in Concrete.
16. ASTM C685/C685M - Standard Specification for Concrete Made By Volumetric Batching and Continuous Mixing.
17. ASTM C1017/C1017M - Standard Specification for Chemical Admixtures for Use in Producing Flowing Concrete.
18. ASTM D994 - Standard Specification for Preformed Expansion Joint Filler for Concrete (Bituminous Type).
19. ASTM D1751 - Standard Specification for Preformed Expansion Joint Filler for Concrete Paving and Structural Construction (Nonextruding and Resilient Bituminous Types).
20. ASTM D1752 - Standard Specification for Preformed Sponge Rubber and Cork Expansion Joint Fillers for Concrete Paving and Structural Construction.
21. ASTM D6690 - Standard Specification for Joint and Crack Sealants, Hot Applied, for Concrete and Asphalt Pavements.
22. ASTM E96 - Standard Test Methods for Water Vapor Transmission of Materials.
23. ASTM E119 - Standard Test Methods for Fire Tests of Building Construction and Materials.
24. ASTM E1643 - Standard Practice for Installation of Water Vapor Retarders Used in Contact with Earth or Granular Fill under Concrete Slabs.
25. ASTM E1745 - Standard Specification for Plastic Water Vapor Retarders Used in Contact with Soil or Granular Fill under Concrete Slabs.

1.4 PERFORMANCE REQUIREMENTS

- A. Vapor Retarder Permeance: Maximum 1 perm when tested in accordance with ASTM E96, Procedure A.

1.5 SUBMITTALS

- A. Submit under provisions of Section 01300.
- B. Product Data: Provide data on joint devices, attachment accessories and admixtures. Provide data on curing and finishing compounds, product characteristics, compatibility and limitations.
- C. Manufacturer's Installation Instructions: Indicate installation procedures and interface required with adjacent work. Indicate criteria for preparation and application.

1.6 QUALITY ASSURANCE

- A. Perform work in accordance with ACI 301/ACI 318, ACI 117 unless more stringent provisions are provided.
- B. Acquire cement and aggregate from same source for all work.
- C. Conform to ACI 305 when concreting during hot weather.
- D. Conform to ACI 306.1 when concreting during cold weather.

1.7 ENVIRONMENTAL REQUIREMENTS

- A. Section 01600 - Product Requirements: Environmental conditions affecting products on site.
- B. Maintain concrete temperature after installation at minimum 50 degrees F for minimum 7 days.

1.8 COORDINATION

- A. Section 01300 - Administrative Requirements: Coordination and project conditions.
- B. Coordinate placement of joint devices with erection of concrete formwork and placement of form accessories.

PART 2 PRODUCTS

2.1 CONCRETE MATERIALS

- A. Cement: ASTM C150, Type I - Normal or Type IA - Air Entraining.
- B. Normal Weight Aggregates: ASTM C33.
- C. Coarse Aggregate Maximum Size: In accordance with ACI 318.
- C. Water: ACI 318, ASTM C94: Potable clean and not detrimental to concrete.

2.2 ADMIXTURES

- A. Air Entrainment: Conform to requirement of ASTM C260.
- B. Fly Ash and Calcinated Pozzolan: Shall not be used and will be rejected.
- C. Silica Fume: ASTM C1240.

2.3 ACCESSORIES

- A. Vapor Barrier: ASTM E1745 Class A, type recommended for below grade application, furnish joint tape recommended by manufacturer.
 - 1. Manufacturers:

- 1) 15 mil Poly
- b. Substitutions: Section 01600 - Product Requirements.

- B. Non-Shrink Grout: ASTM C1107 Grade C premixed compound consisting of non-metallic aggregate, cement, water reducing and plasticizing agents; capable of developing minimum compressive strength of 2,500 psi in 48 hours and 7,000 psi in 28 days.
- C. At floor repair/leveling, use Spec Chem LLC
 1. Spec prime re-emulsifiable underlayment prime for spec flow
 2. Spec flow premium self leveling underlayment

2.4 JOINT DEVICES AND FILLER MATERIALS

- A. Joint Filler Type A: ASTM D1751; Asphalt impregnated fiberboard or felt, 1/2 inch thick; tongue and groove profile.
- B. Construction Joint Devices: Integral galvanized steel; full thickness of slab, less 1/2 inch, formed to tongue and groove profile, with removable top strip exposing sealant trough, knockout holes spaced at 6 inches, ribbed steel spikes with tongue to fit top screed edge.
- C. Sealant: Cold applied two part liquid neoprene.

2.5 CONCRETE MIX

- A. Mix concrete in accordance with ACI 304. Deliver concrete in accordance with ASTM C94.
- B. Select proportions for normal weight concrete in accordance with ACI 301 Method 2.
- C. Provide concrete to the following criteria:
As per Structural Drawing, S1.0, Note Section: Concrete, Item 3.
- D. Use accelerating admixtures in cold weather only when approved by Architect/Engineer. Use of admixtures will not relax cold weather placement requirements.
- E. Use calcium chloride only when approved by Architect/Engineer.
- F. Use set retarding admixtures during hot weather only when approved by Architect/Engineer.
- G. Add air entraining agent to normal weight concrete mix for work exposed to exterior.
- H. Water shall not be added at the site unless approved by the Engineer.
- I. Average Compressive Strength Reduction: Not permitted.

- J. Ready Mixed Concrete: Mix and deliver concrete in accordance with ASTM C94/C94M.
- K. Site Mixed Concrete: Mix concrete in accordance with ACI 318.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify site conditions under provisions of Section 01300.
- B. Verify requirements for concrete cover over reinforcement.
- C. Verify anchors, seats, plates, reinforcement and other items to be cast into concrete are accurately placed, positioned securely, and will not interfere with placing concrete.
- D. Verify compatibility of sealers and substrate finish with finish surface material bonding, in accordance with Manufacturer's recommendations.

3.2 PREPARATION

- A. Prepare previously placed concrete by cleaning with steel brush and applying bonding agent. Remove laitance, coatings, and unsound materials.
- B. In locations where new concrete is doweled to existing work, drill holes in existing concrete, insert steel dowels and pack solid with non-shrink grout.
- C. Remove debris and ice from formwork, reinforcement, and concrete substrates.
- D. Remove water from areas receiving concrete before concrete is placed.

3.3 PLACING CONCRETE

- A. Place concrete in accordance with ACI 301 and ACI 318.
- B. Notify Architect/Engineer minimum 24 hours prior to commencement of operations.
- C. Ensure reinforcement, inserts, embedded parts, formed expansion and contraction joints are not disturbed during concrete placement.
- D. Install vapor barrier under interior slabs on grade in accordance with ASTM E1643. Lap joints minimum 6 inches and seal watertight by taping edges and ends (use taped lap method). End laps should be staggered to avoid build up of layers, Lap vapor retarder over footings and seal to foundation walls.
- E. Repair vapor barrier damaged during placement of concrete reinforcing. Repair with vapor barrier material; lap over damaged areas minimum 6 inches and seal watertight. Seal around all pipe penetrations.

- F. Unless noted otherwise place slab joints such that control joints are spaced approximately 24 to 36 times the thickness. Limit slab area to 450 sf. The length to width area of jointed section of slab shall not exceed 1 – 1/2.
- G. Apply sealants in joint devices in accordance with Section 07900.
- H. Deposit concrete at final position. Prevent segregation of mix.
- I. Place concrete in continuous operation for each panel or section determined by predetermined joints.
- J. Consolidate concrete.
- K. Maintain records of concrete placement. Record date, location, quantity, air temperature, and test samples taken.
- L. Place concrete continuously between predetermined expansion, control, and construction joints.
- M. Do not interrupt successive placement; do not permit cold joints to occur.
- N. Place floor slabs in saw cut pattern indicated.
- O. Saw cut joints within 12 hours after placing. Use 3/16 inch thick blade, cut into 1/3 depth of slab thickness.
- P. Scream floors and slabs on grade level, maintaining surface flatness of F_r of 20 maximum 1/4 inch in 10 ft.

3.4 CONCRETE FINISHING

- A. Finish concrete floor surfaces in accordance with ACI 301 and ACI 318.
- B. Steel trowel surfaces which will receive carpeting, resilient flooring or seamless flooring.
- C. Wood float surfaces which will receive ceramic tile with full bed setting system.
- D. Light Broom finish the exterior concrete walks to provide a non-slip surface, in accordance with ADA regulations.
- E. In areas with floor drains, maintain floor elevation at walls; pitch surfaces uniformly to drains at 1/8 inch per foot nominal or as indicated on drawings.
- F. Finish and measure the concrete surface so that the gap at any point between the concrete surface and unleveled, freestanding, 10 foot long straightedge resting on two high spots and placed anywhere else on the surface does not exceed 1/4 inch.

3.5 CURING AND PROTECTION

- A. Immediately after placement, protect concrete from premature drying, excessively hot or cold temperatures, and mechanical injury. Protect concrete footings from freezing for a minimum of five (5) days.
- B. Maintain concrete with minimal moisture loss at relatively constant temperature

for period necessary for hydration of cement and hardening of concrete.

- C. Cure floor surfaces in accordance with ACI 308.1 and apply curing compound in accordance with manufacturer's instructions.
- D. Ponding: Maintain 100 percent coverage of water over floor slab areas continuously for 7 days.
- E. Spraying: Spray water over floor slab areas and maintain wet for 7 days.
- F. Polyethylene Film: Spread polyethylene film over floor slab areas, lapping edges and sides and sealing with pressure sensitive tape; maintain in place for 7 days.
- G. Apply sealer in accordance with manufacturer's instructions on floor surfaces scheduled to receive carpeting and ceramic tile.
- H. Compound curing will not be permitted for surfaces to receive glue adhered floor coverings to include carpet and resilient flooring, or coatings (penetrants) such as point, epoxy liquid hardener or fluid applied waterproofing.

3.6 FIELD QUALITY CONTROL

- A. Section 01400 - Quality Requirements and 01700 - Execution Requirements: Field inspecting, testing, adjusting, and balancing.
- B. Perform field inspection and testing in accordance with ACI 318.
- C. Submit proposed mix design to Architect/Engineer for review prior to commencement of Work.
- D. Tests of cement and aggregates may be performed at no cost to the Owner to ensure conformance with specified requirements.
- E. Three concrete test cylinders will be taken for every concrete pour.
- F. One additional test cylinder will be taken during cold weather concreting, cured on job site under same conditions as concrete it represents.
- G. One slump test will be taken for each set of test cylinders taken.
- H. Concrete Inspections:
 - 1. Continuous Placement Inspection: Inspect for proper installation procedures.
 - 2. Periodic Curing Inspection: Inspect for specified curing temperature and procedures.
- I. Strength Test Samples:
 - 1. Sampling Procedures: ASTM C172.
 - 2. Cylinder Molding and Curing Procedures: ASTM C31/C31M, cylinder specimens, standard cured.
 - 3. Sample concrete and make one set of three cylinders for every 50 cu yds or less of each class of concrete placed each day and for every 5,000 sf of surface area for slabs and walls.

4. When volume of concrete for any class of concrete would provide less than 5 sets of cylinders, take samples from five randomly selected batches, or from every batch when less than 5 batches are used.
 5. Make one additional cylinder during cold weather concreting, and field cure under same conditions as concrete represents.
 6. One slump test will be taken for each set of test cylinders taken.
- J. Field Testing:
1. Slump Test Method: ASTM C143/C143M.
 2. Air Content Test Method: ASTM C173/C173M and ASTM C231.
 3. Temperature Test Method: ASTM C1064/C1064M.
 4. Measure slump and temperature for each compressive strength concrete sample.
 5. Measure air content in air entrained concrete for each compressive strength concrete sample.
- K. Cylinder Compressive Strength Testing:
1. Test Method: ASTM C39.
 2. Test Acceptance: In accordance with ACI 318.
 3. Test one cylinder at 7 days.
 4. Test two cylinders at 28 days.
 5. Dispose remaining cylinders when testing is not required.
- L. Core Compressive Strength Testing:
1. Sampling and Testing Procedures: ASTM C42/C42M.
 2. Test Acceptance: In accordance with ACI 318.
 3. Drill three cores for each failed strength test from concrete represented by failed strength test.
- M. Maintain records of concrete placement. Record date, location, quantity, air temperature and test samples taken.
- 3.7 PATCHING
- A. Allow Architect/Engineer to inspect concrete surfaces immediately upon removal of forms.
 - B. Excessive honeycomb or embedded debris in concrete is not acceptable. Notify Architect/Engineer upon discovery.
 - C. Patch imperfections as directed and in accordance with ACI 301 and ACI 318.
- 3.8 DEFECTIVE CONCRETE
- A. Defective Concrete: Concrete not conforming to required lines, details, dimensions, tolerances or specified requirements.
 - B. Repair or replacement of defective concrete will be determined by the Architect/Engineer. **Any visible hairline crack will be considered defective.**
 - C. Do not patch, fill, touch-up, repair, or replace exposed concrete except upon express direction of Architect/Engineer for each individual area.
- 3.9 PROTECTION OF FINISHED WORK

- A. Protect finished work under provisions of Section 01500.
- B. Do not permit traffic over unprotected floor surface.

3.10 TOLERANCES

- A. Maximum Variation of surface flatness for exposed concrete floors: 1/4 inch in 10 feet.
- B. Maximum Variation of surface flatness under carpet: 1/8 inch in 10 feet.

END OF SECTION 03300

SECTION 05120
STRUCTURAL STEEL

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Structural shapes.
 - 2. Channels and angles.
 - 3. Hollow structural sections.
 - 4. Structural pipe.
 - 5. Structural plates and bars.
 - 6. Floor plates.
 - 7. Fasteners, connectors, and anchors.
 - 8. Grout under structural base plates, etc.

- B. Related Sections:
 - 1. Section 01400 - Quality Requirements: Testing and Inspection Services.
 - 2. Section 09900 - Painting: Repair of Existing Steel

1.2 REFERENCES

- A. American Institute of Steel Construction:
 - 1. AISC Code of Standard Practice for Steel Buildings and Bridges.
 - 2. AISC Load and Resistance Factor Design (LRFD) Specification for Structural Steel Buildings.
 - 3. AISC Load and Resistance Factor Design Specification for Single-Angle Members.
 - 4. AISC Seismic Provisions for Structural Steel Buildings.
 - 5. AISC Specification for Allowable Stress Design of Single-Angle Members.
 - 6. AISC Specification for the Design of Steel Hollow Structural Sections.
 - 7. AISC Specification for Structural Steel Buildings Allowable Stress Design, and Plastic Design.

- B. American Society of Civil Engineers:
 - 1. ASCE 19 - Standard Applications of Steel Cables for Buildings.

- C. ASTM International:
 - 1. ASTM A36/A36M - Standard Specification for Carbon Structural Steel.
 - 2. ASTM A53/A53M - Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless.
 - 3. ASTM A108 - Standard Specification for Steel Bar, Carbon and Alloy, Cold-Finished.
 - 4. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
 - 5. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware.
 - 6. ASTM A193/A193M - Standard Specification for Alloy-Steel and Stainless Steel Bolting Materials for High-Temperature Service.

7. ASTM A307 - Standard Specification for Carbon Steel Bolts and Studs, 60 000 PSI Tensile Strength.
8. ASTM A325 - Standard Specification for Structural Bolts, Steel, Heat Treated, 120/105 ksi Minimum Tensile Strength.
9. ASTM A354 - Standard Specification for Quenched and Tempered Alloy Steel Bolts, Studs, and Other Externally Threaded Fasteners.
10. ASTM A449 - Standard Specification for Quenched and Tempered Steel Bolts and Studs.
11. ASTM A490 - Standard Specification for Structural Bolts, Alloy Steel, Heat Treated, 150 ksi Minimum Tensile Strength.
12. ASTM A500 - Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes.
13. ASTM A501 - Standard Specification for Hot-Formed Welded and Seamless Carbon Steel Structural Tubing.
14. ASTM A514/A514M - Standard Specification for High-Yield-Strength, Quenched and Tempered Alloy Steel Plate, Suitable for Welding.
15. ASTM A529/A529M - Standard Specification for High-Strength Carbon-Manganese Steel of Structural Quality.
16. ASTM A563 - Standard Specification for Carbon and Alloy Steel Nuts.
17. ASTM A572/A572M - Standard Specification for High-Strength Low-Alloy Columbium-Vanadium Structural Steel.
18. ASTM A588/A588M - Standard Specification for High-Strength Low-Alloy Structural Steel with 50 ksi Minimum Yield Point to 4-in. (100-mm) Thick.
19. ASTM A618 - Standard Specification for Hot-Formed Welded and Seamless High-Strength Low-Alloy Structural Tubing.
20. ASTM A786/A786M - Standard Specification for Hot-Rolled Carbon, Low-Alloy, High-Strength Low-Alloy, and Alloy Steel Floor Plates.
21. ASTM A847 - Standard Specification for Cold-Formed Welded and Seamless High Strength, Low Alloy Structural Tubing with Improved Atmospheric Corrosion Resistance.
22. ASTM A852/A852M - Standard Specification for Quenched and Tempered Low-Alloy Structural Steel Plate with 70 ksi Minimum Yield Strength to 4 in. (100 mm) Thick.
23. ASTM A913/A913M - Standard Specification for High-Strength Low-Alloy Steel Shapes of Structural Quality, Produced by Quenching and Self-Tempering Process (QST).
24. ASTM A992/A992M - Standard Specification for Structural Steel Shapes.
25. ASTM B695 - Standard Specification for Coatings of Zinc Mechanically Deposited on Iron and Steel.
26. ASTM E94 - Standard Guide for Radiographic Examination.
27. ASTM E164 - Standard Practice for Ultrasonic Contact Examination of Weldments.
28. ASTM E165 - Standard Test Method for Liquid Penetrant Examination.
29. ASTM E709 - Standard Guide for Magnetic Particle Examination.
30. ASTM F436 - Standard Specification for Hardened Steel Washers.
31. ASTM F959 - Standard Specification for Compressible-Washer-Type Direct Tension Indicators for Use with Structural Fasteners.
32. ASTM F1554 - Standard Specification for Anchor Bolts, Steel, 36, 55, and 105-ksi Yield Strength.
33. ASTM F1852 - Standard Specification for Twist Off Type Tension Control Structural Bolt/Nut/Washer Assemblies, Steel, Heat Treated, 120/105 ksi Minimum Tensile Strength.

D. American Welding Society:

1. AWS A2.4 - Standard Symbols for Welding, Brazing, and Nondestructive Examination.
 2. AWS D1.1 - Structural Welding Code - Steel.
- E. Research Council on Structural Connections:
1. RCSC - Specification for Structural Joints Using ASTM A325 or A490 Bolts.
- F. SSPC: The Society for Protective Coatings:
1. SSPC - Steel Structures Painting Manual.
 2. SSPC Paint 15 - Steel Joist Shop Paint.
 3. SSPC Paint 20 - Zinc-Rich Primers (Type I - Inorganic and Type II - Organic).
 4. SSPC SP 3 - Power Tool Cleaning.
 5. SSPC SP 6 - Commercial Blast Cleaning.
 6. SSPC SP 10 - Near-White Blast Cleaning.
- 1.3 SUBMITTALS
- A. Section 01330 - Submittal Procedures: Requirements for submittals.
- B. Must be submitted and reviewed at the same time as all the structural steel, roofing and decking items.. Composite system is to be submitted and coordinated by the General Contractor. The submittal shall indicate the coordination amongst both steel and other related items, and associated structural members.**
- C. Shop Drawings:
1. Indicate profiles, sizes, spacing, locations of structural members, openings, attachments and fasteners. Coordinate locations that are required to receive sprayed on fireproofing and verify compatibility of adherence to steel.
 2. Connections.
 3. Cambers.
 4. Indicate welded connections with AWS A2.4 welding symbols. Indicate net weld lengths.
 5. Verify that field measurements are as shown on shop drawings.
- D. Mill Test Reports: Submit indicating structural strength, destructive and non-destructive test analysis.
- E. Welders Certificates: Certify welders employed on the Work, verifying AWS qualification within previous 12 months.

1.4 QUALITY ASSURANCE

- A. Perform Work in accordance with the following:
1. AISC Code of Standard Practice for Steel Buildings and Bridges.
 2. AISC Code of Standard Practice for Steel Buildings and Bridges. Section 10.
 3. AISC Seismic Provisions for Structural Steel Buildings.
 4. AISC Specification for Structural Steel Buildings Allowable Stress Design, and Plastic Design.
- B. Perform Work in accordance with State of North Carolina standards.

- C. Maintain one copy of each document on site.
- D. Single Source Responsibility for the Structural Steel 05120, Steel Roof Deck 05312, and Metal Fabrications 05500**

1.5 QUALIFICATIONS

- A. Fabricator: Company specializing in performing Work of this section with minimum 10 years documented experience with the following current AISC Certification:
 - 1. Standard Steel Building Structures (STD).
 - 2. Conventional Steel Building Structures (SBD).
 - 3. Complex Steel Building Structures (CBD).
- B. Erector: Company specializing in performing Work of this section with minimum 10 years documented experience with the following current AISC Certification:
 - 1. Certified Steel Erector (CSE).
 - 2. Advanced Certified Steel Erector (ACSE).
- C. Shop Painter: Company specializing in performing Work of this section with minimum 10 years documented experience with the following current AISC Certification:
 - 1. Sophisticated Paint Endorsement - Enclosed (P1).
 - 2. Sophisticated Paint Endorsement - Covered (P2).
 - 3. Sophisticated Paint Endorsement - Outside (P3).
- D. Welders and Welding Procedures: AWS D1.1 qualified within previous 12 months.

1.6 COORDINATION

- A. Section 01300 - Administrative Requirements: Requirements for coordination.
- B. Coordinate work with the following:
 - 1. Section 05312 for framed openings other than structural steel.
 - 2. Section 05500 for miscellaneous steel supports other than structural steel.

PART 2 PRODUCTS

2.1 STRUCTURAL STEEL

- A. Structural S-Shapes: ASTM A529/A529M; Grade 50 and ASTM A572/A572M; Grade 50.
- B. Channels and Angles: ASTM A36/A36M.
- C. Round Hollow Structural Sections: ASTM A500, Grade B.
- D. Square and Rectangular Hollow Structural Sections: ASTM A500, Grade B.
- E. Structural Pipe: ASTM A53/A53M, Grade B.
- F. Structural Plates and Bars: ASTM A36/A36M.

2.2 FASTENERS, CONNECTORS, AND ANCHORS

- A. High Strength Bolts: ASTM A325; Type 1.
 - 1. Finish: Unfinished.
- B. Nuts: ASTM A563 heavy hex type.
 - 1. Finish: Unfinished.
- C. Washers: ASTM F436; Type 1, circular.
 - 1. Finish: Unfinished.
- D. Shear Connectors: ASTM A108; headed, unfinished and in accordance with AWS D1.1; Type B.
- E. Anchor Rods: ASTM A36/A36M.
 - 1. Shape: Hooked.
 - 2. Plate Washers: ASTM A36/A36M.
- F. Threaded Rods: ASTM A36/A36M.
 - 1. Finish: Mechanically galvanized.

2.3 WELDING MATERIALS

- A. Welding Materials: AWS D1.1; type required for materials being welded.

2.4 ACCESSORIES

- A. Grout: Non-shrink type, pre-mixed compound consisting of non-metallic aggregate, cement, water reducing and plasticizing additives, capable of developing minimum compressive strength of 7,000 psi at 28 days.
- B. Shop and Touch-Up Primer: SSPC Paint 15, Type 1, red oxide.
- C. Touch-Up Primer for Galvanized Surfaces: SSPC Paint 20 Type I Inorganic.

2.5 FABRICATION

- A. Space shear stud connectors equally along beam span, unless indicated otherwise on Drawings.
- B. Continuously seal joined members by continuous welds. Grind exposed welds smooth.
- C. Fabricate connections for bolt, nut, and washer connectors.
- D. Develop required camber for members.

2.6 FINISH

- A. Prepare structural component surfaces in accordance with SSPC SP 3.

- B. Shop prime structural steel members. Do not prime surfaces that will be fireproofed, field welded, in contact with concrete, or high strength bolted.
- C. Galvanizing for Structural Steel Members: ASTM A123/A123M; minimum 1.2 oz/sq ft coating thickness; galvanize after fabrication.
- D. Galvanizing for Fasteners, Connectors, and Anchors:
 - 1. Hot-Dipped Galvanizing: ASTM A153/A153M.
 - 2. Mechanical Galvanizing: ASTM B695; Class 50 minimum.

2.7 SOURCE QUALITY CONTROL AND TESTS

- A. Section 01400 - Quality Requirements: Testing, inspection and analysis requirements.
- B. Shop test bolted and welded connections as specified for field quality control tests.
- C. When fabricator is approved by authority having jurisdiction, submit certificate of compliance indicating Work performed at fabricator's facility conforms to Contract Documents.
 - 1. Specified shop tests are not required for Work performed by approved fabricator.
- D. Welding: Inspect welds in accordance with AWS D1.1, by independent testing laboratory in accordance with Section 01400.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Section 01300 - Administrative Requirements: Verification of existing conditions before starting work.
- B. Verify bearing surfaces are at correct elevation.
- C. Verify anchors rods are set in correct locations and arrangements with correct exposure for steel attachment.
- D. **Replace and or Repair and existing bent and or twisted structural members.**

3.2 PREPARATION

- A. Furnish templates for installation of anchor rods and embedments in concrete and masonry work.

3.3 ERECTION

- A. Allow for erection loads, and for sufficient temporary bracing to maintain structure safe, plumb, and in alignment until completion of erection and installation of permanent bracing.
- B. Field weld components and shear connectors indicated on Drawings and shop drawings.
- C. Field connect members with threaded fasteners; torque to required resistance tighten to snug tight for bearing type connections.
- D. Do not field cut or alter structural members without approval of Architect/Engineer.

3.4 GROUT INSTALLATION

- A. Grout under base plates in accordance with Section 03600 - Grout.

3.5 ERECTION TOLERANCES

- A. Section 01400 - Quality Requirements: Tolerances.
- B. Maximum Variation From Plumb: 1/4 inch per story, non-cumulative.
- C. Maximum Offset From Alignment: 1/4 inch.

END OF SECTION

SECTION 05312
STEEL ROOF DECK

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes:
1. Steel roof deck and accessories.
 2. Formed steel cant strips, eave strips and valley strips.
 3. Framing for openings.
 4. Bearing plates and angles.
- B. Related Sections:
1. Section 05120 - Structural Steel: Support framing for deck openings.
 2. Section 05311 - Steel Floor Deck.
 3. Section 07511 - Built -Up Asphalt Roofing
 4. Section 07620 - Manufactured Sheet Metal Roofing
 5. Section 07810 - Applied Fireproofing: Spray applied fireproofing applied to deck.
 6. Division 15: Plumbing- Reinforcement pans with roof drain hub assemblies.
 7. Division 15: Plumbing- Placement of acoustic deck insulation strips.

1.2 REFERENCES

- A. American Society of Civil Engineers:
1. ASCE 3 - Standard Practice for the Construction and Inspection of Composite Slabs.
- B. ASTM International:
1. ASTM A446 and A525
 2. ASTM A36/A36M - Standard Specification for Carbon Structural Steel.
 3. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
 4. ASTM A924/A924M - Standard Specification for General Requirements for Steel Sheet, Metallic-Coated by the Hot-Dip Process.
 5. ASTM A1008/A1008M - Standard Specification for Steel, Sheet, Cold-Rolled, Carbon, Structural, High-Strength Low-Alloy and High-Strength Low-Alloy with Improved Formability.
- C. American Welding Society:
1. AWS D1.1 - Structural Welding Code - Steel.
- D. Steel Deck Institute:
1. SDI 29 - Design Manual for Composite Decks, Form Decks and Roof Decks.
- E. SSPC: The Society for Protective Coatings:
1. SSPC Paint 15 - Steel Joist Shop Paint.

1.3 PERFORMANCE REQUIREMENTS

- A. Design metal deck in accordance with SDI 29 Design Manual.

- B. Calculate to structural limit stress design and maximum vertical deck deflection of 1/240.

1.4 SUBMITTALS

- A. Section 01330 - Submittal Procedures: Submittal requirements.
- B. Shop Drawings: Indicate deck plan, support locations, projections, openings and reinforcement, pertinent details, and accessories.
- C. Product Data: Submit deck profile characteristics and dimensions, structural properties, and finishes.
- D. Manufacturer's Installation Instructions: Submit manufacturer's installation instructions.
- E. Manufacturer's Certificates: Certify Products meet or exceed specified requirements.
- F. Welders Certificates: Certify welders employed on the Work, verifying AWS qualification within previous 12 months.

1.5 QUALITY ASSURANCE

- A. Perform Work in accordance with ASCE 3 for composite decks.
- B. Perform Work in accordance with State of North Carolina standards.
- C. Maintain one copy of each document on site.
- D. **Single Source Responsibility for the Structural Steel 05120, Steel Roof Deck 05312, and Metal Fabrications 05500.**

1.6 QUALIFICATIONS

- A. Installer: Company specializing in performing Work of this section with minimum 10 years documented experience.
- B. Design deck layout, spans, fastening, joints, and under direct supervision of Professional Engineer experienced in design of this Work and licensed in State of North Carolina.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Section 01600 - Product Requirements: Product storage and handling requirements.
- B. Deliver products to site, store and protect in accordance with manufacturer's recommendations.
- C. Cut plastic wrap to encourage ventilation.
- D. Separate sheets and store deck on dry wood sleepers; slope for positive drainage.

1.8 SINGLE SOURCE FABRICATOR AND ERECTOR

- A. For Sections 05120, 05311, and 05312 the project will require a single source fabricator and erector.

PART 2 PRODUCTS

2.1 MATERIALS

- A. Manufacturers:
 - 1. Vulcraft Steel Deck 1-1/2" 22 gauge Type B Roof Deck, galvanized
 - 2. Substitutions: Section 01600 - Product Requirements.
- B. Sheet Steel: ASTM A653, Grade 33 Structural Quality; with G90 galvanized coating conforming to ASTM A525.
- C. Sheet Steel: ASTM A1008/A1008M, Grade 33 Structural Steel, unfinished.
- D. Bearing Plates: ASTM A36 steel, unfinished.
- E. Welding Materials: AWS D1.1.
- F. Shop and Touch-Up Primer: SSPC 15, Type 1, red oxide.
- G. Touch-Up Primer for Galvanized Surfaces: SSPC 20 Type I – Inorganic.

2.2 ACCESSORIES

- A. Flute Closures: Closed cell foam rubber, 1 inch thick; profiled to fit tight to deck.
- B. Acoustical Insulation: Glass fiber type, minimum 1.1 lb/cu ft density; profiled to suit deck.
- C. Sump Pans, Sump Plates, Valley Strips, Eave Strips: Fabricated of metal of same type and finish as deck.

2.3 FABRICATION

- A. Metal Deck: See Structural Drawings for deck information.
- B. Related Deck Accessories: Metal closure strips, wet concrete stops, cover plates, cant strips, 20 gage thick galvanized sheet steel; of profile and size as indicated on Structural drawings.
- C. Fabricate roof sump pans of 14 gage sheet steel, flat bottom, sloped sides, recessed 1-1/2 inches wide, sealed watertight.
- D. Fasteners: Galvanized hardened steel, steel tapping.
- E. Weld Washers: Mild steel, uncoated, 3/4 inch outside diameter, 1/8 inch thick.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Section 01300 - Administrative Requirements: Coordination and project conditions.

3.2 INSTALLATION (reference general notes on Structural drawings)

- A. Erect metal deck in accordance with SDI Manual.
- B. Bear deck on masonry and concrete support surfaces with 6 inch minimum bearing. Align and level.
- C. Bear deck on steel supports with 3 inch minimum bearing. Align and level.
- D. Fasten ribbed deck to steel support members at ends and intermediate supports with Simpson #12 Oversized Head Deck fasteners at 36/7 pattern at supports and provide (4) #10 Teks Screws between supports.
- E. Weld in accordance with AWS D1.1.
- F. Mechanically fasten male/female side laps at 18 inches oc maximum.
- G. Reinforce steel deck openings from 6 to 18 inches in size with 4 x 4 x 1/4 inch steel angles. Place framing angles perpendicular to flutes; extend minimum two flutes beyond each side of opening and mechanically attach to deck at each flute.
- H. Install 6 inch minimum wide sheet steel cover plates, of same thickness as deck, where deck changes direction. Mechanically attach 12 inches oc maximum.
- I. Install sheet steel closures and angle flashings to close openings between deck and walls, columns, and openings.
- J. Install double row of foam flute closures above walls and partitions perpendicular to deck flutes.
- K. Position roof sump pans with flange bearing on top surface of deck. Weld at each deck flute.
- L. Place metal cant strips in positions and weld.
- M. Immediately after welding deck and other metal components in position, coat welds, burned areas, and damaged surface coating with touch-up prime paint.

3.3 FIELD QUALITY CONTROL

- A. Welding: Inspect welds in accordance with AWS D1.1.

END OF SECTION

SECTION 05400
COLD-FORMED METAL FRAMING

PART 1 GENERAL

1.1 SUMMARY

- A. To furnish and install all cold-formed structural framing studs for load bearing and non-load bearing steel stud walls for exterior and interior wall framing to include framing studs, tracks, bracing, angles, plates and all related accessories indicated in the construction documents.
- B. Related Sections:
1. Section 04810 - Unit Masonry Assemblies: Head and sill flashings.
 2. Section 04810 - Unit Masonry Assemblies: Veneer masonry supported by wall stud metal framing.
 3. Section 05120 - Structural Steel: Structural building framing.
 4. Section 05312 - Steel Roof Deck: Metal roof decking supported by wall stud metal framing.
 5. Section 06114 - Wood Blocking and Curbing: Rough wood blocking.
 6. Section 08410 - Aluminum Framed Storefronts & Entrances: Anchors for support of curtain wall window and door frames.
 7. Section 09260 - Gypsum Board Assemblies: Light weight, non-load bearing metal stud framing, insulation, sound attenuation and wall sheathing.

1.2 REFERENCES

- A. American Iron and Steel Institute:
1. AISI General - Standard for Cold-Formed Steel Framing - General Provisions.
 2. AISI Header - Standard for Cold-Formed Steel Framing - Header Design.
 3. AISI NASPEC - North American Specification for Design of Cold-Formed Steel Structural Members.
 4. AISI - Residential Steel Framing Manual.
- B. ASTM International:
1. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
 2. ASTM A780 - Standard Practice for Repair of Damaged and Uncoated Areas of Hot-Dip Galvanized Coatings.
 3. ASTM A1003/A1003M - Standard Specification for Steel Sheet, Carbon, Metallic and Nonmetallic-Coated for Cold-Formed Framing Members.
 4. ASTM A1008/A1008M - Standard Specification for Steel, Sheet, Cold-Rolled, Carbon, Structural, High-Strength Low-Alloy and High-Strength Low-Alloy with Improved Formability.
 5. ASTM A1011/A1011M - Standard Specification for Steel, Sheet and Strip, Hot-Rolled, Carbon, Structural, High-Strength Low-Alloy and High-Strength Low-Alloy with Improved Formability.
 6. ASTM A1003/A1003M - Standard Specification for Steel Sheet, Carbon, Metallic and Nonmetallic-Coated for Cold-Formed Framing Members.
 7. ASTM C955 - Standard Specification for Load-Bearing (Transverse and Axial) Steel Studs, Runners (Tracks), and Bracing or Bridging for Screw Application of Gypsum Panel Products and Metal Plaster Bases.

- C. American Welding Society:
 - 1. AWS D1.1 - Structural Welding Code - Steel.
 - 2. AWS D1.3 - Structural Welding Code - Sheet Steel.
 - D. National Association of Architectural Metal Manufacturers:
 - 1. NAAMM ML/SFA 540 - Lightweight Steel Framing Systems Manual.
 - E. SSPC: The Society for Protective Coatings:
 - 1. SSPC Paint 15 - Steel Joist Shop Paint.
 - 2. SSPC Paint 20 - Zinc-Rich Primers (Type I - Inorganic and Type II - Organic).
 - F. Steel Stud Manufacturers Association:
 - 1. SSMA - Product Technical Information.
- 1.3 SYSTEM DESCRIPTION
- 1. Size components to withstand design loads as shown on Structural Drawings.
 - B. Maximum Allowable Deflection: 1: 240 of span.
 - C. Wall System:
 - 1. Design to AISI NASPEC, AISC General, and AISC Header.
 - 2. Design to provide for movement of components without damage, failure of joint seals, undue stress on fasteners, or other detrimental effects when subject to seasonal or cyclic day/night temperature ranges.
 - 3. Design system to accommodate construction tolerances, deflection of building structural members, and clearances of intended openings.
- 1.4 PERFORMANCE REQUIREMENTS
- A. Select stud thickness to resist minimum 5 psf uniform load and maximum 1/240 deflection.
- 1.5 SUBMITTALS
- A. Section 01330 - Submittal Procedures: Submittal requirements.
 - B. Product Data: Submit data on standard framing members; describe materials and finish, product criteria and limitations.
 - C. Manufacturer's Installation Instructions: Submit special procedures, perimeter conditions requiring special attention.
 - D. Mill Certifications: Submit mill certifications for steel delivered to site. Certify steel bare metal thickness in 0.001 inch, yield strength, tensile strength, total elongation in 2 inch or 8 inch gauge length, chemical analysis, and galvanized coating thickness.
- 1.6 QUALITY ASSURANCE
- A. Calculate structural properties of framing members in accordance with AISI NASPEC.
 - B. Furnish framing materials in accordance with SSMA - Product Technical Information.
 - C. Maintain one copy on site.

1.7 QUALIFICATIONS

- A. Manufacturer: Company specializing in manufacturing products specified in this section with minimum three years documented experience.
 - 1. Current member of Steel Stud Manufacturers Association.
- B. Installer: Company specializing in performing Work of this section with minimum 5 years documented experience approved by manufacturer.
- C. Form, fabricate, provide, and connect components in accordance with NAAMM ML/SFA 540 - Lightweight Steel Framing Systems Manual.

1.8 COORDINATION

- A. Section 01300 - Administrative Requirements: Coordination and project conditions.
- B. Coordinate placement of components within stud framing system.
- C. Upon delivery, the structural framing materials shall be protected from the elements by storing them in a sheltered area or using protective covering.

PART 2 PRODUCTS

2.1 COLD-FORMED METAL FRAMING

- A. Manufacturers:
 - 1. Clark Steel Framing Systems.
 - 2. Harrison Manufacturing Co.
 - 3. MarinoWare
 - 4. Unimast Incorporated.
 - 5. Dale / Incor
 - 6. Substitutions: Section 01600 - Product Requirements.
- B. Cold-Formed Metal Framing: ASTM C955.

2.2 FRAMING COMPONENTS

- A. Steel Sheet: ASTM A1003/A1003M; Structural Grade, Type H, painted metallic coated: equivalent to G-60 galvanized finish.
 - 1. Grade: ST33H.
 - 2. Coating: G-60 galvanized finish - See Structural General Notes.

2.3 ACCESSORIES

- A. Bracing, Furring, Bridging: Formed sheet steel, thickness determined by performance requirements specified.

2.4 FASTENERS

- A. Self-drilling, Self-tapping Screws, Bolts, Nuts, and Washers: Steel, hot dip galvanized.
- B. Anchorage Devices: Power actuated, drilled expansion bolts, screws with sleeves,.
- C. Welding: In conformance with AWS D1.1 and AWS D1.3.

2.5 FABRICATION

- A. Fabricate assemblies of formed sections of sizes and profiles required.
- B. Fit, reinforce, and brace framing members to suit design requirements.
- C. Fit and assemble in largest practical sections for delivery to site, ready for installation.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Section 01300 - Administrative Requirements: Coordination and project conditions.
- B. Verify substrate surfaces and building framing components are ready to receive Work.
- C. Verify rough-in utilities are in proper location.

3.2 ERECTION OF STUDS

- A. Align floor and ceiling tracks; locate to wall partition layout. Secure in place with fasteners at each stud. Coordinate installation of acoustic sealant with floor and ceiling tracks.
- B. Place studs at 16 inches oc (unless noted otherwise in contract documents); not more than 2 inches from abutting walls and at each side of openings. Connect studs to tracks using fastener.
- C. Construct corners using minimum three studs. Double stud wall openings, door jambs, and window jambs.
- D. Erect load bearing studs one piece full length. Splicing of studs is not permitted.
- E. Erect load bearing studs, brace, and reinforce to develop full strength, to achieve design requirements.
- F. Fully seat axial loaded studs in receiving tracks maximum 1/16 inch gap between stud and track web.
- G. Coordinate placement of insulation in multiple stud spaces after erection.
- H. Install intermediate studs above and below openings to align with wall stud spacing.

- I. Install studs with deflection allowance in stud track, directly below horizontal building framing at non-load bearing framing.
- J. Attach cross studs and furring channels to studs for attachment of fixtures anchored to walls.
- K. Install framing between studs for attachment of mechanical and electrical items, and to prevent stud rotation.
- L. Touch-up field welds and damaged primed surfaces with primer to match shop coating.
- M. Complete framing ready to receive finish surface material.

3.3 ERECTION TOLERANCES

- A. Section 01400 - Quality Requirements: Tolerances.
- B. Maximum Variation from Indicated Position: 1/4 inch.
- C. Maximum Variation of Members from Plane: 1/4 inch.

END OF SECTION

SECTION 05500
METAL FABRICATIONS

PART 1 GENERAL

1.1 SUMMARY

- A. Section includes shop fabricated metal items.
 - 1. Lintels.
 - 2. Ledge and shelf angles.
 - 3. Elevator sill angles and hoist and divider beams.
 - 4. Structural supports for miscellaneous attachments.

- B. Related Sections:
 - 1. Section 03300 - Cast-In-Place Concrete: Execution requirements for embedded anchors and attachments for metal fabrications specified by this section in concrete.
 - 2. Section 04810 - Unit Masonry Assemblies: Execution requirements for embedded anchors and attachments for metal fabrications specified by this section in masonry.
 - 3. Section 05120 - Structural Steel: Structural steel column, framing and anchor bolts.
 - 4. Section 05311 - Steel Floor Deck: Bearing plates angles and for metal deck bearing, including anchorage.
 - 5. Section 05510 - Metal Stairs and Ladders.
 - 6. Section 05520 - Handrails and Railings.
 - 7. Section 09900 - Paints and Coatings: Field applied paint finish.

1.2 REFERENCES

- A. Aluminum Association:
 - 1. AA DAF-45 - Designation System for Aluminum Finishes.

- B. American Architectural Manufacturers Association:
 - 1. AAMA 611 - Voluntary Specification for Anodized Architectural Aluminum.
 - 2. AAMA 2603 - Voluntary Specification, Performance Requirements and Test Procedures for Pigmented Organic Coatings on Aluminum Extrusions and Panels.
 - 3. AAMA 2604 - Voluntary specification, Performance Requirements and Test Procedures for High Performance Organic Coatings on Aluminum Extrusions and Panels.
 - 4. AAMA 2605 - Voluntary Specification, Performance Requirements and Test Procedures for Superior Performing Organic Coatings on Aluminum Extrusions and Panels.

- C. ASTM International:
 - 1. ASTM A36/A36M - Standard Specification for Carbon Structural Steel.
 - 2. ASTM A53/A53M - Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless.
 - 3. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.

4. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware.
 5. ASTM A167 - Standard Specification for Stainless and Heat-Resisting Chromium-Nickel Steel Plate, Sheet, and Strip.
 6. ASTM A276 - Standard Specification for Stainless Steel Bars and Shapes.
 7. ASTM A297/A297M - Standard Specification for Steel Castings, Iron-Chromium and Iron-Chromium-Nickel, Heat Resistant, for General Application.
 8. ASTM A283/283M - Standard Specification for Low and Intermediate Tensile Strength Carbon Steel Plates.
 9. ASTM A307 - Standard Specification for Carbon Steel Bolts and Studs, 60 000 PSI Tensile Strength.
 10. ASTM A312/A312M - Standard Specification for Seamless and Welded Austenitic Stainless Steel Pipes.
 11. ASTM A325 - Standard Specification for Structural Bolts, Steel, Heat Treated, 120/105 ksi Minimum Tensile Strength.
 12. ASTM A354 - Standard Specification for Quenched and Tempered Alloy Steel Bolts, Studs, and Other Externally Threaded Fasteners.
 13. ASTM A479/A479M - Standard Specification for Stainless Steel Bars and Shapes for Use in Boilers and Other Pressure Vessels.
 14. ASTM A500 - Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes.
 15. ASTM A501 - Standard Specification for Hot-Formed Welded and Seamless Carbon Steel Structural Tubing.
 16. ASTM A554 - Standard Specification for Welded Stainless Steel Mechanical Tubing.
 17. ASTM A563 - Standard Specification for Carbon and Alloy Steel Nuts.
 18. ASTM A572/A572M - Standard Specification for High-Strength Low-Alloy Columbium-Vanadium Structural Steel.
 19. ASTM B26/B26M - Standard Specification for Aluminum-Alloy Sand Castings.
 20. ASTM B85 - Standard Specification for Aluminum-Alloy Die Castings.
 21. ASTM B177 - Standard Guide for Chromium Electroplating on Steel for Engineering Use.
 22. ASTM B209 - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate.
 23. ASTM B210 - Standard Specification for Aluminum and Aluminum-Alloy Drawn Seamless Tubes.
 24. ASTM B211 - Standard Specification for Aluminum and Aluminum-Alloy Bar, Rod, and Wire.
 25. ASTM B221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes.
 26. ASTM B695 - Standard Specification for Coatings of Zinc Mechanically Deposited on Iron and Steel.
 27. ASTM F436 - Standard Specification for Hardened Steel Washers.
 28. ASTM F1554 - Standard Specification for Anchor Bolts, Steel, 36, 55, and 105-ksi Yield Strength.
- D. American Welding Society:
1. AWS A2.4 - Standard Symbols for Welding, Brazing, and Nondestructive Examination.
 2. AWS D1.1 - Structural Welding Code - Steel.
 3. AWS D1.6 - Structural Welding Code - Stainless Steel.
- E. National Ornamental & Miscellaneous Metals Association:

1. NOMMA Guideline 1 - Joint Finishes.

F. SSPC: The Society for Protective Coatings:

1. SSPC - Steel Structures Painting Manual.
2. SSPC SP 1 - Solvent Cleaning.
3. SSPC SP 10 - Near-White Blast Cleaning.
4. SSPC Paint 15 - Steel Joist Shop Paint.
5. SSPC Paint 20 - Zinc-Rich Primers (Type I - Inorganic and Type II - Organic).

1.3 SUBMITTALS

- A. Section 01330 - Submittal Procedures: Submittal requirements.
- B. Shop Drawings: Indicate profiles, sizes, connection attachments, reinforcing, anchorage, size and type of fasteners, and accessories. Include erection drawings, elevations, and details where applicable. Indicate welded connections using standard AWS A2.0 welding symbols. Indicate net weld lengths.
- C. Welders Certificates: Certify welders employed on the Work, verifying AWS qualification within previous 12 months.

1.4 QUALITY ASSURANCE

- A. Finish joints in accordance with NOMMA Guideline 1.
- B. Perform Work in accordance with State of North Carolina standards.
- C. Maintain one copy of each document on site.
- D. **Single Source Responsibility for the Structural Steel 05120, Steel Floor Deck Section 05311, Steel Roof Deck 05312, and Metal Fabrications 05500.**

1.5 QUALIFICATIONS

- A. Design under direct supervision of Professional Engineer experienced in design of this Work and licensed in State of North Carolina.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Section 01600 - Product Requirements: Product storage and handling requirements.
- B. Accept metal fabrications on site in labeled shipments. Inspect for damage.
- C. Protect metal fabrications from damage by exposure to weather.

1.7 FIELD MEASUREMENTS

- A. Verify field measurements are as indicated on shop drawings.

PART 2 PRODUCTS

2.1 MATERIALS - STEEL

- A. Steel Sections: ASTM A572/A572M; Grade 50.
- B. Steel Plate: ASTM A36/A36M.
- C. Hollow Structural Sections: ASTM A500, Grade B.
- D. Steel Pipe: ASTM A53/A53M, Grade B.
- E. Sheet Steel: ASTM A653/A653M, Grade 33 Structural Quality with galvanized coating.
- F. Bolts: ASTM A325; Type 1
 - 1. Finish: Unfinished.
- G. Nuts: ASTM A563 heavy hex type.
 - 1. Finish: Unfinished.
- H. Washers: ASTM F436; Type 1.
 - 1. Finish: Unfinished.
- I. Welding Materials: AWS D1.1; type required for materials being welded.
- J. Shop and Touch-Up Primer: SSPC Paint 15, Type 1, red oxide.
- K. Touch-Up Primer for Galvanized Surfaces: SSPC Paint 20 Type I Inorganic.

2.2 LINTELS

- A. Lintels: Steel sections, size and configuration as indicated on Drawings, length to allow 8 inches minimum bearing on both sides of opening.
 - 1. Exterior Locations: Galvanized.
 - 2. Interior Locations: Prime paint, one coat.

2.3 LEDGE AND SHELF ANGLES

- A. Ledge and Shelf Angles, and Plates Not Attached to Structural Framing: For support of metal decking, joists, masonry; galvanized.

2.4 ELEVATOR SILL ANGLES AND HOIST AND DIVIDER BEAMS

- A. Sill Angles: Steel sections as indicated on Drawings for support of elevator sills; galvanized.
- B. Hoist and Divider Beams: Steel wide flange sections, shape and size required to support applied loads with maximum deflection of 1/240 of the span; prime paint, one coat.

2.5 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. Continuously seal joined members by continuous welds.
- D. 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.
- E. Exposed Mechanical Fastenings: Flush countersunk screws or bolts; unobtrusively located; consistent with design of component, except where specifically noted otherwise.
- F. Supply components required for anchorage of fabrications. Fabricate anchors and related components of same material and finish as fabrication, except where specifically noted otherwise.

2.6 FACTORY APPLIED FINISHES - STEEL

- A. Clean surfaces of rust, scale, grease, and foreign matter prior to finishing.
- B. Do not prime surfaces in direct contact with concrete or where field welding is required.
- C. Prime paint items with two coats except where galvanizing is specified.
- D. Galvanizing: ASTM A123/A123M; minimum 2.0 oz/sq ft coating thickness; galvanize after fabrication.
- E. Galvanizing for Fasteners, Connectors, and Anchors:
 - 1. Hot-Dipped Galvanizing: ASTM A153/A153M.
 - 2. Mechanical Galvanizing: ASTM B695; Class 50 minimum.

2.7 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

3.1 EXAMINATION

- A. Section 01300 - Administrative Requirements: Coordination and project conditions.
- B. Verify field conditions are acceptable and are ready to receive Work.

3.2 PREPARATION

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

3.3 INSTALLATION

- A. Install items plumb and level, accurately fitted, free from distortion or defects.
- B. Make provisions for erection stresses. Install temporary bracing to maintain alignment, until permanent bracing and attachments are installed.
- C. Field weld components indicated on shop drawings.
- D. Perform field welding in accordance with AWS D1.1.
- E. Obtain approval of Architect/Engineer prior to site cutting or making adjustments not scheduled.
- F. After erection, touch up welds, abrasions, and damaged finishes with prime paint or galvanizing repair paint to match shop finishes.

3.4 ERECTION TOLERANCES

- A. Section 01400 - Quality Requirements: Tolerances.
- B. Maximum Variation From Plumb: 1/4 inch per story or for every 12 ft in height whichever is greater, non-cumulative.
- C. Maximum Offset From Alignment: 1/4 inch.
- D. Maximum Out-of-Position: 1/4 inch.

END OF SECTION

SECTION 06100
ROUGH CARPENTRY
For Plywood at Room 121 Workshop - Alternate #2

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Grounds, nailers, blocking, furring, sheathing.
- B. Miscellaneous framing and sheathing – framing above top plate of metal stud walls
- C. Telephone and electrical panel boards.
- D. Concealed wood blocking for support of toilet and bath accessories, wall cabinets, and wood trim.
- E. Window/door opening flashing wall seam - membrane

1.2 RELATED SECTIONS

- A. Section 04200 - Unit Masonry System: Cavity Wall System.
Section 05400 – Cold Formed Structural Framing
- B. Section 06193 - Plate Connected Wood Trusses.
- C. Section 07620 - Sheet Metal Flashing and Trim
- D. Section 07640 – Fiber Cement Siding.

1.3 REFERENCES

- A. ALSC - American Lumber Standards Committee: Softwood Lumber Standards.
- B. APA: American Plywood Association.
- C. AWWPA (American Wood Preservers Association) C1 - All Timber Products Preservative Treatment by Pressure Process.
- D. NFPA: National Forest Products Association.
- E. SPIB: Southern Pine Inspection Bureau.
- F. WWPA: Western Wood Products Association.
- G. ANSI A117.1: Providing Accessibility and Usability for Physically Handicapped People.
- H. American Disability Act.

1.4 SUBMITTALS

- A. Submit under provisions of Section 01300.

- B. Product Data: Provide technical data on wood preservative materials, and application instructions.
- C. Manufacturer's Certificate: Certify that Products meet or exceed specified requirements.

1.5 QUALITY ASSURANCE

- A. Perform Work in accordance with the following:
 - 1. Lumber Grading Agency: Certified by DOC PS 20.
 - 1. Wood Structural Panel Grading Agency: Certified by EWA - The Engineered Wood Association.
 - 2. Lumber: DOC PS 20.
 - 3. Wood Structural Panels: DOC PS 1 or DOC PS 2.
- B. Surface Burning Characteristics:
 - 1. Fire Retardant Treated Materials: Maximum 25/450 flame spread/smoke developed index when tested in accordance with ASTM E84.
- C. Apply label from agency approved by authority having jurisdiction to identify each preservative treated material.
- D. Perform Work in accordance with State of South Carolina standards.
- E. Maintain one copy of each document on site.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Deliver, store, protect, and handle products to site under provisions of Section 01600.

PART 2 PRODUCTS

2.1 LUMBER MATERIALS

- A. Lumber Grading Rules: NFPA, SPIB, and WWPA as applicable.
- B. Non-Structural Light Misc. Framing and Blocking: Southern Yellow Pine species, No. 2 grade, 19 percent maximum moisture content.
- C. Grounds and Blocking: Preservative; Wolman CCA Type C: Arch Wood Protection above ground, Southern Yellow Pine species, No. 2 grade, NIST PS 20, 19 percent maximum moisture content.

2.2 SHEATHING MATERIALS

- A. Plywood Wall Sheathing: APA Rated Sheathing, Span Rating 32/16; Exposure Durability 1; unsanded.
- B. Telephone and Electrical Panel Boards: Plywood.

2.3 SHEATHING LOCATIONS

- C. Wall Sheathing at Workshop Room 121: 3/4 inch thick, 48 x 96 inch sized sheets, square edges.

2.4 ACCESSORIES

- A. Nails, Fasteners and Anchors:
 - 1. Nails and Fasteners; hot dipped galvanized or stainless steel see Structural Drawings. Must be compatible with wolmanized lumber (preservative treated).
 - 2. Anchors: Unless otherwise noted the following applies; Toggle bolt type for anchorage to hollow masonry. Expansion shield and lag bolt type for anchorage to solid masonry or concrete. Bolt or ballistic fastener for anchorages to steel.
- B. Joists Hangers and Connectors: Hot-dipped galvanized steel, size to suit framing conditions (U.N.O.).
- C. Glue: APA AFG-01, waterproof of water solvent base, air cure type, cartridge dispensed.
- D. Building Paper: ASTM D226, Type I and Type II asphalt saturated felt, plain untreated cellulose building paper. 15# on walls, the roof will receive a weatherproofing membrane.
- E. Straps and Connectors - By Simpson Strong Tie, galvanized with approved fasteners. Provide as noted on drawings and as required to meet uplift requirements.
- F. **Window and Door Opening Flashing: Perma-A-Barrier Wall Seam Tape by W.R. Grace and Co.. A 30 mil, cold applied self adhering membrane composed of a 2-1/2" mil high density, cross laminated polyethylene film coated on one side with a 27-1/2' mil layer of rubberized asphalt adhesive. To be applied at all window/door openings and at all exterior plywood seams.**
- G. Bituthane behind brick veneer as indicated on architectural wall sections; W.R. Grace and Co. 3000 flexible water proof membrane roll – to extend from thru wall flashing at base of wall to 6" above the brick veneer.

PART 3 EXECUTION

- 3.1 FRAMING - COORDINATE NAILING PATTERN WITH STRUCTURAL NOTES AND COMPLY WITH THE MOST STRINGENT (for all framing above the top plate of the metal stud walls)
 - A. Set structural members level and plumb, in correct position.
 - B. Make provisions for erection loads, and for sufficient temporary bracing to maintain structure safe, plumb, and in true alignment until alignment until completion of erection and installation of permanent bracing.
 - C. Place horizontal members flat, crown side up.
 - D. Construct framing members full length without splices

- E. Construct double joist headers at floor and ceiling openings and under wall stud partitions that are parallel to floor joists. Frame rigidly into joists.
- F. Bridge framing in excess of 8 feet span and/or at mid-span. Fit solid blocking and bridging at ends of members.
- G. Contractor is to confirm any cutting or drilling of joists, rafters, or studs with Architect prior to any installation of Electrical, Mechanical, or Plumbing work.
- H. Contractor shall provide a continuous path of uplift resistance from the roof to the foundation.
- I. Provide solid bridging at all wall and floor framing, at all plywood joints, glue and nail to sheathing.
- J. Draftstop/Firestop all holes in top plates of framed wall.
- K. Coordinate installation of wood blocking for support of all bathroom accessories with Architect prior to installation of Gypsum board.
- L. Building Felt - Provide 15 lb. felt for walls. Place building felt horizontally over wall sheathing weather lap edges a minimum of 2" and lap ends a minimum of 6". Fasten to wall with corrosive resistant nails. Provide an additional lap of felt to extend 12" from each corner at both the inside and outside. Provide a positive resistance to water flow with lapping.
- M. **At all window and door openings install Perm-A-Barrier wall seam tape as indicated on the opening details in accordance with the manufactures recommendation. The tape when install on the exterior casing flange of the window opening shall be set back from the exterior edge of the flange to assure proper sealant compatibility between the window casing and the wood trim. Submit data that illustrates that there compatibility with the sealant and the window casing. (see Section 07900).**
- N. Install all straps, connectors and fasteners as required by manufacturer.

3.2 SHEATHING

- A. Wall sheathing: Install with long dimensions or strength axis across supports. Allow 1/8" spacing at panel ends and edges. Fasten in accordance with the Structural Drawings - wall sheathing shall bridge discontinuities in all wall framing; i.e. plywood seam shall not align with seam of joint. Install Perm-A-Barrier wall seam membrane at all exterior plywood seams.
- B. Place building paper horizontal over wall sheathing, weather lap edges and ends.
- C. Install telephone and electrical panel boards with plywood sheathing material where required. Over sized the panel by 12 inches on all sides.

3.3 TOLERANCES

- A. Framing Members: 1/4 inch from true position, maximum.
- B. Surface Flatness of Floor; 1/4 inch in 10 feet maximum, and 1/2 inch maximum in 30 feet.

END OF SECTION 06100

SECTION 06114
WOOD BLOCKING AND CURBING

PART 1 GENERAL

1.1 SUMMARY

- A. Section includes roof curbs, cants, and perimeter nailers; blocking in wall and roof openings; wood furring and grounds; concealed wood blocking for support of toilet and bath accessories, wall cabinets, wood trim; telephone and electrical panel back boards; concealed wood blocking for support of toilet and bath accessories, wall cabinets wood trim.
- B. Related Sections:
1. Section 06193 – Plate Connected Wood Trusses
 2. Section 07613- Manufacturing Sheet Metal Roofing
 3. Section 07620- Sheet Metal Flashing and Trim
 4. Division 8: Doors and Windows: Window, Door and Curtain Wall System openings to receive wood blocking.

1.2 REFERENCES

- A. American National Standards Institute:
1. ANSI A208.1 - Mat-Formed Wood Particleboard.
- B. American Wood-Preservers' Association:
1. AWPA C1 - All Timber Products - Preservative Treatment by Pressure Process.
 2. AWPA C20 - Structural Lumber - Fire-Retardant Treatment by Pressure Processes.
- C. ASTM International:
1. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials.
- D. National Fire Protection Association:
1. NFPA 255 - Standard Method of Test of Surface Burning Characteristics of Building Materials.
- E. The Redwood Inspection Service:
1. RIS - Standard Specifications for Grades of California Redwood Lumber.
- F. Southern Pine Inspection Bureau:
1. SPIB - Standard Grading Rules for Southern Pine Lumber.
- G. Underwriters Laboratories Inc.:
1. UL 723 - Tests for Surface Burning Characteristics of Building Materials.
- H. U. S Department of Commerce National Institute of Standards and Technology:
1. DOC PS 1 - Construction and Industrial Plywood.

2. DOC PS 2 - Performance Standard for Wood-Based Structural-Use Panels.
 3. DOC PS 20 - American Softwood Lumber Standard.
- I. West Coast Lumber Inspection Bureau:
 1. WCLIB - Standard Grading Rules for West Coast Lumber.
 - J. Western Wood Products Association:
 1. WWPA G-5 - Western Lumber Grading Rules.
- 1.3 SUBMITTALS
- A. Section 01330 - Submittal Procedures: Submittal procedures.
 - B. Product Data: Submit technical data on wood preservative and fire retardant treatment materials and application instructions.
- 1.4 QUALITY ASSURANCE
- A. Perform Work in accordance with the following:
 1. Lumber Grading Agency: Certified by DOC PS 20.
 2. Wood Structural Panel Grading Agency: Certified by EWA - The Engineered Wood Association.
 3. Lumber: DOC PS 20.
 4. Wood Structural Panels: DOC PS 1 or DOC PS 2.
 - B. Surface Burning Characteristics:
 1. Fire Retardant Treated Materials: Maximum 25/450 flame spread/smoke developed index when tested in accordance with ASTM E84.
 - C. Apply label from agency approved by authority having jurisdiction to identify each preservative treated material.
 - D. Sustainable Design Requirements:
 1. Regional Materials: Furnish materials extracted, processed, and manufactured within 500 miles of Project site.
 2. Certified Wood Materials: Furnish wood materials certified in accordance with FSC Guidelines.
 - E. Perform Work in accordance with State of South Carolina standards.
 - F. Maintain one copy of each document on site.

PART 2 PRODUCTS

2.1 MATERIALS

- A. Lumber Grading Rules: SPIB.
- B. Miscellaneous Framing: SYP - Southern Yellow Pine species, No. 2 grade, 19 percent maximum moisture content.

- C. Plywood: APA/EWA Rated Sheathing, Grade C-D; Exposure Durability 2; sanded.

2.2 ACCESSORIES

- A. Fasteners and Anchors:
 - 1. Fasteners: Hot dipped galvanized steel for high humidity and treated wood locations.
 - 2. Nails and Staples: ASTM F1667.
 - 3. Anchors: Toggle bolt type for anchorage to hollow masonry. Expansion shield and lag bolt type for anchorage to solid masonry or concrete. Bolt or ballistic fastener for anchorages to steel.

2.3 FACTORY WOOD TREATMENT

- A. Wood Preservative (Pressure Treatment): AWPA C1 using water borne preservative with 0.25 percent retainage.
- B. Moisture Content After Treatment: Kiln dried (KDAT).
 - 1. Lumber: Maximum 19 percent.
 - 2. Structural Panels: Maximum 15 percent.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Section 01300 - Administrative Requirements: Verification of existing conditions before starting work.
- B. Verify substrate conditions are ready to receive blocking, curbing and framing.

3.2 PREPARATION

- A. Coordinate placement of blocking, curbing and framing items.

3.3 INSTALLATION

- A. Set members level and plumb, in correct position.
- B. Place horizontal members, crown side up.
- C. Construct curb members of solid wood sections.
- D. Curb roof openings except where prefabricated curbs are provided. Form corners by alternating lapping side members.
- E. Coordinate curb installation with installation of decking and support of deck openings, and parapet construction.
- F. Space framing and furring 16 inches oc.

- G. Secure sheathing to framing members with ends over firm bearing and staggered.
- H. Install telephone and electrical panel back boards with plywood sheathing material where required. Size back boards 12 inches beyond size of electrical and telephone panel.

END OF SECTION 06114

SECTION 06200
FINISH CARPENTRY

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Finish carpentry items other than shop prefabricated casework.
- B. Attachment accessories

1.2 RELATED SECTIONS

- A. Section 06112 - Framing and Sheathing.
- B. Section 08211 - Flush Wood Doors.
- C. Section 08800 - Glazing: Glass and Glazing of Doors.
- D. Section 09900 - Painting: Painting and Finishing of Finish Carpentry Items.

1.3 REFERENCES

- A. ASTM E84 - Test Method for Surface Burning Characteristics of Building Materials
- B. AWI – American Woodworking Institute

1.4 SUBMITTALS

- A. Submit under provisions of Section 01300.
- B. Submit samples of each product for review of conformance and quality.

1.5 QUALITY ASSURANCE

- A. Perform work in accordance with AWI (Architectural Woodwork Institute) Architectural Woodwork Quality Standards Illustrated, Premium Grade.
- B. Surface Burning Characteristics: Maximum 25/450 flame spread/smoke developed index when tested in accordance with ASTM E84.
- C. Apply label from agency approved by authority having jurisdiction to identify each preservative treated and fire retardant treated material.
- A. Perform Work in accordance with State of North Carolina standards.
- B. Maintain one copy of each document on site.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Deliver, store, protect and handle products to site under provisions of Section 01600.
- B. Protect work from moisture damage.

PART 2 PRODUCTS

2.1 INTERIOR STANDING AND RUNNING TRIM

- A. AWI Quality Grade: Custom grade, Lumber grade II opaque, plain saw finger joint not permitted.
- B. Solid Wood:
 - 1. Poplar "D" and better paint grade to be painted.
 - 2. Fastened with stainless steel type 316 angular chisel point nails
 - 3. Moisture content not to exceed 10% and relative indoor humidity of 45-70%
 - 4. At interior walls as indicated on Contract Documents - horizontal running select cypress B and better S1S2E. Final selection to be made by Architect.
- C. Smoothness: 20 KCPI and 30 grit.
- D. Flushness variation not to exceed .015".
- E. Sizes and locations as indicated on the drawings 12'0" lengths.
- F. Provide a moisture content not to exceed 10% and a relative indoor humidity of 45-70%.

2.2 MISCELLANEOUS SHELVING AND BUILT-IN WORK

- A. Softwood Limber: PS 20; Graded in accordance with AWI Custom; Douglas Fir, Western Red Cedar, Western Pine, and Yellow Cypress species, plain swan, maximum moisture content of 6-8 percent; with mixed grain, of quality suitable for transparent finish.
- B. Softwood Plywood: PS 1 Grade AB; Graded in accordance with AWI, veneer core; Douglas Fir face species, plain cut.
- C. Fasteners: Sizetype to suit application. Hot dipped galvanized steel for exterior exposed, interior concealed, high humidity, and treated wood locations; stainless steel where exposed at interior locations.
- D. Contact Adhesives: Water base type.
- E. Lumber for Shimming and Blocking: Softwood lumber of SYP species.
- F. Wood Filler: Solvent or oil base, tinted to match surface finish color.
- G. Hardware: Manufactured by Stanley Hardware Division of the Stanley Works as follows:
 - 1. Closet Rods and Escutcheons: V7502, adjustable steel tubing integral escutcheons; polished chrome finish.
 - 2. Handrail Brackets: DP57-1050, zinc die cast; satin chrome finish.
 - 3. Adjustable Shelving Tracks: Brushed chrome with shelf supports.

2.3 FABRICATION

- A. Fabricate to AWI Custom Standards.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify adequacy of backing and support framing.
- B. Verify mechanical, electrical, and building items affecting work of this section are placed and ready to receive this work.
- C. Interior trim must be stacked and stored on site in accordance with AWI guidelines for wood to acclimate to local conditions and achieve a maximum moisture content of 12% prior to back priming.

3.2 INSTALLATION

- A. Install Work in accordance with AWI Quality Standards.
- B. Set and secure materials and components in place, plumb and level.
- C. Carefully scribe work abutting other components, with maximum gaps of 1/32 inch. Do not use additional overlay trim to conceal larger gaps.
- D. Install trim with nails at 8 inch on center.
- E. Apply sealant as required (see Section 07900).

3.3 PREPARATION FOR SITE FINISHING

- A. Site Finishing: Refer to Section 09900.
- B. Before installation, prime paint surfaces of items or assemblies to be in contact with cementitious materials.
- C. Interior Back Primer: Alkyd primer sealer.

3.4 ERECTION TOLERANCES

- A. Maximum Variation from True Position: 1/16 inch.
- B. Maximum Offset from True Alignment with Abutting Materials: 1/32 inch.

END OF SECTION 06200

SECTION 06410
ARCHITECTURAL WOOD CASEWORK
Alternate #1

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Shop Built cabinet units.
- B. Countertops.
- C. Cabinet hardware.

1.2 RELATED SECTIONS

- A. Section 06112 - Framing and Sheathing: Grounds and support framing.
- B. Section 06200 - Finish Carpentry: Related trim not specified in this section.
- C. Section 09900 - Painting: Finishing cabinet exterior and interior.
- D. Section 15440 - Plumbing Fixtures and Trim.

1.3 REFERENCES

- A. ANSI/BHMA A156.9 - Cabinet Hardware.
- B. AWI - Quality Standards.
- C. FS MM-L-736 - Lumber Hardwood.
- D. PS 1 - Construction and Industrial Plywood.
- E. PS 20 - American Softwood Lumber Standard.

1.4 SUBMITTALS

- A. Submit under provisions of Section 01330.
- B. Shop Drawings: Indicate materials, component profiles and elevations, assembly methods, joint details, fastening methods, accessory listings, hardware location, and schedule of finishes.
- C. Samples: Submit two, 12 x 12 inch size samples illustrating cabinet finish.
- D. Samples: Submit two, 12 x 12 inch size samples illustrating counter top finish.
- E. Samples: Submit two samples of drawer pulls, hinges and, shelf brackets, locks, and standards illustrating hardware finish.

1.5 QUALITY ASSURANCE

- A. Perform Work in accordance with State of North Carolina standards.

- B. Maintain one (1) copy of each document on site.
- C. Perform work in accordance with AWI Custom quality.

1.6 QUALIFICATIONS

- A. Manufacturer: Company specializing in manufacturing the products specified in this section with minimum five years experience.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Deliver, store and handle products to site under provisions of Section 01600.
- B. Protect units from moisture damage.

1.8 FIELD MEASUREMENTS

- A. Verify that field measurements are as indicated on shop drawings.

1.9 COORDINATION

- A. Coordinate work under provisions of Section 01039.
- B. Coordinate the work with Division 15, Plumbing Rough-In, Division 16, Electrical Rough-In. Coordinate location of grommets with data outlets.
- C. Conform to all ADA Regulations for counter height and clearances.

1.10 SYSTEM DESCRIPTION

- A. All countertops and exposed surfaces of cabinets to be plastic laminate. Inside of drawers and inside base cabinets, sealed wood.
- B. Coordinate prior to fabrication for exact size and clearances.
- C. All cabinets to be flush overlay.
- D. Coordinate all blocking and provide clearance for a pull-out keyboard (N.I.C.) to be installed in the future at areas.

PART 2 PRODUCTS

2.0 ACCEPTABLE MANUFACTURERS

- A. Shop Built Cabinets

2.2 SHEET MATERIALS

- A. Hardwood Plywood: Ps 1; graded in accordance with AWI, type of glue recommended for application; face veneer and cuts as follows:

<u>ITEM</u>	<u>FACE SPECIES</u>	<u>CUT</u>
Drawer & Cabinet Face	Birch	Rift Sawn
Gables and Backs	Birch	Plain Sawn
Shelving	Birch	Plain Sawn
Drawer Bottoms	Spruce, Fir	Plain Sawn
Backs	Spruce, Fir	Plain Sawn

- B. Wood Particle Board: PS 1; AWI standard, composed of wood chips, medium

density, made with high waterproof resin binders; of grade to suit application; sanded faces, located as follows:

ITEM

Tops, Backsplash

2.3 MANUFACTURERS - PLASTIC LAMINATE

- A. Wilson Art
- B. Formica
- C. Nevamar

2.4 LAMINATE MATERIALS

- A. Plastic Laminate: NEMA LD3, GP-50 General Purpose type; color pattern to be selected, and matte surface texture as selected.
- B. Laminate Backing Sheet: LD3 BK20 backing grade, undecorated plastic laminate.

2.5 ACCESSORIES

- A. Fasteners: Size and type to suit application.
- B. Bolts, Nuts, Washers, Lags, Pins, and Screws: Of size and type to suit application.
- C. Concealed Joint Fasteners: Threaded steel.
- D. Grommets: Provide the number equal to data and electrical outlets within corresponding casework.

2.6 HARDWARE

- A. Drawer and Door Pulls: Hafele or equal brushed chrome, Bow Handles, Wire design; attached with machine screws at 4 inch centers.
- B. Drawer Slides: Blum BS 230E or equal sliding epoxy coated steel glides with nylon tired rollers.
- C. Hinges: Blum Module 170 or equal, concealed design, all metal construction 170 degree opening, full adjustable for door alignment: provide tow hinges per door.

2.7 FABRICATION

- A. Shop assemble casework for delivery to site in units easily handled and to permit passage through building openings.
- B. Fit shelves, doors, and exposed edges with 3/8 inch matching veneer edging. Use one piece for full length only.

- C. Door and Drawer Fronts: 3/4 inch thick; flush overlay style with trim as indicated on drawings.
- D. When necessary to cut and fit on site, provide materials with ample allowance for cutting. Provide trim for scribing and site cutting.
- E. Provide cutouts for plumbing fixtures, inserts, appliances, outlet boxes, fixtures and fittings. Verify locations of cutout from on-site dimensions. Prime paint and seal contact surfaces of cut edges.
- F. Apply plastic laminate finish in full uninterrupted sheets consistent with manufactured sizes. Fit corners and joints hairline; secure with concealed fasteners. Locate counter butt joints minimum two feet from sink cutouts. Provide eased edge corners, sharp corners will not be accepted.
- G. Apply laminate backing sheet to reverse side of plastic laminate finished surfaces.

2.8 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 which matches surrounding surfaces and of types recommended for applied finishes.
- D. Seal and stain exposed to view surfaces.
- E. Seal, stain and varnish internal exposed to view surfaces. Brush apply only.
- F. Seal surfaces in contact with cementitious material.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify adequacy of backing and support framing.

3.2 INSTALLATION

- A. Set and secure casework in place; rigid, plumb and level.
- B. Use fixture attachments in concealed locations for wall mounted components.
- C. Use concealed joint fasteners to align and secure adjoining cabinet units and counter tops.
- D. Carefully scribe casework abutting other components, with maximum gaps of 1/32 inch. Do not use additional overlay trim for this purpose.
- E. Secure cabinet and counter bases to floor using appropriate angles and anchorages.
- F. Countersink anchorage devices at exposed locations. Conceal with solid wood plugs of species to match surrounding wood; finish flush with surrounding surfaces.

3.3 ADJUSTING

- A. Adjust work under provisions of Section 01700.
- B. Adjust moving or operating parts to function smoothly and correctly.

3.4 CLEANING

- A. Clean work under provision of Section 01700.
- B. Clean casework, counters, shelves, hardware, fittings and fixtures.

END OF DOCUMENT 06410

SECTION 07213
BATT AND BLANKET INSULATION

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Batt insulation and vapor barrier in exterior wall.
- B. Batt insulation for filling perimeter window and door shim spaces and crevices in exterior wall and roof.

1.2 RELATED SECTIONS

- A. Section 05400 – Metal Stud Framing
- B. Section 06193 – Plate Connected Wood Trusses
- C. Section 06100 – Rough Carpentry
- D. Section 07270 - Firestopping.
- E. Section 09260 - Gypsum Board Systems: Acoustic insulation.

1.3 REFERENCES

- A. FS HH-I-521 - Insulation Blankets, Thermal, (Mineral Fiber for Ambient Temperatures).
- B. FS HH-I-558 - Insulation, Blocks, Boards, Blankets, Felts, Sleeving (Pipe and Tube Covering), and Pipe Fitting Covering, Thermal (Mineral Fiber, Industrial Type).

1.4 PERFORMANCE REQUIREMENTS

- A. Materials of this Section shall provide continuity of thermal barrier at building enclosure elements.
- B. Materials of this Section shall provide continuity of vapor and air barrier at building enclosure elements.
- C. Comply with South Carolina Energy Code, IEC 2009

1.7 QUALITY ASSURANCE

- A. Insulation Installed in Concealed Locations Surface Burning Characteristics:
 - 1. Batt Insulation: Maximum 25/450 flame spread/smoke developed index when tested in accordance with ASTM E84.
- B. Insulation Installed in Exposed Locations Surface Burning Characteristics: Maximum 25/450 flame spread/smoke developed index when tested in accordance with ASTM E84.
 - 1. Attic Floor Insulation: Minimum 0.12 watt per sq cm critical radiant flux when tested in accordance with ASTM E970.

- C. Carolina standards.
- D. Maintain one copy (1) copy of each document on site.

1.8 COORDINATION

- A. Coordinate Work under provisions of Section 01039.

PART 2 PRODUCTS

2.1 MATERIALS

- A. Owens Corning Fiberglass Corp. FS-25
- B. Manville FSK-25
- C. CertainTeed FSK-25
- D. Batt Insulation: FS HH-I-521 Type II - with non-reflective membrane one side mineral fiber; friction fit, conforming to the following:

Batt Size	Exterior walls: R-21 - Unfaced
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- E. Tape: Bright aluminum self-adhering type, mesh reinforced, 2 inch wide.
- F. Wire Mesh: Galvanized steel hexagonal wire mesh or heavy gauge plastic mesh for attachment to bottom of trusses.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify site conditions under provisions of Section 01039.
- B. Verify that substrate, adjacent materials, and insulation are dry and ready to receive insulation.

3.2 INSTALLATION

- A. Install insulation in accordance with manufacturer's instructions.
- B. Install in exterior walls, roof and ceiling spaces without gaps or voids.
- C. Trim insulation neatly to fit spaces.
- D. Fit insulation tight in spaces and tight to exterior side of mechanical and electrical services within the plane of insulation. Leave no gaps or voids.
- E. Install with factory applied membrane facing warm side of building spaces. Lap ends and side flanges of membrane between framing members.
- F. Tape seal butt ends, lapped flanges, and tears or cuts in membrane.

3.3 SCHEDULES

- A. Wall Insulation (8" metal stud wall): R21 batt, unfaced.
- B. Install sprayfoam, to fill the gaps between the exterior wall and the roof deck.

END OF SECTION 07213

SECTION 07460
FIBER CEMENT SIDING

PART 1 GENERAL

1.1 SCOPE

- A. Furnish and install Hardiplank fiber-cement siding, Hardtrim fascia and moulding and accessories where shown on drawings or as specified herein.
- B. Coordinate this section with interfacing and adjoining work for proper sequence of installation.
- C. Work in other sections affecting this work.
 - 1. Section 05400 - Metal Stud Framing
 - 2. Section 06100 – Rough Carpentry: Wood Framing and Bracing, Sheathing
 - 3. Section 07213 – Batt and Blanket Insulation: Insulation
 - 4. Section 07620 – Sheet Metal Flashing & Trim: Typical Flashing Conditions
 - 5. Section 09900 – Paints and Coatings

1.2 SUBMITTALS

- A. Submit three 6 inch x 6 inch pieces of Hardiplank / Harditrim claddings in texture and widths shown and specified herein. Submittal to include a sample of the batton strip.
- B. Submit three copies of specifications, installation data and other pertinent manufacturer's literature.
- C. Submit with Submittal Action Form provided in Section 01300

1.3 PRODUCT HANDLING

- A. Stack Hardiplank / Harditrim claddings on edge or lay flat on a smooth, level surface. Protect edges and corners from chipping. Store sheets under cover and keep dry prior to installing.

1.4 JOB CONDITIONS

- A. Install weather-resistive barriers and claddings to dry surfaces.
- B. Repair any punctures or tears in the weather-resistive barrier prior to the installation of the siding.
- C. Protect siding from other trades.

1.5 WARRANTY

- A. Provide a limited product warranty against manufacturing defects in Hardiplank lap for 50 years, HardiTrim for 10 years.

1.6 MOCK UP

- A. **Provide mock-up of an area minimum 8 feet wide by full height to include all trim boards, flashing , window trim for review and approval as per provisions of Section 01400. Mock-up shall indicate the installation and finish quality to include nailing patterns.**

- B. When accepted mock-up will demonstrate minimum standard for the work. Mock-up may remain part of the work.
- C. The mock-up will aid in determining the color selections and compatibility with other material textures and colors.

PART 2 PRODUCTS

2.1 HARDIPLANK / HARDITRIM FASCIA AND MOULDING

by James Hardie: Basis of Design; Any and all substitutions must receive prior approval in accordance with Section 01600: Product Requirements. If approval is not stated in an addendum, a substitution will not be acceptable. All products shall be primed and meet HZ10 criteria.

- A. Non-asbestos fiber-cement siding to comply with ASTM Standard Specification C1186 Grade II, Type A.
- B. Siding – Horizontal siding type “colonial smooth” 8”w 6-3/4” exposure with a recess top edge – 5/16” thick and 12’-0” length
- C. Siding to meet the following building code compliance National Evaluation Report No. NER 405 (BOCA, ICBO, SBCCI); Non-asbestos fiber-cement siding to be non-combustible when tested in accordance with ASTM test method E136.
- D. Trim Type: HardiTrim XLD 1” Smooth Planks 5/4” nominal by the width as required and as indicated on the drawings. Provide the full length boards. All boards to be solid boards, not to have holes at back.
- E. Soffit panel/board: Hardisoffit NonVented 1/4” x 16” x 144” smooth finish to be used only on horizontal surface not on sloped rakes.
- F. Ceiling Board: Hardi-Panel for use as indicated for ceiling at the Porch unless noted otherwise.
Panel Type: Hardipanel Smooth 5/16” x 4’ x 10’.

2.2 FASTENERS

- A. Wood framing: 0.093” shank x 0.222” head x 2” corrosion resistant (Stainless Steel) siding nails for trim and as per manufacturers recommendations whichever is more stringent. For batten use 2 inch minimum 16 ga. Stainless steel finish nail.
- B. Metal Stud Framing – Screws: Ribbed bugle head (No. 8- 18 x 1-5/8” long x 0.323” HD) Must penetrate minimum three threads into metal framing. Nails: ET & F Pin (0.10” shank x 0.25 HD and 1-1/2” long). Nails must penetrate minimum ¼” into metal framing.
- C. Do not place fasteners closer than ¾ inches from the edges
- D. Submit fastener for approval for metal framing prior to installation.

PART 3 EXECUTION

3.1 SURFACE CONDITIONS

- A. Correct conditions detrimental to timely and proper completion of work.

3.2 INSTALLATION

- A. Install flashing around all wall openings.
- B. Block framing between studs where horizontal joints of Hardi Panel occur.
- C. Fasten through trim into structural framing or code complying sheathing. Fasteners must penetrate minimum $\frac{3}{4}$ inch or full thickness or sheathing.
- D. Place fasteners no closer than $\frac{3}{4}$ inch and no further than 2 inch from side edge of trim board and no closer than 1 inch from end. Fasten maximum 16 inch on center.
- E. Allow minimum 1-1/2" inch vertical clearance between roofing and bottom edge of siding.
- F. Align vertical joints of the planks over wood framing members. Leave a small gap between the boards in accordance with the manufacturers recommendation and apply sealant prior to installing the batten strip.
- G. Maintain clearance between siding and adjacent finished grade. Minimum of 6" inches.
- H. Fasteners should be driven snug with the exterior surface of the siding (no airspace). Do not overdrive fastener into the siding or batten. Do not drive fastener in to surface at an angle. The use of Aluminum fasteners, staples and clipped head nails is not allowed.
- I. Maintain clearance between trim and adjacent finished grade.
- J. Trim inside corner with single board.
- K. Install single board of outside corner board then align second corner board to outside edge of first corner board. Do not fasten Harditrim board to Harditrim board.
- L. Allow 1/8 inch gab between trim and siding.
- M. Seal gap with high quality, paint-able caulk. See Section 07900 - Joint Sealants.
- N. Shim frieze board as required to align with corner trim.
- O. Install Harditrim fascia over structural wood subfascia.

3.3 INSTALLATON – HARDIPLANK SIDING

- A. Starting: Install a minimum ¼ inch thick lath starter strip at the bottom course of the wall. Apply planks horizontally with minimum ¼ inch wide laps at the top. The bottom edge of the first plank overlaps the starter strip.
- B. Allow minimum 1 inch vertical clearance between roofing and bottom edge of siding.
- C. Align vertical joints of the planks over framing members.
- D. Maintain clearance between siding and adjacent finished grade.
- E. Locate splices at least one stud cavity away from window and door openings.
- F. Use off-stud metal joiner when vertical joints occur between framing members. Position metal joiner so that the bottom lip is resting on the solid course of planks. Fasten plank to the framing. Position and fasten abutting plank into place insuring that the lower edges of the two planks align. Locate metal joiner centrally behind the joint. Locate off-stud splices a minimum of two stud cavities from wall corners and stagger all subsequent course splices at minimum 24 inch intervals when located in the same wall cavity.
- G. Wind Resistance: A wind resistance is required and Hardiplank lab siding should be installed to framing members and secured with fasteners described in Table No. 2 in National Evaluation Service Report No. NER-405.
- H. All field cut edges shall receive prime and paint.

3.4 FINISHING

- A. Finish primed siding with two coats high quality, alkali-resistant, 100% acrylic exterior grade topcoat within 90 days of installation. Follow paint manufacturer's written product recommendation and written application instructions. Use Elastomeric Sealant: ASTM C920 Grade NS or higher in accordance with ASTM C1193
- B. See Section 09900 – Paints and Coatings. Paint must be applied with a brush, no spray application will be allowed.

END OF SECTION 07460

SECTION 07540

POLYVINYL-CHLORIDE ROOFING

PART 1 GENERAL

1.1 RELATED DOCUMENTS

1.1.1 Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

1.2.1 This Section includes but is not limited to the following:

1.2.1.1 Roof insulation.

1.2.1.2 Mechanically fastened membrane roofing system.

1.2.2 Related Sections include the following:

1.2.2.1 Section 06100 "Rough Carpentry".

1.2.2.2 Section 07620 "Flashing and Sheet Metal".

1.2.2.3 Section 07900 "Sealants and Caulking."

1.3 DEFINITIONS

1.3.1 Roofing Terminology: Refer to ASTM D1079 and glossary of NRCA's "The NRCA Roofing and Waterproofing Manual" for definition of terms related to roofing work in this Section.

1.3.2 Design Uplift Pressure: The uplift pressure, calculated according to procedures in SPRI's "Wind Load Design Guide for Fully Adhered and Mechanically Fastened Roofing Systems," before multiplication by a safety factor.

1.3.3 Factored Design Uplift Pressure: The uplift pressure, calculated according to procedures in SPRI's "Wind Load Design Guide for Fully Adhered and Mechanically Fastened Roofing Systems," after multiplication by a safety factor.

1.4 PERFORMANCE REQUIREMENTS

1.4.1 General: Provide installed roofing membrane and base flashings that remain watertight; do not permit the passage of water; and resist specified uplift pressures, thermally induced movement, and exposure to weather without failure.

1.4.2 Material Compatibility: Provide roofing materials that are compatible with one another under conditions of service and application required, as demonstrated by roofing membrane manufacturer based on testing and field experience.

1.4.3 Roofing System Design: Provide a membrane roofing system that is identical to systems that have been successfully tested by a qualified testing and inspecting agency to resist the factored design uplift pressures calculated according to SPRI's "Wind Load Design Guide for Fully Adhered and Mechanically Fastened Roofing Systems." Roofing system design shall meet or exceed a FM 1-105 rated system.

1.4.3.1 Field-of-Roof Design Uplift Pressure: 51 lbf/sq. ft.

1.4.3.2 Perimeter Design Uplift Pressure: 77 lbf/sq. ft.

1.4.3.3 Corner Design Uplift Pressure: 110 lbf/sq. ft.

1.4.3.4 Safety Factor: 2

1.5 DESCRIPTION OF WORK

1.5.1 Work required in this specification is referenced below and is based on Carlisle Syntec Products and Specifications. A polyvinyl-chloride roof system from Sika Sarnafil (SS) or Soprema installed in accordance with the requirements and procedures listed in this Specification will be accepted. Acceptable SS and Soprema products are listed in parentheses following listed Carlisle Syntec products in Part 2 of this Spec Section.

1.5.2 Roof System:

1.5.2.1 Mechanically Attached 60 mil PVC roof membrane such as:

1.5.2.1.1 Carlisle Syntec Sure-Flex PVC membrane

1.5.2.1.2 Sika Sarnafil G410 PVC membrane

1.5.2.1.3 Soprema Sentinel P150 PVC membrane

1.6 SUPERVISION

1.6.1 Contractor shall assign a full-time, English speaking, qualified Roofing Sup't. to the project to coordinate the various aspects of the work; to provide Quality Control Services for the project; and to serve as liason with the Owner's representative.

1.6.2 The roofing crew shall be supervised at all times by Contractor's full-time, English speaking Foreman.

1.7 SUBMITTALS

1.7.1 Product Data: For each type of product indicated.

1.7.2 Shop Drawings: For roofing system. Include plans, sections, and details of attachments to other Work.

1.7.2.1 Base flashings and membrane terminations.

- 1.7.2.2 Insulation fastening patterns
- 1.7.2.3 PVC Seam layout.
- 1.7.3 Samples for Verification: For the following products:
 - 1.7.3.1 12-by-12-inch (300-by-300-mm) square of sheet roofing, of color specified, including T-shaped side and end lap seam.
 - 1.7.3.2 12-inch (300-mm) length of metal termination bars.
 - 1.7.3.3 12-inch (300-mm) length of battens.
 - 1.7.3.4 Four insulation fasteners and plates of each type, length, and finish.
 - 1.7.3.5 Four roof membrane cover fasteners of each type, length, and finish.
- 1.7.4 Installer Certificates: Signed by roofing system manufacturer certifying that Installer is approved, authorized, or licensed by manufacturer to install roofing system.
- 1.7.5 Manufacturer Certificates: Signed by roofing manufacturer certifying that roofing system complies with requirements specified in "Performance Requirements" Article.
 - 1.7.5.1 Submit evidence of meeting performance requirements.
- 1.7.6 Qualification Data: For Installer and manufacturer.
 - 1.7.6.1 Product Test Reports: Based on evaluation of comprehensive tests performed by manufacturer and witnessed by a qualified testing agency, for components of roofing system.
 - 1.7.6.2 Research/Evaluation Reports: For components of membrane roofing system.
 - 1.7.6.3 Maintenance Data: For roofing system to include in maintenance manuals.
 - 1.7.6.4 Submittal of sample warranty provides Architect or Owner an opportunity to further verify that warranty coverage meets requirements.
 - 1.7.6.5 Warranties: Special warranties specified in this Section.
 - 1.7.6.6 Inspection Report: Copy of roofing system manufacturer's inspection report of completed roofing installation.
- 1.8 QUALITY ASSURANCE
 - 1.8.1 Installer Qualifications: A qualified firm that is approved, authorized, or licensed by roofing system manufacturer to install manufacturer's product and that is eligible to receive manufacturer's warranty.

- 1.8.2 Manufacturer Qualifications: A qualified manufacturer that has UL listing and FMG approval for membrane roofing system identical to that used for this Project.
- 1.8.3 Source Limitations: Obtain components for membrane roofing system approved by roofing membrane manufacturer.
- 1.8.4 Fire-Test-Response Characteristics: Provide membrane roofing materials with the fire-test-response characteristics indicated as determined by testing identical products per test method below by UL, FMG, or another testing and inspecting agency acceptable to authorities having jurisdiction. Materials shall be identified with appropriate markings of applicable testing and inspecting agency.
 - 1.8.4.1 Exterior Fire-Test Exposure: Class A; ASTM E108, for application and roof slopes indicated.
- 1.8.5 Pre-installation Roofing Conference: Before starting removals and roof recover construction, conduct conference at Project site. Review methods and procedures related to roof recover construction and roofing system including, but not limited to, the following:
 - 1.8.5.1 Meet with Owner, Architect, and roofing system manufacturer's representative.
 - 1.8.5.2 Review methods and procedures related to roofing installation, including manufacturer's written instructions.
 - 1.8.5.3 Review and finalize construction schedule and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
 - 1.8.5.4 Examine existing substrate conditions and finishes for compliance with requirements, including flatness and fastening.
 - 1.8.5.5 Review structural loading limitations of roof deck during and after roofing.
 - 1.8.5.6 Review base flashings, special roofing details, roof drainage, roof penetrations, equipment curbs, and condition of other construction that will affect roofing system.
 - 1.8.5.7 Review governing regulations and requirements for insurance and certificates if applicable.
 - 1.8.5.8 Review temporary protection requirements for roofing system during and after installation.
 - 1.8.5.9 Review roof observation and repair procedures after roofing installation.

1.9 DELIVERY, STORAGE, AND HANDLING

- 1.9.1 Deliver roofing materials to Project site in original containers with seals unbroken and labeled with manufacturer's name, product brand name and type, date of manufacture, and directions for storing and mixing with other components.
 - 1.9.2 Store liquid materials in their original undamaged containers in a clean, dry, protected location and within the temperature range required by roofing system manufacturer. Protect stored liquid material from direct sunlight.
 - 1.9.2.1 Discard and legally dispose of liquid material that cannot be applied within its stated shelf life.
 - 1.9.3 Protect roof insulation materials from physical damage and from deterioration by sunlight, moisture, soiling, and other sources. Store in a dry location. Comply with insulation manufacturer's written instructions for handling, storing, and protecting during installation. Storage exposed to weather in manufacturer's original packaging alone is not sufficient. Provide tarps and store above ground on pallets at a minimum.
 - 1.9.4 Handle and store roofing materials and place equipment in a manner to avoid permanent deflection of deck. Do Not Stockpile equipment or materials on the roof.
- 1.10 PROJECT CONDITIONS
- 1.10.1 Requirements Prior to Job Start
 - 1.10.1.1 Pre-Roofing Conference: Roofing Contractor shall schedule a pre-roofing construction conference to be conducted by the Project Architect or his Representative, and attended by the installing roofing contractor, the roofing system manufacturer, the Owner's representative and sub-contractors engaged in the work of this project.
 - 1.10.1.2 Notification: Give a minimum of 5 days' notice to the Owner, Project Architect, and Manufacturer prior to commencing any work and notify all parties on a daily basis of any change in work schedule.
 - 1.10.1.3 Permits: Obtain all permits required by local agencies and pay all fees which may be required for the performance of the work.
 - 1.10.1.4 Safety: Familiarize every member of the application crew with all fire and safety regulations recommended by OSHA, NRCA and other industry or local governmental groups.
 - 1.10.2 Asbestos Products
 - 1.10.2.1 No products containing asbestos fibers are present in the work covered
 - 1.10.2.2 No Asbestos bearing materials are to be incorporated into the work as a part of this contract. No existing asbestos containing material is to be left

or incorporated into the work of this contract.

1.10.2.3 In the event the Contractor finds asbestos containing materials not previously identified, then Contractor shall stop all work in the affected area and notify the Owner and Architect. Contractor shall provide all materials necessary to temporarily dry-in the affected area in the Base Bid. Additional work caused by the discovery, if authorized by the Owner, will be handled as a Change Order to this Contract.

1.10.3 Weather Limitations: Proceed with installation only when existing and forecasted weather conditions permit roofing system to be installed according to manufacturer's written instructions and warranty requirements.

1.10.4 Protection Requirements

1.10.4.1 Membrane Protection: Provide protection against staining and mechanical damage to newly applied roofing and adjacent surfaces throughout this project.

1.10.4.2 Limited Access: Prevent access by the public to materials, tools and equipment during the course of the project.

1.10.4.3 Debris Removal: Remove all debris daily from the project site and take to a legal dumping area authorized to receive such materials.

1.10.4.4 Site Condition: Complete, to the Owner's satisfaction, all job site clean-up including building interior, exterior and landscaping where affected by the construction.

1.10.4.5 Facility Protection:

1.10.4.5.1 Limit size of work sections to safeguard adjacent materials, structures, etc., and to minimize dust and noise.

1.10.4.5.2 Protect existing facilities from damage during work. Do not overload existing paving, curbs, sidewalks, etc. with vehicle traffic. Do not overload new or existing construction with demolition debris, equipment, new materials etc.

1.10.4.5.3 Protect existing facilities from fire. Contractor shall provide suitable and adequate fire extinguishers conveniently located on the premises at staging areas, storage areas and at areas of equipment. Competent operators shall be in attendance at all times and shall be properly trained or instructed in fire protection.

1.10.4.5.4 Plywood, minimum 3/4 inch thick, or other suitable materials shall be used to protect roof areas from damage that may be caused by concentrated equipment loads and foot traffic.

- 1.10.4.5.5 Site and roof traffic shall be confined to work areas. Contractor shall be responsible for leaks that develop in traffic areas during and after Project completion.
 - 1.10.4.5.6 Contractor shall protect interior operations from adverse weather during roofing operations. This requirement extends beyond the immediate project scope of work to adjacent contiguous roof areas.
 - 1.10.4.5.7 The Contractor is responsible and shall be held liable for any damages to the adjacent roof assemblies, building, building contents, its occupancy, grounds or landscaping resulting from work under the Contract. In the event of damage, Contractor will restore property to a condition equivalent to that at the time the Project started. Restoration may be necessary to construction assemblies not specified in this project manual. In such cases, repair methods and materials are subject to approval by Owner.
- 1.10.4.6 The Contractor shall keep existing drainage facilities clear of debris during construction.

1.11 WARRANTY

- 1.11.1 Manufacturer's Warranty: Manufacturer's standard form, without monetary limitation, in which manufacturer agrees to repair or replace components of membrane roofing system that fail in materials or workmanship within specified warranty period. Failure includes roof leaks. Reference WARRANTIES Section 01740.
 - 1.11.1.1 Special warranty includes roofing membrane, base flashings, roofing membrane accessories, cover boards, walkway products and other components of membrane recover roofing system.
 - 1.11.1.2 Warranty Period: 20 years from date of Substantial Completion.
- 1.11.2 Special Project Warranty: Submit roofing Installer's watertight warranty, on warranty form provided in Execution Requirements Section 01700, signed by Installer, covering Work of this Section, including all components of membrane roofing system such as roofing membrane, base flashing, flexible sheet and metal flashings, roof recover board, fasteners, sheet metal components, metal siding and walkway products for the following warranty period:
 - 1.11.2.1 Warranty Period: Two years from date of Substantial Completion.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- 2.1.1 In other Part 2 articles where titles below introduce lists, the following requirements apply for product selection:

2.1.1.1 Products: Subject to compliance with requirements, provide one of the products specified.

2.1.1.2 Manufacturers: Subject to compliance with requirements, provide products by the manufacturers specified.

2.2 POLYVINYL-CHLORIDE ROOFING MEMBRANE

2.2.1 A 60 mil PVC thermoplastic membrane with a polyester scrim reinforcement, with lacquer coating, ASTM D4434.

2.2.1.1 Thickness: 60 mils, nominal.

2.2.1.2 Field Sheet Width: 10' max.

2.2.1.3 Perimeter Half Sheet Width: Not Required.

2.2.1.4 Exposed Face Color: White

2.2.1.5 Physical Properties:

<u>Parameters</u>	ASTM Test Method	ASTM D-4434 Spec. Requirement
Overall Thickness, mil	D638	45
Reinforcing Material Thickness Above Scrim, mil		16
Felt Weight, oz/yd ²		
Tensile Strength min.	D638	
Machine Direction, psi		1500
Cross Direction, psi		1500
Elongation at Break, min.	D638	
Machine Direction, %		250
Cross Direction, %		220
Seam Strength min., (% of original)*	D638	75
Retention of Properties After Heat Aging	D3045	
Tensile Strength min., (% of original)	D638	90
Elongation min., (% of original)	D639	90
Tearing Resistance (M.D.) min., lbf (N)	D1004	10 (45.0)
Low Temperature Bend -40 °F (-40 °C)	D2136	Pass
Accelerated Weathering Test (Florescent Light, UV exposure), Hours	G154	5,000
Cracking (7x magnification)		None
Discoloration (by observation)		Negligible
Crazing (7x magnification)		None
Linear Dimensional Change (C.D.), %	D1204	0.10 max.
Weight Change After Immersion in Water, %	D570	± 3.0 max.
Static Puncture Resistance, 33 lbf (15 kg)	D5602	Pass
Dynamic Puncture Resistance, 7.3 ft-lbf (10 J)	D5635	Pass

Recycled Content (10' & 5' sheet only)

9% Pre-Consumer / 1% Post-Consumer

2.3 AUXILIARY MATERIALS

2.3.1 General: Auxiliary materials recommended by roofing system manufacturer for intended use and compatible with membrane roofing.

2.3.1.1 Liquid-type auxiliary materials shall meet VOC limits of authorities having jurisdiction.

2.3.2 Sheet Flashing: Manufacturer's standard unreinforced Polyvinyl Chloride sheet flashing, 55 mils thick, minimum, of same color as sheet membrane.

2.3.3 Bonding Adhesive: Manufacturer's standard solvent-based bonding adhesive for base flashings.

2.3.4 Metal Termination Bars: Manufacturer's standard predrilled stainless-steel or aluminum bars, approximately 1 by 1/8 inch (25 by 3 mm) thick; with anchors.

2.3.5 Metal Battens: Manufacturer's standard aluminum-zinc-alloy-coated or zinc-coated steel sheet, approximately 1 inch (25 mm) wide by 0.05 inch (1.3 mm) thick, prepunched.

2.3.6 Fasteners: Factory-coated steel fasteners and metal or plastic plates meeting corrosion-resistance provisions in FMG 4470, designed for fastening membrane to substrate, and acceptable to membrane roofing system manufacturer.

2.3.7 Compressible Filler: 1.5" and 3" Diameter Poly Backer Rod, Closed Cell Non-Stick Skin.

2.3.8 Miscellaneous Accessories: Provide pourable sealers, preformed cone and vent sheet flashings, preformed inside and outside corner sheet flashings, T-joint covers, termination reglets, cover strips, and other accessories.

2.4 ROOF INSULATION

2.4.1 General: Provide preformed roof insulation boards that comply with requirements and referenced standards, selected from manufacturer's standard sizes and of thicknesses indicated.

2.4.2 Polyisocyanurate Board Insulation: ASTM C1289, Type II, Class 2, Grade 2. All glass facer on both major surfaces such as Energy 3 AGF. Maximum board size is 4ft. x 8ft. x 1-1/2" for mechanical attachment. Total Roof Insulation is 4-1/2" thick (three layers of 1-1/2").

2.4.2.1 Manufacturers:

2.4.2.1.1 Carlisle SynTec Incorporated.

2.4.2.1.2 Soprema

2.4.2.1.3 Sika Sarnafil

2.4.2.1.4 Hunter.

- 2.4.3 HD Coverboard: A 1/2" thick high density 100 psi polyiso insulation panel specifically designed for use as a cover board, such as SecurShield HD Board by Carlisle Syntec.
- 2.4.4 Tapered Edge Strips: Wood Fiber, provide 0" – 1" x 6" tapered edge strip at leading edge of overlayment board at drain sumps.
- 2.4.5 Provide preformed saddles, crickets, tapered edge strips, and other insulation shapes where indicated for sloping around fixed equipment and to drains. At cricket conditions, fabricate to slopes double the normal slope of the roof.

2.5 INSULATION ACCESSORIES

- 2.5.1 General: Roof insulation accessories recommended by insulation manufacturer for intended use and compatible with membrane roofing.

2.5.2 Mechanical Fasteners:

- 2.4.2.1. Drill•Tec™ XHD Screws: Heavy gauge alloy steel fastener with CR-10 coating with a .275" diameter thread. Factory Mutual Standard 4470 Approved, #3 Phillips truss head for use on heavy steel decks.
- 2.4.2.2. Drill•Tec™ RhinoBond® Insulation Plates: Galvalume, 3" diameter, specially coated for use in RhinoBond® attachment systems in PVC roof membranes.

2.5. INDUCTION WELDING EQUIPMENT

- 2.5.1. RhinoBond® Portable Bonding Machine
- 2.5.2. Minimum 5,000-watt, continuous generator per two RhinoBond® Portable Bonding Machines.
- 2.5.3. 100' max length, #12 minimum gauge electrical cords.
- 2.5.4. 6 cooling clamps (stand-up magnets that put pressure on the newly welded plate).
- 2.5.5. Pliers
- 2.5.6. Heavy Duty Plunger
- 2.5.7. Lumber Crayon

2.6 WALKWAYS (Not Used this Project)

- 2.6.1 Flexible Walkways: Factory-formed, nonporous, heavy-duty, solid-rubber, slip-resisting, surface-textured walkway pads or rolls, approximately 3/16 inch (5 mm) thick, and acceptable to membrane roofing system manufacturer.

PART 3 EXECUTION

3.1 EXAMINATION

- 3.1.1 Examine substrates, areas, and conditions for compliance with the following requirements and other conditions affecting performance of roofing system:
 - 3.1.1.1 Verify that roof openings and penetrations are in place and set and braced.
 - 3.1.1.2 Verify that abandoned roof openings have been appropriately covered and attached to existing or new structural members.
 - 3.1.1.3 Verify that wood blocking, curbs, and nailers are securely anchored to roof deck at penetrations and terminations and that nailers match thicknesses of insulation.
 - 3.1.1.4 Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- 3.2.1 Clean substrate existing roof surface of dust, debris, moisture, and other substances detrimental to roofing installation according to roofing system manufacturer's written instructions. Remove sharp projections.
- 3.2.2 Complete terminations and base flashings and provide temporary seals to prevent water from entering completed sections of roofing system at the end of the workday or when rain is forecast. Remove and discard temporary seals before beginning work on adjoining roofing.

3.3 INSULATION INSTALLATION

- 3.3.1 Install roof system insulation material as follows:
 - 3.3.1.1 Coordinate installing membrane roofing system components so insulation is not exposed to precipitation or left exposed at the end of the workday.
 - 3.3.1.2 Comply with membrane roofing system manufacturer's written instructions for installing roof insulation.
 - 3.3.1.3 Install insulation with long joints of insulation in a continuous straight line with end joints staggered between rows, abutting edges and ends between boards. Fill gaps exceeding 1/4 inch (6 mm) with insulation.
 - 3.3.1.4 Apply insulation with end joints staggered approximately one-half the length of the units.
 - 3.3.1.5 Where two or more insulation layers occur, install layers with joints of each succeeding layer staggered from joints of previous layer a minimum of 6 inches (150 mm) in each direction.

- 3.3.1.6 Cut and fit insulation within 1/4 inch (6 mm) of nailers, projections, and penetrations.
- 3.3.1.7 New Roof Area:
 - 3.3.1.7.1 Install three layers of insulation under area of roofing to achieve required thickness. Where two or more insulation layers occur, install layers with joints of each succeeding layer staggered from joints of previous layer a minimum of 6 inches in each direction.
 - 3.3.1.7.2 Install two layers of 1-1/2" insulation over one layer of 1-1/2" insulation in between ribs of the new metal roof panels. Cut insulation to fit snugly between panel ribs.
 - 3.3.1.7.3 Loose lay 1/2" overlayment board on top of base insulation and metal panel ribs so that it runs continuous across the roof surface.
 - 3.3.1.7.4 Offset joints in overlayment board by a minimum of one half board width between rows.
 - 3.3.1.7.5 Mechanically fasten insulation and overlayment board through the existing metal panel with the required number of fasteners per board.
 - 3.3.1.7.6 Fasten insulation to the substrate in an appropriate grid pattern as established by the RhinoBond® Attachment Table. Using chalk lines to make the grids on the substrate is the easiest way to make sure the grid is consistent and plates are easy to find.
 - 3.3.1.7.7 In the field, fasten each full insulation board with 12 fasteners per board in a pattern as described in FM Loss Prevention Data Sheet 1-29. In no case less than 2 fasteners per single board segment.
 - 3.3.1.7.8 Increase fastener spacing to 15 fasteners per 4'x8' board in the 8' perimeter and 24 fasteners per 4'x8' board in the 8'x8' corners.
 - 3.3.1.7.9 Fasteners must be tight enough that the RhinoBond® Plate does not turn or rock.
 - 3.3.1.7.10 Over-driven fasteners that distort the face or top of the plate must be removed and discarded. A new RhinoBond® Plate and Fastener must be reinstalled next to the original, but not into the same space and hole.
 - 3.3.1.7.11 Under driven or "high fasteners" must be re-driven to proper depth.

3.3.1.7.12 When installation of RhinoBond® Plates and Fasteners are complete, the area should be blown or broomed clean to remove any dirt or debris from the substrate surface or contaminants from the plate's bonding surface. This is critical so as not to puncture the membrane from beneath or to impair the welding of the membrane to the RhinoBond® Plate.

3.4 INDUCTION WELDING ROOFING MEMBRANE INSTALLATION

3.4.1 Install roofing membrane over area to receive roofing according to roofing system manufacturer's written instructions. Unroll roofing membrane and allow to relax before installing.

3.4.1.1 Install sheet according to ASTM D5082.

3.4.2 Start installation of roofing membrane in presence of roofing system manufacturer's technical personnel.

3.4.3 Equipment Settings

3.4.3.1 As with any electrical tool, it is imperative that the tool receive the recommended amount of current for its proper operation. Damage could result from overload (surge) as well as a low voltage situation. No other electrical devices shall be run at the same time as the RhinoBond® Portable Bonding Machines.

3.4.3.2 The RhinoBond® tool must be adjusted to achieve the maximum bond strength with most roofing membranes between 0° and 120° F.

3.4.4 Calibration of the Machine

3.4.4.1 The user must adjust the RhinoBond® tool to achieve maximum bond strength with PVC roofing membranes from 0° to 120° F ambient temperatures. The tool leaves the factory set to deliver an optimal weld with most membranes at 70°F when set to an energy level of "0". The energy level must be adjusted up (+1, +2, etc.) when temperatures are below 70°F, and down (-1, -2 etc) when temperatures are above 70°F. These adjustments can be made by using the up/down arrow keys next to the display window on the machine.

3.4.4.2 In an area adjacent to the day's work, lay out 5 RhinoBond® Plates 10" apart and cover them with a fresh piece of field membrane approximately 18" x 5'.

3.4.4.3 Locate the plates under the membrane by dragging your foot across the surface of the membrane. After locating the RhinoBond® Plate, center the machine's red location circle directly over the plate.

- 3.4.4.4 Determine an initial setting based on the ambient temperature. Remember that 70°F is a “0” energy setting on the display. On a 110° F day in Phoenix, AZ your initial energy setting may be “2” or “3”.
 - 3.4.4.5 Weld the first plate at your initial energy setting and immediately place the cooling clamp onto the plate and mark the setting with the lumber crayon. Increase the energy setting using the “up” arrow on the machine by a unit of 1. Weld the second plate to the right of the first plate; mark the setting in crayon and put the second cooling clamp on the plate. Increase by another unit of 1 and weld the third plate. Repeat this process for the next two plates – installing them to the left of your first weld – except reduce the energy setting by a unit of 1 from your original setting each time. From left to right, your set of plates will be marked as follows (on a 70 degree F day): -2, -1, 0, 1, 2.
 - 3.4.4.6 Let the membrane over the plates cool to ambient temperature and fold the membrane over exposing the RhinoBond® Plates. Standing on the membrane, use your pliers to grip the plate and pull the plate from the test material, delaminating the plate from the membrane in the process.
 - 3.4.4.7 Three distinct types of bonds are probable, and are as follows: Full bond, an even and consistent weld of the membrane to the plate. The plate will also leave an impression in the membrane. This is a spec installation. Uneven/incomplete weld of the plate to the membrane. Cause of failure may be energy source set too low, machine not centered over the plate completely, or the plate may be over-driven. This would be a complete or partial hit of the plate. Remember, a full concentration of heat applied to the plate is needed to achieve a spec weld.
- 3.4.5 Accurately align roofing membranes and maintain uniform side and end laps of minimum dimensions required by manufacturer to meet the design pressures specified in this section. Stagger end laps at a minimum by the width of the membrane roll.
 - 3.4.6 Full-width rolls shall be installed in the field and perimeter regions of the roof.
 - 3.4.7 Overlap full roof membrane sheets a minimum of 3” for side and end laps.
 - 3.4.8 Install membrane so that the lap runs across the roof slope and lapped toward the drainage points, if possible.
 - 3.4.9 All exposed sheet corners shall be rounded a minimum of 1”.
 - 3.4.10 All cut edges of reinforced PVC membrane must be sealed with Cut Edge Sealant.

- 3.4.11 Weld PVC to RhinoBond® Plates with RhinoBond® Portable Bonding Tool. Weighted cooling magnets are placed over the bonded membrane/plates for a minimum of 45 seconds.
 - 3.4.12 Seams: Clean seam areas, overlap roofing membrane, and hot-air weld side and end laps of roofing membrane with 2" machine welds or 1.5" field welds, or according to manufacturer's written instructions to ensure a watertight seam installation.
 - 3.4.12.1 Test lap edges with probe to verify seam weld continuity. Apply lap sealant to seal cut edges of roofing membrane.
 - 3.4.12.2 Verify field strength of seams a minimum of twice daily and repair seam sample areas.
 - 3.4.12.3 Repair tears, voids, and lapped seams in roofing membrane that does not meet requirements.
 - 3.4.13 In-Splice Attachment: Secure one edge of roofing membrane using fastening plates or metal battens centered within membrane splice and mechanically fasten roofing membrane to roof deck. Field-splice seam.
 - 3.4.14 Install roofing membrane and auxiliary materials to tie in to existing conditions.
- 3.5 FIELD QUALITY CONTROL
- 3.5.1 Final Roof Inspection: Arrange for roofing system manufacturer's technical personnel to inspect roofing installation on completion and submit report to Architect.
 - 3.5.1.1 Notify Architect or Owner 48 hours in advance of date and time of inspection.
 - 3.5.2 Repair or remove and replace components of membrane roofing system where test results or inspections indicate that they do not comply with specified requirements.
 - 3.5.3 Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.
- 3.6 PROTECTING AND CLEANING
- 3.6.1 Protect membrane roofing system from damage and wear during remainder of construction period. When remaining construction will not affect or endanger roofing, inspect roofing for deterioration and damage, describing its nature and extent in a written report, with copies to Architect and Owner
 - 3.6.2 Correct deficiencies in or remove membrane roofing system that does not comply with requirements, repair substrates, and repair or reinstall membrane roofing system to a condition free of damage and deterioration at time of Substantial Completion and according to warranty requirements.

- 3.6.3 Clean overspray and spillage from adjacent construction using cleaning agents and procedures recommended by manufacturer of affected construction.

END OF SECTION 07540

SECTION 07613
MANUFACTURED SHEET METAL ROOFING

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Preformed, prefinished metal roofing and flashing for sloped roofing to include rigid insulation
- B. Miscellaneous trim, flashing, closures, drip flashing, and accessories.
- C. Sealant
- D. Fastening devices, ridge vents.
- E. Weatherproofing Membrane.

1.2 RELATED SECTIONS

- A. Section 02225 - Selective Minor Renovation and Demotion
- B. Section 04810 - Unit Masonry Systems
- C. Section 05312 – Steel Roof Deck
- D. Section 05440 - Pre Engineered Cold Formed Steel Trusses
- E. Section 06100 – Rough Carpentry
- F. Section 06200 – Finish Carpentry
- G. Section 07620 - Sheet Metal Flashing & Trim
- G. Section 07900 - Joint Sealers

1.3 REFERENCES

- A. American Iron & Steel Institute (AISI) Specification for the Design of Coldformed Steel Structural Member
- B. ASTM A-525 Steel Sheet, Zinc-Coated (Galvanized)
- C. ASTM E-283-84 Air Infiltration
- D. ASTM E-331-86 Water Infiltration
- E. Spec Data Sheet - Gal Valume Sheet Metal By Bethlehem Corp.
- F. SMACNA – Sheet Metal and Air Conditioning Contractors National Association, Inc.: Architectural Sheet Metal Manual
- G. NCRA – The National Roofing Contractors Association: Roofing and Waterproofing Manual (including Construction Details), and Handbook of Accepted Roofing Knowledge
- H. Manufacturer’s Construction Details Handbook

- I. ASIC Steel Construction Manual
- J. AISI Cold Formed Steel Design Manual

1.4 ASSEMBLY DESCRIPTION

- A. The roofing assembly includes preformed sheet metal panels, related accessories, valleys, hips, ridges, eaves, ridge vent, crickets, miscellaneous flashing and attaching devices.

1.5 SUBMITTALS

- A. Submit under provisions of Section 01330.
- B. Submit a sample of each type of roof panel, complete with factory finish.
- C. Submit detailed drawings showing layout of panels, anchoring details, joint details, trim, flashing, and accessories. Show details of weatherproofing and terminations. A complete analysis/report shall be submitted indicating clip attachment and spacing.
- D. Submit results indicating compliance with minimum requirements of the following performance tests:
 - 1. Air Infiltration ASTM E 283-84
 - 2. Water Infiltration ASTM E331-86
- E. Submit calculations with registered SC engineer seal, verifying roof panel and attachment method resists wind pressures imposed on it pursuant to applicable building codes. The design is to include clip spacing design. The work will not commence without approval of submitted data.
- F. Submit manufacturer's warranty covering the substrate (metal) against rupture, perforation, and structural failure due to normal atmospheric corrosion for twenty (20) years.
- G. Submit manufacturer's thirty (30) year warranty on paint finish against cracking, peeling, blistering, chalk, and color change.
- H. Submit test reports complying with finish specifications per section 2.02 C5 through C8.

1.6 QUALITY ASSURANCE

- A. Manufacturer: Company specializing in Architectural Sheet Metal Products with ten (10) years minimum experience.
- B. No product substitutions shall be permitted without meeting specifications.
- C. Substitutions shall be submitted 10 days prior to Bid Date and acceptance put forth in an addendum as per Section 01600 - Material & Equipment.
- E. Before Fabrication: The contractor shall take field measurements of the structure and substrates indicated and specified to ensure that panel lengths and brakeformed flashings are dimensioned accurately to facilitate easy installation. Fabrication shall not begin until all field conditions have been

verified. Allow for sufficient trimming of panel units at eaves, valleys, and gables prior to fabrication.

- F. Perform Work in accordance with State of South Carolina standards.
- G. Maintain one (1) copy of each document on site.

1.7 DELIVERY, STORAGE AND HANDLING

- A. Upon receipt of panels and other materials, installer shall examine the shipment for damage and completeness.
- B. Panels should be stored in clean, dry place. One end should be elevated to allow moisture to run off.
- C. Panels with strippable film must not be stored in the open, exposed to the sun.
- D. Stack all materials to prevent damage and to allow for adequate ventilation.
- E. Store materials above ground, on skids. Protect material with waterproof covering and allow sufficient ventilation to prevent condensation build-up or moisture entrapment in the materials.

1.8 WARRANTY

- A. Paint finish shall have a twenty (20) year guarantee against cracking, peeling and fade (not to exceed 5 N.B.S. units).
- B. Galvalume material shall have a twenty (20) year guarantee against failure due to corrosion, rupture, or perforation.
- C. Applicator shall furnish guarantee covering watertightness of the roofing system for the period of two (2) years from the date of substantial completion where the installer shall assure weathertightness and watertightness on the roof, without any cost to the building owner.
- D. Provide a twenty (20) year manufacturers watertightness warranty. The twenty (20) year weather tightness warranty must be issued to the Owner by the metal manufacturer, there will be no third party warranty permitted.

1.9 SINGLE SOURCE CONTRACTOR

- A. For Sections 07620, 07613, the project will require a single source roofing contractor. The single source contractor shall be responsible for all products and services and may use various suppliers and subcontractors for this work under their supervision.

PART 2 PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

- A. Englert, Inc. - Series 2000
- B. Merchant & Evans (2" zip lock)
- C. Morin - SWL

- D. Or approved substitution in accordance with Section 01600: Product Requirements.

2.2 SHEET MATERIALS

- A. Panel System should be:
1. Englert Series 2000, 1-3/4" x 14" Architectural Snap-Lock Standing Seam System with **pencil ribs**. The panels shall have baked on finish as specified.
 2. Manufacturers Standard Color:
Pre Weathered Galvalume (R 45.7, E .91, SI 53.1).
Final color selection to be determined by Architect.
- B. Substrate: .032 Aluminum Alloy 3105-H14 approved equal.
- C. Performance:
1. Panel shall meet the requirements of Underwriter's Laboratories, Inc. for Class 90 wind uplift resistance and 580 classification for 90 lb./sq. ft. uplift test.
 2. Air Infiltration/Water Penetration: No evidence of uncontrolled leakage on Snap-Lock Seam at 100 mph with simulated water spray of 8.8" of rainfall per hour.
 3. Panel shall display a flame spread classification of a (Class 1) when tested in accordance with ASTM E-84-87.
 4. Permacolor 2000 Finish (30 year Warranty: Englert's Permacolor coatings comprises of a .8 to .9 mil full strength 70% Kynar 500 fluorocarbon (Polyvinylidene Fluoride PVF2) coating over a urethane primer of .2 to .3 mil on the finish side, with primer and a wash coat on the reverse, on steel with just a wash coat on aluminum. Face film thickness 1.0 mil ± .2 mil.
 5. Film Thickness: Topside finish primer shall be .2 - .3 mil. Kynar 500 top coat shall be .8 - .9 mil. Reverse side finish shall be .2 - .3 mil primer with a wash coat. Total dry film thickness for the coating system shall be 1.00 mil nominal. All measurements per NCCA Technical Bulletin II-4 or ASTM D1005-84.
 6. Specular Gloss: As determined per ASTM D523-85 at a glossmeter angle of 60 degrees. 35% ± 5 specular reflectance.
 7. Humidity Resistance: No blistering, cracking, peeling, loss of gloss or softening of the finish after 3000 hours aluminum 1000 hours coated steel, of exposure at 100% humidity at 95 degrees F, per Federal Test Method Standard 141, Method 6201 or ASTM D2247-87.
 8. Salt Spray Resistance: Samples diagonally scored and subjected to 5% - at 95 degrees F, neutral salt spray per ASTM B117-85, then taped with Scotch #610 cellophane tape: 3000 hours aluminum/1000 hours coated steel, no blistering and no loss of adhesion greater than 1/8 from score line. (Samples taped one hour after removal from test cabinet).
 9. Chemical Resistance: No effect after 24 hour exposure of a 10% solution of hydrochloric acid, and 18-hour exposure to 20% sulfuric acid, per ASTM D1308-85, including exposure to 10% muriatic acid and nitric acid fumes.
 10. Chalking Resistance: No chalking greater than #8 rating, per ASTM D659-86 test procedure after a 3000-hour weatherometer test.
 11. Color Change: Finish coat color change shall not exceed 5 NBS units per ASTM D822-86, ASTM G23-88 and ASTM D2244-85 (South Florida 10-years) test procedure after 3000-hour weatherometer test.
 12. Abrasion Resistance: Shall pass 60 liters.mil., minimum of falling sand

per ASTM D968-81. Method A.

- D. Strippable film shall be applied to the top side of the painted coil to protect finish during fabrication, shipping and field handling. This strippable film must be removed before installation.

2.3 ACCESSORY MATERIALS

- A. Fasteners: Stainless steel with washers.
- B. In-seam sealant: Weathermaster Metal Roof Sealant
- C. Vinyl weatherseal insert.
- D. Clips: 050760R clip 2000 universal 18 gauge stainless steel
- E. Concealor profile clip fastener; carbon steel epoxy coated #2 square recessed; size to penetrate insulation and securely fasten to metal decking.

2.4 FABRICATION

- A. Panel Construction: Panels shall be uniformly dimensioned, roll formed to exact lengths to avoid trimming. The panel system shall be anchored as recommended by the Manufacturer. All fasteners shall be concealed. Panels shall be continuous from ridge to eaves with not end laps. There shall be no face penetration of panels.
- B. Flashing and Trim: All exposed standard or special flashing/trim and such other brake formed in the same gauge, color, and finish to match roofing panels, furnished with protective strippable film to be removed upon installation.
- C. Accessories such as clips, closures, fasteners, etc., shall be as recommended by the Manufacturer.
- D. All exposed adjacent flashing shall be of the same material and finish as the roof panels.
- E. Hem all exposed edges of flashing on underside, 1/2 inch.

2.5 STANDING SEAM PANEL

- A. 1-3/4" high vertical legs shall be spaced at 16" o.c. and shall have no exposed fasteners.
- B. Panels shall be site formed with Portable Roll Former in continuous lengths from ridge to eave or factory formed to 40' max.
- C. Continuous Rib panel shall be 1-3/4" in height. Rib shall be connected to substrate with panel clips and the clips attached with two (2) screw fasteners. Clips are to be spaced in accordance with submitted and approved engineer report.
- D. Vinyl Weatherseal to be factory installed over Continuous Snap Lock Standing Seam.
- E. Certification shall be submitted, based on independent testing laboratory,

indicating no measurable water penetration or air leakage through the system when tested in accordance with ASTM E-331-86 and E-283-84.

2.6 WEATHERPROOFING MEMBRANE

- A. Midstates Asphalt; Quick-Stick HT, 60mil thick, SBS modified self-adhering membrane reinforced with non woven fiber glass mat, composite underlayment, ASTM D1970 installed over entire roof on the polyisocyanurate insulation in accordance with manufacturer's recommendations.

2.7 ROOF INSULATION BENEATH METAL PANEL ROOFS:

- 2.7.1. Polyisocyanurate Roof Insulation – 2" Flat: ASTM C 1289 Type II such as Siplast Paratherm (JM: E'NERG'Y 3; S: Sopra-Iso) 4' x 8' maximum size for mechanical attachment. Six Fastener assemblies per 4'x8' board.
- 2.7.2. Provide Peel and Stick Underlayment over roof insulation same day as insulation is applied.

PART 3 EXECUTION

3.1 INSPECTION

- A. Verify substrate is uniform, even and symmetrical by running a string test. Inspect to assure that all purlins or substructure/framing members are flat and insulation is embedded symmetrically so when the metal panels are applied, they will not appear wavy or distorted.

- B. Prior To Installation

1. Inspect support members and anchorage to ensure that they have been installed in accordance with AISC Manual of Steel Construction "Code of Standard Practice" and meet the requirements of the roof panel manufacturer.
2. Ensure that the substrate is not out of plane and that there are not defects that may promote oil canning or prevent proper installation.
3. Inspect each panel prior to installation to ensure that there was no objectionable oilcanning induced during fabrication. If objectionable oilcanning is observed, notify the roof panel manufacturer promptly for evaluation and determination. Do not install questionable panels.
4. Inspect each panel to assure that the factory applied seam sealant is present in female rib, and complete from eave to ridge, end to end.
5. Install a 16 ga. Galvanized valley and ridge stiffener plate centered over the valley and ridge. Secure to the substrate metal decking with epoxy coated long life deck fasteners at 12" OC. Joggle the ridge stiffener up 3/8" to flush out with the plane of the roofing panels.

During Installation:

1. Continuously inspect installed panels for visible oilcanning and other imperfections during installation. If oilcanning is noticed, stop installation and promptly notify the roof panel manufacturer for evaluation and determination. If installed panels were acceptable prior to installation, oilcanning may be induced by substrate conditions. Unless thermally induced, oilcanning does not normally occur over time. If the substrate is not in tolerance, oilcanning will usually occur as the panels are installed.

3.2 INSTALLING SOLID SUPPORT

- A. Remove ice, frost, snow, and moisture from the steel roof deck and

broom clean all surfaces.

B. Lay single two (2) layers of rigid polyisocyanurate insulation boards over steel deck substrate and fasten to steel deck as recommended by the manufacturer to comply with their requirements. Stagger joints of boards off each layer 12" minimum end and side joints.

C. When required to achieve solid support for the edges of the boards, cut wood blocking boards neat and true so that edges of boards occur over the center of the steel deck flutes to provide full solid edge bearing for the boards.

D. Install no more solid support than will be covered with completed roof the same day, or at end of work day, or before arrival of inclement weather. Cover all materials before leaving the roof for more than 30 minutes. All support not covered at the end of the day shall be removed from the project site and replaced with new.

E. Install solid support with tightly butted joints and without deformation or damage to the materials. Recut boards as necessary to ensure that joints are tightly butted. Provide fill in any gap greater than ¼".

F. Do not use boards that are broken or crushed, have less than perfect edges, have holes or depressions or are less than half width.

G. Remove fasteners that do not penetrate the upper flange. Provide additional perimeter fastening as required by the manufacturer to meet specified wind uplift requirements.

H. Ensure that all edges of the boards are flush and that edges do not bounce or deflect when walked on after fasteners have been installed. Install additional fasteners to make all edges flush and eliminated bounce and deflection.

I. No fastener shall be closer than 6 inches to or 12 inches from the edge of the insulation.

J. Remove fasteners that are overdriven that have crushed the boards, or that have cupped the fastener disk and replace with properly driven fasteners. When a fastener has crushed a board, remove the board and install a new and true board.

K. Remove fasteners that extend below the edge of the bottom flute and replace with fasteners of proper length.

3.3 FLEXIBLE UNDERLAYMENT INSTALLATION

A. Install where underlayment over solid support according to the recommendations and instructions of the manufacturers of the roof panels and underlayment for the specified watertightness warranty. At minimum provide one roll width at eaves, rakes and ridges; and two roll widths lapped over centerline of valley conditions 2'.

B. Turn up vertical terminations as indicated on the Drawings.

C. Fold over roof edge at eaves and rakes and protect by metal gutter, trim or flashings.

D. Cover immediately with roof panels. Do not allow to be exposed to sunlight.

E. Do not install in temperatures below 40 deg. F.

F. Form 4-inch side laps and 6-inch end laps.

G. Remove all wrinkles and gaps so that underlayment lays smooth and even.

3.2 METAL ROOFING INSTALLATION:

- A. The metal panel system shall be installed plumb, level, and straight over a layer weatherproofing membrane.
- B. The standing seam shall be equidistant and shall align for corners, hips, valleys, mullions, and columns in accordance with architectural design parameters as shown on the drawings.
- C. Installation shall be made in accordance with manufacturer' recommended procedures and layout drawings. Manufacturers of construction Detail Handbook, SMACNA Architectural Sheet Metal Manual, NRCA Roofing and Waterproofing Manual and Handbook of Roofing Knowledge shall be used as guides and details whenever applicable. Because of various levels of each manufacturers and SMACNA , the Architect will accept only the most restrictive guide and it is at the discretion of the Architect.
- D. No face penetrations or perforation shall be made in metal panels by fasteners without architect's specific approval. All panels shall be continuous from ridge to eaves with no horizontal end laps.
- E. End lap all flashing and trim at least 3". All butt joints must be caulked. Soldered areas shall be counter flashed or painted to match. All valleys shall be treated with a layer of Ice and Watershield spread out at least 24" each side from the center of the valley, on both sides, before applying valley flashing. End lap at least 6" at joints.
- F. Exercise proper care during installation to avoid damage or scratching of the panels. Avoid walking over the metal roof after installation is completed.
- G. Comply with manufacturers standard instructions and conform to standards set forth in the Architectural Sheet Metal Manual published by SMACNA, in order to achieve a watertight installation.
- H. Install panels in such a manner that horizontal lines are true and level and vertical lines are plumb.
- I. Install starter and edge trim before installing roof panels.
- J. Remove protective strippable film prior to installation of roof panels.
- K. Attach panels using manufacturer's standard clips and fasteners, spaced in accordance with approved shop drawings.
- L. Install sealants for preformed roofing panels as approved on shop drawings.
- M. Do not allow panels or trim to come into contact with dissimilar materials.
- N. Do not allow traffic on completed roof. If required, provide cushioned walk boards.
- O. Protect installed roof panels and trim from damage caused by adjacent construction until completion of installation.
- P. Remove and replace any panels or components which are damaged beyond successful repair.

- Q. All ridge and flashing shall be attached with long life fasteners at 6" oc. The Z closure requires a minimum of 4 fasteners per panel on 1" inch butyl tape that is separating the Z closure and the panel pan.

3.3 CLEANING

- A. Clean any grease, finger marks, or stains from the panels per manufacturer's recommendations.
- B. Remove all scrap and construction debris from the site.

3.4 FIELD QUALITY CONTROL

- A. Section 01400 - Quality Requirements and 01700 - Execution Requirements: Field inspecting, testing, adjusting, and balancing.
- B. Inspection will involve surveillance of Work by third party inspector during installation to ascertain compliance with specified requirements.
- C. Owner will provide third party roofing inspections during the work. See Section 01200 Price and Payment Procedures: Allowances. Such inspections may be daily or periodic. Inspector to be Shepard & Associates, LLC.
- D. Contractor Responsibilities: Unless otherwise indicated, provide quality control inspections with Contractor's own work force. Repair or replace non-conforming work.
- E. Associated Services: Co-operate with Owner's Inspectors and Agencies performing inspections, and similar quality control services, and provide reasonable auxiliary services as requested by such parties. Provide the following minimum assistance:
 - 1. Access to the work
 - 2. Incidental labor and materials to facilitate the inspections and testing as may be deemed appropriate.

END OF SECTION 07613

SECTION 07620

FLASHING AND SHEET METAL

PART 1 GENERAL

1.1 WORK INCLUDED

1.1.1 Fabrication and installation of new metal edge trim.

1.1.2 Fabrication and installation of new metal hot vent stack flashing.

1.2 RELATED WORK SPECIFIED ELSEWHERE

1.2.1 Rough Carpentry – Section 06100

1.2.2 Thermoplastic Membrane Roofing – Section 07540

1.2.3 Sealants & Caulking – Section 07920

1.3 QUALITY ASSURANCE

1.3.1 Qualifications of the Manufacturer: Products used in the work of this section shall be produced by manufacturers regularly engaged in the manufacture of similar items and with a history of successful production acceptable to the Consultant.

1.3.2 Qualifications of the Installers: Use adequate numbers of skilled workmen who are thoroughly trained and experienced in the necessary crafts and are completely familiar with the specified requirements and the methods needed for the proper performance of the work in this section.

1.4 SHOP DRAWINGS

1.4.1 Submit shop drawings for all metal component shapes in accordance with specifications.

1.4.2 Indicate material profile, jointing pattern, jointing details, fastening methods, and installation details.

1.5 SUBMITTALS

1.5.1 Refer to Shop drawings, Product Data and Samples - SECTION 01340

1.6 STORAGE AND HANDLING

1.6.1 Store materials dry in accordance with Specifications.

1.6.2 Stack material to prevent twisting, bending, or abrasion.

1.6.3 During storage prevent material contact with any substance that would discolor or stain, including soil and water.

1.7 SCHEDULING

1.7.1 All new sheet metal work shall be closely coordinated with the installation of the new roofing membrane such that roofing membrane terminations will not be left unprotected by metal.

1.7.2 New sheet metal components shall be installed directly after roofing work such that roofing membrane terminations will not be left unprotected by metal.

1.7.3 Immediately after installation of new sheet metal work install all bituminous flashings such that moisture is not trapped under new metal components.

1.8 GUARANTEE

1.8.1 All new materials and workmanship covering work provided under this section of the specifications shall be guaranteed in writing by the contractor to maintain all sheet metal flashing in a watertight condition without cost to the Owner for a period of two (2) years after date of final completion.

PART 2 PRODUCTS

2.1 SHEET METAL MATERIAL

2.1.1 Termination Bar: Shall be Aluminum Alloy 6061-T6, 1/8 inch x 1 1/4 inch. Fasteners for termination bar at masonry shall be stainless steel Rawl LITE SPIKE 3/16 inch by 1-1/2 inches with EPDM washers.

2.1.2 Pre-Finished Sheet Metal: Shall be formed from minimum 24 gauge pre-finished galvalume sheets conforming to ASTM A-792, AZ50 or greater and Kynar 500/Hylar 5000 fluorocarbon coating applied in two steps, with protective film to be removed after coating installation. Pre-finished sheets shall be as manufactured by Metal Roofing Systems, Inc., or approved equal such as Vincent Metals.

2.1.3 Sheet Metal: Shall be formed from minimum 22 gauge galvalume plus sheets conforming to ASTM A-792, AZ50 or greater. Note: Divorce from any preservative treated lumber with at a minimum one layer of 15 lb. asphalt saturated felt.

2.1.4 Stainless steel: 24 gage, Type 302/304 Mill Rolled Finish No.2D or 2B, Conforming to ASTM A167, Federal Specification QQ-S-766C.

1.8.2 Solder for Stainless Steel: Solder joints with stainless steel type flux, 50/50 solder, neutralize flux after soldering.

2.1.5 METAL COMPONENT WEIGHT & FINISH SUMMARY:

2.1.5.1	Metal Edge Trim	24 ga. pre-finished galvalume
2.1.5.2	Locking Cleat	22 ga. galvalume
2.1.5.3	Counter Flashing	24 ga. pre-finished galvalume
2.1.5.4	Hot Vent Stack Flashing	24 ga. Stainless Steel
2.1.5.5	Hot Vent Stack Bonnet	24 ga. Stainless Steel
2.1.5.6	Overflow Scupper Liner	24 ga. Stainless Steel
2.1.5.7	Scupper Outside Closure	24 ga. pre-finished galvalume
2.1.5.8	Expansion Joint Flange	24 ga. pre-finished galvalume
2.1.5.9	Expansion Joint Cap	24 ga. pre-finished galvalume
2.1.5.10	Gutter	24 ga. pre-finished galvalume
2.1.5.11	Gutter bracket	1" x ³ / ₁₆ " aluminum flat bar
2.1.5.12	Gutter spacer	¹ / ₈ " x 1" aluminum flat bar
2.1.5.13	Downspout	24 ga. pre-finished galvalume
2.1.5.14	Downspout Strap	1/8" x 1-1/2" flat alum. bar
2.1.5.15	Metal eave trim	24 ga. pre-finished galvalume
2.1.5.16	Rake trim	24 ga. pre-finished galvalume
2.1.5.17	Apron Flashing	24 ga. pre-finished galvalume

2.2 ACCESSORY MATERIALS

- 2.2.1 All clamps, straps and supports to be stainless steel.
- 2.2.2 Nails: Shall be hot-dipped galvanized or stainless steel ring shank nails, size as required by construction.
- 2.2.3 Metal to Metal Screws: Shall be ITW Buildex SCOTS stainless steel 12-14x1" (Part No. 1165209) with bonded washer.

- 2.2.4 Wood to Metal Screws: Shall be ITW Buildex TRAXX™ Climacoat™ flat head 12-24X2 ½" (part No. 1094000).
- 2.2.5 Caulking: Sealant shall be Sikaflex - 1a, manufactured by Sika Corporation; Chem-Calk 900, manufactured by Bostik, Inc.; or Sonolastic NP-1, manufactured by Sonneborn Building Products or approval equal. Color shall be selected by Owner.
- 2.2.6 CLEANER: For Sikaflex 1a, cleaner shall be Xylol, Toluol, Methly ethyl ketone or commercial solvent recommended by the sealant manufacturer.
- 2.2.7 PRIMER: Shall be as recommended by sealant manufacturer.
- 2.2.8 Flexible Vinyl Flashing: Shall be 20 mil PVC, width as required, such as that manufactured by BMCA, a division of GAF.

PART 3 EXECUTION

3.1 INSPECTION

- 3.1.1 Inspect all surfaces to which metal is to be applied to verify they are clean, smooth, free of depressions, waves, or projections and have solidly supported joints. Do not install metal unless surfaces are even, sound, clean, dry and free from defects that might affect the application of the new material.

3.2 REMOVAL

- 3.2.1 Reroofing Removals & Preparations – Section 07591

3.3 FABRICATION AND INSTALLATION

- 3.3.1 All Sheet Metal Requirements and Details are referenced to SMACNA Architectural Sheet Metal Manual, Seventh Edition.
- 3.3.2 Install shop formed metal edge trim and counter flashings in 10 foot lengths, maximum, with a minimum number of pieces for each straight run. Adjust joint spacing so that no metal fabrication less than 5' in length is required.
- 3.3.3 Form sections square, true, and accurate to size, free from distortion, sharp edges, and other defects detrimental to appearance or performance.
- 3.3.4 Junctures, intersections, corners, and unions of sheet metal fabrications shall be formed with 18-inch legs.
- 3.3.5 Dissimilar metals shall be kept separated to prevent galvanic action. Preventative measures shall include separation by suitable electrolysis breaking material.
- 3.3.6 Separate any aluminum components from preservative treated lumber with a minimum divorcing layer of 15 lb. asphalt saturated building felt. NEVER USE

ALUMINUM FASTENERS IN PRESERVATIVE TREATED LUMBER.

- 3.3.7 All metal flanges shall be installed on top of membrane in accordance with membrane manufacturer's written installation instructions.
 - 3.3.8 Flash in metal flanges per roofing system manufacturer's written recommendations unless in conflict with contract documents and/or detail drawings. Resolve any conflict with Architect, prior to installation of stripping plies.
 - 3.3.9 Install metal to be water and weather tight with lines, arises, and angles sharp and true with plane surfaces free of waves or buckles.
 - 3.3.10 All exposed edges of sheet metal shall be folded back, or hemmed, on concealed surfaces (minimum 1/2").
 - 3.3.11 All hemmed edges to be engaged in locking cleats shall have 3/4" hem with a folded back return of 5/8". Hem angle maximum 30°. Reference SMACNA Architectural Sheet Metal Manual (Seventh Edition) Figure 2-1 Detail 1.
 - 3.3.12 All locking cleats to be one gauge heavier than metal fabrication being secured by the cleat.
- 3.4 FABRICATION AND INSTALLATION OF NEW METAL EDGE TRIM.
- 3.4.1 Form metal edge trim in accordance with project drawings and SMACNA Architectural Sheet Metal Manual (Seventh Edition) Figure 2-1B and Figure 2-1 Detail 1 and the Basic Flange Nailing Pattern.
 - 3.4.2 Attach new continuous metal locking cleat to existing and new wood blocking with fasteners spaced 6" O.C.
 - 3.4.3 Continuously engage formed edge with the new continuous metal locking cleat as shown on the drawings and attach to the wood decking with fasteners spaced at 3" o.c. staggered.
 - 3.4.4 Set metal edge fascia over membrane. Metal flange edge shall be fastened through membrane with fasteners at 3" O.C. staggered.
 - 3.4.5 Strip flange with membrane and heat weld flange to field membrane sheet.
 - 3.4.6 Provide cut edge sealant at edge of TPO stripping membrane.
- 3.5 FABRICATION AND INSTALLATION OF NEW METAL COUNTER FLASHING.
- 3.5.1 Cut existing metal counter flashing, leaving approximately 1-1/4" to attach new metal counterflashing.

- 3.5.2 Form and install new counter flashing metal with lap in joints a minimum of 3 inches and lock joint lap. Notch and lap counter flashing sections a minimum of 3 inches.
 - 3.5.3 Form new counter flashings with a return to face of curbs or walls so that bottom of counter flashing lays tight against the wall or curb.
 - 3.5.4 Fasten counter flashing to lip of existing trimmed flashing receiver with stainless steel screws, spaced at 12" centers.
 - 3.5.5 At equipment curbs, form counter flashings with a minimum 1-½" flange that rests on top of the curb and secure to the top of the curb with roofing nails spaced at 6" O.C.
- 3.6 FABRICATION AND INSTALLATION OF NEW METAL HOT VENT STACK FLASHING.
- 3.6.1 Fabricate and install new stainless steel metal flashings for hot pipes penetrating the roof.
 - 3.6.2 Fabricate with a ½" hem at the top edge.
 - 3.6.3 Fabricate in 2 pieces, if necessary. Seam and solder all metal joints.
 - 3.6.4 Seal all openings in deck around roof penetration to prevent leakage of fill materials into building. Hold new wood blocking installed beneath roof flange a minimum of 2" away from double wall stacks and fill void between blocking and pipe sleeve with non-combustible filler.
 - 3.6.5 Set flange over field membrane sheet and secure to wood blocking with suitable fasteners placed near each corner and at the center of each side.
 - 3.6.6 Strip flange with membrane and heat weld flange to field membrane sheet. Fit membrane snugly to the vertical flange.
 - 3.6.7 Provide cut edge sealant at edge of TPO stripping membrane.
 - 3.6.8 Install bonnet flashing extending outside and below the perimeter edge of the pan.
- 3.7 FABRICATION AND INSTALLATION OF NEW METAL GUTTER AND DOWNSPOUTS.
- 3.7.1 Install new gutters at eaves as specified below. Refer to SMACNA Architectural Sheet Metal Manual Figure 1-2, Style F.
 - 3.7.2 Size of gutters to be 6 inches wide by 5 inches deep. Downspouts shall be 4" x 6".
 - 3.7.3 Gutter expansion joints: Shall be fabricated and installed in accordance with SMACNA. Figure 1-7, Butt Type gutter expansion joint with cover plates.

- 3.7.4 Provide aluminum gutter brackets sized 1" x $\frac{3}{16}$ " spaced 3'-0" O.C. Refer to SMACNA Architectural Sheet Metal Manual Figure 1-13A.
- 3.7.4.1 Wrap aluminum gutter brackets on the three exposed sides with pre-finished galvalume, color to match the gutter. Powder coated aluminum brackets may be used with prior approval by the Architect.
- 3.7.5 Provide aluminum gutter spacers sized at 1" x $\frac{1}{8}$ " spaced 3'-0" O.C. Refer to SMACNA Architectural Sheet Metal Manual Figure 1-13A.
- 3.7.6 Downspout straps shall be fabricated in accordance with SMACNA Figure 1-35J. Form downspout straps from 1/8" x 1-1/2" aluminum flat bar, spaced at +/- 5 feet.
- 3.7.6.1 Wrap aluminum downspout straps on the three exposed sides with pre-finished galvalume, color to match the gutter. Powder coated downspout straps may be used with prior approval by the Architect.
- 3.7.7 Apply sealant between flat surface of downspout straps and walls prior to securing.
- 3.8 FABRICATION AND INSTALLATION OF NEW METAL EAVE TRIM.
- 3.8.1 Form and install new metal eave trim in accordance with project drawings.
- 3.8.2 Prior to eave trim installation, install new self-adhering underlayment on existing substrate and overlapping the back wall of the new gutter by 2" minimum.
- 3.8.3 After the installation of the new gutter, install new metal eave trim extending approximately 1.5" into the new gutter.
- 3.8.4 Fasten the new metal eave trim to the substrate decking with fasteners spaced 6" O.C., staggered.
- 3.8.5 Strip in new metal eave trim with self-adhering underlayment.
- 3.9 FABRICATION AND INSTALLATION OF NEW METAL RAKE TRIM.
- 3.9.1 Form and install new pre-finished metal rake trim in accordance with Project Drawings.
- 3.9.2 Attach new rake clip to existing wood deck with fasteners spaced according to the metal roof manufacturer's written instruction.
- 3.9.3 Install a continuous strip of tri-bead butyl tape sealant to the top of the new rake clip prior to installation of the rake flashing.
- 3.9.4 Attach new continuous metal locking cleat to existing and new wood blocking with

fasteners spaced 6" O.C.

- 3.9.5 Engage the hemmed edge of the rake flashing onto the outside edge of the new metal locking cleat and new rake clip.
- 3.9.6 Attach the new metal rake flashing to the new rake clip with long life fasteners spaced at 6" O.C. Do not secure rake flashing fastener through the vertical leg of the metal roof panel.
- 3.9.7 inside the flashing laps.

END OF SECTION 07620

SECTION 07840
FIRESTOPPING

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Fireproof firestopping and fire safing materials and accessories.

1.2 RELATED SECTIONS

- A. Section 01039 - Coordination and Meetings: Cutting and patching.
- B. Section 09260 - Gypsum Board Systems: Gypsum wallboard fireproofing.
- C. Division 15: Mechanical: Mechanical work requiring firestopping.
- D. Division 16: Electrical: Electrical General Requirements: Electrical work requiring firestopping.

1.3 REFERENCES

- A. ASTM E84 - Test Method for Surface Burning Characteristics of Building Materials.
- B. ASTM E119 - Method for Fire Tests of Building Construction and Materials.
- C. ASTM E814 - Test Method of Fire Tests of Through Penetration Firestops.
- D. Standard Building Code.

1.4 PERFORMANCE REQUIREMENTS

- A. Fireproofing Materials: ASTM E119 and ASTM E814 to achieve a fire rating as noted on Drawings unless specified otherwise. Provide materials and insulation identical with assemblies which have been tested and defined in publications by recognized rating authorities for fire resistance rating authorities for fire resistance rating indicated.
 - 1. Comply with the applicable design numbers of the "Fire Resistance Directory" by UL.

1.5 SUBMITTALS

- A. Submit under provisions of Section 01300.
- B. Product Data: Provide data on product characteristics, performance and limitation criteria.
- C. Manufacturer's Installation Instructions: Indicate preparation and installation instructions.
- D. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.

1.6 QUALITY ASSURANCE

- A. Through Penetration Firestopping of Fire Rated Assemblies: ASTM E814 with 0.10 inch water gage minimum positive pressure differential to achieve fire F-Ratings and temperature T-Ratings as indicated on Drawings, but not less than 1-hour.
 - 1. Wall Penetrations: Fire F-Ratings as indicated on Drawings, but not less than 1-hour.
 - 2. Floor and Roof Penetrations: Fire F-Ratings and temperature T-Ratings as indicated on Drawings, but not less than 1-hour.
 - a. Floor Penetrations Within Wall Cavities: T-Rating is not required.
- B. Through Penetration Firestopping of Non-Fire Rated Floor and Roof Assemblies: Materials to resist free passage of flame and products of combustion.
 - 1. Noncombustible Penetrating Items: Noncombustible materials for penetrating items connecting maximum of three stories.
 - 1. Penetrating Items: Materials approved by authorities having jurisdiction for penetrating items connecting maximum of two stories.
- C. Fire Resistant Joints in Fire Rated Floor, Roof, and Wall Assemblies: E1966 to achieve fire resistant rating as indicated on Drawings for assembly in which joint is installed.
- B. Fire Resistant Joints Between Floor Slabs and Exterior Walls: ASTM E119 with 0.10 inch water gage minimum positive pressure differential to achieve fire resistant rating as indicated on Drawings for floor assembly.
- C. Surface Burning Characteristics: Maximum 25/450 flame spread/smoke developed index when tested in accordance with ASTM E84.
- D. Perform Work in accordance with State of South Carolina standards.
- E. Maintain one (1) copy of each document on site.

1.7 QUALIFICATIONS

- A. Manufacturer: Company specializing in manufacturing the products specified in this Section with minimum three years experience.
- B. Applicator: Company specializing in performing the work of this Section with minimum three years experience approved by manufacturer.

1.8 REGULATORY REQUIREMENTS

- A. Conform to applicable South Carolina Building Code for fire resistance ratings and surface burning characteristics.

1.9 ENVIRONMENTAL REQUIREMENTS

- A. Do not apply materials when temperature of substrate material and ambient air is below 60 degrees F.
- B. Maintain this minimum temperature before, during, and for 3 days after

installation of materials.

- C. Provide ventilation in areas to receive solvent cured materials.

1.10 SEQUENCING

- A. Sequence Work under the provisions of Section 01039.
- B. Sequence Work to permit firestopping materials to be installed after adjacent and surrounding work is complete.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Dow Corning Corporation.
- B. Substitutions: Under provisions of Section 01600, and A701 and Article 9 of Instruction to Bidders.

2.2 MATERIALS

- A. Compatibility: Before selection and purchase of each specified firestopping, investigate its compatibility with joint surfaces. Joint fillers, and other materials in joint system.
- B. Each Firestop System installation shall bear the same fire ratings as the partition penetrated.
- C. The following items D, E and F are principal items only. Contractor is to comply with U.L. requirements for any and all penetrations through rated construction.
- D. At un-insulated steel pipe, conduit or ducts provide one of the following:
 - 1. Fire Barrier CP25 N/S Caulk; 3M.
 - 2. Metal Caulk 835: Rector Seal.
 - 3. Firestop foam and Firestop sealant; Dow Corning corp.
- E. At insulation and un-insulated plastic pipe and insulated steel pipe, conduit or ducts, provide one the following:
 - 1. Fire barrier FS-195 with CP Caulk or MP Moldable Putty; 3M.
 - 2. Metal Caulk 950/880: Rector Seal.
 - 3. Fire stop wrap strip 2002; Dow Corning.
- F. Where fire rated partitions abut underside of steel decks, beams, or concrete decks and/or slabs, provide one of the following:
 - 1. Fire Stop Sealant; Dow Corning.
 - 2. Fire-SIL; Tremco.
 - 3. CS240 Firestop Sealant: Hilti Construction Chemicals.

2.3 ACCESSORIES

- A. Provide metal and/or wire mesh sleeves, retaining collars, backing materials including mineral wool and other components required for Firestop system used.
- B. Retainers: Compatible clips to support mineral fiber matting.

- C. Dam material: mineral fiberboard, removable.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify site conditions under provisions of Section 01039.
- B. Verify that openings are ready to receive the work of this Section.

3.2 PREPARATION

- A. Clean substrate surfaces of dirt, dust, grease, oil, loose material, or other matter which may effect bond of firestopping material, immediately before installation.
- B. Remove incompatible materials which affect bond.
- C. Install backing materials to arrest liquid material leakage.

3.3 APPLICATION

- A. Apply primer and materials in accordance with manufacturer's instructions.
- B. Apply firestopping material and intumescent wrap in sufficient thickness to achieve rating to uniform density and texture.
- C. Install material at walls or partition openings which contain penetrating sleeves, piping, ductwork, conduit and other items requiring firestopping.
- D. Remove dam material after firestopping material has cured.
- E. Where fire rated partitions abut underside of steel, firmly pack mineral wool (min 4 PLF density) into space between top of partition and underside of steel allowing 1/2" depth on each face of partition for fire resistive firestop. Provide materials and installation in conformance with assembly that has been tested and defined in publications by testing agency, if available.
- F. Do not allow sealants or compounds to overflow or spill onto adjoining surfaces, or to migrate into voids of adjoining surface including rough textures. Use masking tape or other precautionary devices to prevent staining on adjoining surfaces, by either primer/sealer or the sealant.

3.4 CLEANING

- A. Clean Work under provisions of Section 01500.
- B. Clean adjacent surfaces of firestopping materials and remove excess and spillage of compounds promptly as work progresses. Clean adjoining surfaces without damage to adjoining surfaces to eliminate evidence of spillage.

3.5 PROTECTION OF FINISHED WORK

- A. Protect finished Work under provisions of Section 01500.
- B. Protect adjacent surfaces from damage by material installation.

END OF SECTION 07840

SECTION 07900
JOINT SEALERS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Preparing sealant substrate surfaces.
- B. Sealant and backing.

1.2 RELATED SECTIONS

- A. Section 03300 - Cast-In-Place Concrete: Sealants used in conjunction with cast in place concrete.
- B. Section 04810 - Unit Masonry Systems: Sealants required in conjunction with masonry.
- C. Section 06200 - Finish Carpentry: Sealants used in conjunction with siding and trim.
- D. Section 07840 - Firestopping: Sealants used in conjunction with firestopping.
- E. Section 07620 - Sheet Metal Flashing and Trim: Sealants used in conjunction with metal flashings.
- F. Section 08112 - Standard Steel Frames: Sealants used in conjunction with door frames.

1.3 REFERENCES

- A. ANSI/ASTM D1056 - Flexible Cellular Materials - Sponge or Expanded Rubber.
- B. ANSI/ASTM D1565 - Flexible Cellular Materials - Vinyl Chloride Polymers and Copolymers (Open-Cell Foam).
- C. ASTM C790 - Use of Latex Sealing Compounds.
- D. ASTM C804 - Use of Solvent-Release Type Sealants.
- E. ASTM C834 - Latex Sealing Compounds.
- F. FS TT-C-00598 - Caulking Compound, Oil and Resin Base Type.
- G. FS TT-S-001657 - Sealing Compound, Single Component, Butyl Rubber Based, solvent Release Type.
- H. FS TT-S-00227 - Sealing Compound: Elastomeric Type, Multi-Component.
- I. FS TT-S-00230 - Sealing Compound: Elastomeric Type, Single Component.
- J. FS TT-S-001543 - Sealing Compound, Silicone Rubber Base.

- K. SWI (Sealing and Waterproofers Institute) - Sealant and Caulking Guide Specification.

1.4 SUBMITTALS

- A. Section 01330 - Submittal Procedures: Submittal procedures.
- B. Products Data: Submit data indicating sealant chemical characteristics, performance criteria, substrate preparation, limitations, and color availability. Color to match mortar color.
- C. Manufacturer's Installation Instructions: Submit special procedures, surface preparation, and perimeter conditions requiring special attention under provisions of 01330.
- D. Submit manufacturer's certificate under provisions of Section 01400 that products meet or exceed specified requirements.

1.5 QUALITY ASSURANCE

- A. Manufacturer: Company specializing in manufacturing the products specified in this Section with minimum three years experience.
- B. Applicator: Company specializing in applying the work of this Section with minimum three years experience.
- C. Conform to Sealant and Waterproofers Institute requirements for materials and installation.
- D. Before selection and purchase of each specified sealant investigate its compatibility with joint surfaces, joint fillers, and other material in joint system. Provide any materials which are known to be fully compatible with ASTM installation conditions.
- E. Maintain one copy of each referenced document covering installation requirements on site.

1.6 FIELD SAMPLES

- A. Provide samples under provisions of Section 01330.
- B. Construct field sample panel, 1-1/2 feet long, illustrating sealant type, color, and tooled surface.
- C. Locate where directed.
- D. Accepted sample may not remain as part of the Work.

1.7 ENVIRONMENTAL REQUIREMENTS

- A. Do not install solvent curing sealants in enclosed building spaces.
- B. Maintain temperature and humidity recommended by the sealant manufacturer during and after installation.

- C. Section 01600 - Product Requirements.
- D. Maintain temperature and humidity recommended by sealant manufacturer during and after installation.

1.8 SEQUENCING AND SCHEDULING

- A. Coordinate work under provisions of Section 01100.
- B. Coordinate the work of this Section with all Sections referencing this Section.

1.9 WARRANTY

- A. Provide three year warranty under provisions of Section 01700.
- B. Warranty: Include coverage of installed sealants and accessories which fail to achieve air tight and watertight seal, exhibit loss of adhesion or cohesion, or do not cure.

PART 2 PRODUCTS

2.1 SEALANTS

- A. Acrylic Latex (Type A): ASTM C920, Grade NS, Class 12-1/2, Use NT; single component, solvent curing, non-staining, non-bleeding, non-sagging; color as selected.
- B. Butyl Sealant (Type B): ASTM C920, single component, solvent release, non-skinning, non-sagging, black color.
- C. Polyurethane Sealant (Type C): ASTM C920, Type S, Grade NS, Class 25, Use T; multi-component, chemical curing, non-staining, non-bleeding, capable of continuous water immersion, self-leveling type; white color.
- D. Polyurethane Sealant (Type D): ASTM C920, Type M, Grade P, Class 25, Use T; multi-component, chemical curing, non-staining, non-bleeding, capable of continuous water immersion, self-leveling type; white color.
- E. Acetoxy Silicone Sealant (Type E): ASTM C920, Grade NS, Class 25, Use G; single component, solvent curing, non-sagging, non-staining, fungus resistant, non-bleeding; color.
- F. Polyurethane Sealant (Type F): Single component, chemical curing, non-staining, non-bleeding, capable of continuous water immersion, non-sagging, self-leveling type; color as selected; Chem-Caulk 500 manufactured by Bostik.

Elongation Capability	25 percent
Service Temperature Range	-40 to 180 degrees F
Shore A Hardness Range	20 to 35
- G. At FRP Panels: Provide sealant compatible with manufacturer's recommendations.
- H. Security: Sealant high strength, pick resistant by Sika Corp.

2.2 ACCESSORIES

- A. Primer: Non-staining type, recommended by sealant manufacturer to suit application.
- B. Joint Cleaner: Non-corrosive and non-staining type, recommended by sealant manufacturer; compatible with joint forming materials.
- C. Joint Backing: ANSI/ASTM D1056; round, closed cell polyethylene foam rod; oversized 30 to 50 percent larger than joint width.
- D. Bond Breaker: Pressure sensitive tape recommended by sealant manufacturer to suit application.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Section 01300 - Administrative Requirements: Coordination and project conditions.
- B. Verify substrate surfaces and joint openings are ready to receive work.
- C. Verify joint backing and release tapes are compatible with sealant.

3.2 PREPARATION

- A. Remove loose materials and foreign matter impairing adhesion of sealant.
- B. Clean and prime joints.
- C. Perform preparation in accordance with ASTM C804 for solvent release sealants.
- D. Protect elements surrounding Work of this section from damage or disfiguration.

3.3 INSTALLATION

- A. Perform installation in accordance with ASTM C804 for solvent release sealants.
- B. Measure joint dimensions and size materials to achieve required width/depth ratios.
- C. Install joint backing to achieve a neck dimension no greater than 1/3 the joint width.
- D. Install bond breaker where joint backing is not used.
- E. Apply sealant within recommended application temperature ranges. Consult manufacturer when sealant cannot be applied within these temperature ranges.
- F. Install sealant free of air pockets, foreign embedded matter, ridges, and sags.
- G. Apply sealant within recommended application temperature ranges. Consult manufacturer when sealant cannot be applied within these temperature ranges.

H. Tool joints concave.

3.4 CLEANING

A. Section 01700 - Execution Requirements: Final cleaning.

B. Clean adjacent soiled surfaces.

3.5 PROTECTION OF INSTALLED CONSTRUCTION

A. Section 01700 - Execution Requirements: Protecting installed construction.

B. Protect sealants until cured.

3.6 SCHEDULE

<u>Location</u>	<u>Type</u>
Window perimeter, exterior, interior	F
Door Frame/Walls, exterior	C
Door Frame/Walls, interior	A
Under Thresholds	B
Ceramic Tile	E
Concrete Joints	D
Other exterior joints	C
Other interior joints	A
Fiber Cement Siding & Trim	E or C

END OF SECTION 07900

SECTION 08111
STANDARD STEEL DOORS AND FRAMES
Allowance

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Non-rated and fire rated steel doors and frames - KD "Knockdown" frames.
- B. **Allowances: Include under provisions of Section 01200 - Price and Payment Procedures.**
The General Contractor shall allow the sum of as indicated in Section 01200 for the furnishing and installation of sheet carpet. This sum does not include the overhead and profit of the General Contractor. The Architect reserves the right to assign a contract, or purchase order, to the General Contractor. The General Contractor **shall not issue a contract** on the allowance without the prior approval of the Architect.

1.2 RELATED SECTIONS

- A. Section 08211 – Wood Doors.
- B. Section 08712 - Door Hardware
- C. Section 08800 – Glazing: Glazing of Doors.
- D. Section 09900 – Painting: Field Painting of Door

1.3 REFERENCES

- A. ANSI A117.1 and ADA - Specifications for Making Buildings and Facilities Accessible to and Usable by Physically Handicapped People.
- B. ANSI/SDI-100 - Standard Steel Doors and Frames.
- C. ASTM A525 - Steel Sheet, Zinc-Coated (Galvanized) by the Hot-Dip Process.
- D. ASTM E152 - Methods of Fire Tests of Door Assemblies.
- E. Door Hardware Institute (DHI) - The Installation of Commercial Steel Doors and Steel Frames, Insulated Steel Doors in Wood Frames and Builder's Hardware.
- F. NFPA 80 - Fire Doors and Windows.

1.4 SUBMITTALS

- A. Shop Drawings: Indicate door elevations, internal reinforcement, closure method, and cut-outs for louvers, and finish.
- B. Product Data: Indicate door configurations, location of cut-outs for hardware reinforcement.

- C. Manufacturer's Installation Instructions: Indicate special installation instructions.

1.5 QUALITY ASSURANCE

- A. Perform Work in accordance with ANSI A250.8.
- B. Fire Rated Door Construction: Conform to NFPA 252.
- C. Fire Rated Door Construction: Conform to one of the following:
 - 1. NFPA 252; with neutral pressure level at 40 inches maximum above sill at 5 minutes into test.
 - 2. UL 10C.
 - 3. 20-Minute Fire Rated Corridor Doors: Fire tested without hose stream test.
- D. Fire Rated Door Construction: Conform to UBC Standard 7-2.
- E. Fire Rated Stair Doors: Rate of rise of 450 degrees F across door thickness.
- F. Installed Fire Rated Door Assembly: Conform to NFPA 80 for fire rated class as indicated on Drawings.
- G. Smoke and Draft Control Doors: Tested in accordance with UL 1784.
 - 1. Air Leakage: Maximum 3.0 cfm/sf of door opening with 0.10 inch water gage pressure differential.
- H. Attach label from agency approved by authority having jurisdiction to identify each fire rated door.
 - 1. Indicate temperature rise rating for stair doors.
 - 2. Attach smoke label to smoke and draft control doors.
- I. Surface Burning Characteristics:
 - 1. Foam Insulation: Maximum 75/450 flame spread/smoke developed index when tested in accordance with ASTM E84, NFPA 25.
- J. Apply label from agency approved by authority having jurisdiction to identify each foam plastic insulation board.
- K. Perform Work in accordance with State of South Carolina standards.
- L. Maintain one (1) copy of each document on site.

1.8 DELIVERY, STORAGE, AND HANDLING

- A. Protect doors with resilient packaging sealed with heat shrunk plastic.

1.9 FIELD MEASUREMENTS

- A. Verify that field measurements are as indicated on shop drawings.

1.10 COORDINATION

- A. Coordinate the work with door opening construction, door frame and door hardware installation.

1.11 REGULATORY REQUIREMENTS

- A. Conform to applicable code for fire rated frames and doors.

1.12 SINGLE SOURCE CONTRACTOR

- A. For Sections 08111 and 08212, the project will require a single source supplier. The single source supplier shall be responsible for all products and services and may use various suppliers for this work under their supervision.

PART 2 PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS: DOOR AND FRAMES

- A. Amweld Building Products
- B. Curries Manufacturing, Inc.
- C. Steelcraft Manufacturing Company.
- D. Ceco Corporation.
- E. Republic Builders Products.

2.02 DOORS AND PANELS

- A. Exterior Doors: SDI-100(1985), Grade II, Model 1- Galvaneal 1-3¼" Level B.

2.03 DOOR CONSTRUCTION AND FRAME CONSTRUCTION

- A. Face: Steel sheet in accordance with ANSI/SDI-100.
- B. Core: Impregnated cardboard honeycomb.
- C. Interior and Exterior; 16 gauge thick material core thickness. To suit grade and model of door. Frames types as "knock down" frames to accommodate wall thickness. All frames to have rubber silencers with minimum three (3) anchors per jamb, six (6) per frame, welded and ground smooth, with 2 bottom spreaders all with 18 gauge floor anchors, unless otherwise noted.
- D. Full glass door with frame that is flush with door facing.

2.04 ACCESSORIES

- A. Primer: Zinc chromate type.
- B. Bituminous: Fibered asphalt emulsion.
- C. Rubber silencers: Resilient rubber.
- D. Removable Glazing Stops: Rolled steel channel shape, mitered corners.; prepared for countersink screws.

2.05 FABRICATION

- A. Fabricate doors with hardware reinforcement welded in place.
- B. Attach fire rated label to each door unit.
- C. Close top and bottom edge of exterior doors with flush end closure. Seal joints watertight.
- D. Standard reinforcement for hardware as per SDI-100 (1985).
- E. Astragal for double doors: Steel T shaped, specifically for double doors, as indicated.

2.06 FINISH

- A. Steel Sheet: A60 Galvannealed at exterior applications.
- B. Primer: Baked.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify substrate conditions.
- B. Verify that opening sizes and tolerances are acceptable.

3.02 INSTALLATION

- A. Install doors in accordance with ANSI/SDI-100 and DHI.
- B. Coordinate installation of glass and glazing.
- C. Install door, plumb and level.
- D. Coordinate installation of doors with installation of frames specified in Section 08112 and hardware specified in Section 08712.
- E. Touch-up factory finished doors.
- F. Install a minimum of three (3) anchors per jamb (6 per frame).

3.03 ERECTION TOLERANCES

- A. Maximum Diagonal Distortion: 1/16 inch measured with straight edge, corner to corner.

3.04 ADJUSTING

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

END OF SECTION 08111

SECTION 08212
WOOD DOORS
Allowance

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Flush wood doors; flush configuration; fire rated and non-rated, "Pre-Finished", to include fixed units DP1 and DP2 (materials only).

- B. Allowances: Include under provisions of Section 01200 - Price and Payment Procedures.
The General Contractor shall allow the sum of as indicated in Section 01200 for the furnishing and installation of sheet carpet. This sum does not include the overhead and profit of the General Contractor. The Architect reserves the right to assign a contract, or purchase order, to the General Contractor. The General Contractor **shall not issue a contract** on the allowance without the prior approval of the Architect.

1.2 RELATED SECTIONS

- A. Section 08115 - Standard Steel Frames: Steel door frames.
- B. Section 08710 - Door Hardware.
- C. Section 08800 - Glazing: Glazing for doors.

1.3 REFERENCES

- A. ASTM E152 - Methods of Fire Tests of Door Assemblies.
- B. ASTM E413 - Classification for Determination of Sound Transmission Class.
- C. AWI - Quality Standards of the Architectural Woodwork Institute.
- D. NFPA 80 - Fire Doors and Windows.
- E. NFPA 252 - Standard Method of Fire Tests for Door Assemblies.
- F. UL 10B - Fire Tests of Door Assemblies.
- G. Warnock-Hersey - Certification Listings for fire doors.

1.4 SUBMITTALS

- A. Submit under provisions of Section 01330.
- B. Shop Drawings: Illustrate door opening criteria, elevations, sizes, types, swings, undercuts required, special blocking for hardware.
- C. Product Data: Indicate door core materials and construction; veneer species, type and characteristics; factory machining criteria, factory finishing criteria.

- D. Manufacturer's Installation Instructions: Indicate special installation instructions.

1.5 QUALITY ASSURANCE

- A. Perform work in accordance with AWI Quality Standard Section 1300, Custom Grade.
- B. Perform Work in accordance with State of South Carolina standards.
- C. Maintain one (1) copy of each document on site.

1.6 QUALIFICATIONS

- A. Manufacturer: Company specializing in manufacturing the Products specified in this section with minimum three years documented experience.

1.7 REGULATORY REQUIREMENTS

- A. Fire Door Construction: Conform to UL 10B, ASTM E152, UL 10B.
- B. Installed Doors: Conform to NFPA 80 for fire rated class indicated on schedules.

1.8 DELIVERY, STORAGE, AND HANDLING

- A. Deliver, store, protect, and handle products to site under provisions of Section 01600.
- B. Package, deliver and store doors in accordance with AWI Section 1300 and ANSI/AWMA Requirements.
- C. Protect doors with resilient packaging sealed with heat shrunk plastic. Do not store in damp or wet areas; or in areas where sunlight might bleach veneer. Seal top and bottom edges if stored more than one week. Break seal on-site to permit ventilation.

1.9 FIELD MEASUREMENTS

- A. Verify that field measurements are as indicated on shop drawings, instructed by manufacturer.

1.10 COORDINATION

- A. Coordinate work under provisions of Section 01300.
- B. Coordinate the work with door opening construction, door frame and door hardware installation.

1.11 WARRANTY

- A. Provide warranty under provisions of Section 01700 to the following term:
 - 1. Interior Doors: Manufacturer one (1) year.

- B. Provide for replacing to include cost of rehangng and refinishing at no cost to the owner. Wood doors exhibiting defects in materials or workmanship, including warp and delamination within minimum period of one (1) year from date of substantial completion of the work.

1.12 SINGLE SOURCE CONTRACTOR

- A. For Sections 08111 and 08212, the project will require a single source supplier. The single source supplier shall be responsible for all products and services and may use various suppliers for this work under their supervision.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Mohawk Flush Doors.
- B. Marshfield Doors
- C. Algoma Hardwoods, Inc.
- D. Substitutions under provisions of Section 01600 and A701 and Article 9 of Instructions to Bidders.

2.2 DOOR AND TRANSOM PANEL TYPES

- A. Flush Interior Doors: 1-3/4 inches thick; solid core construction LD 2, fire rated as indicated.

2.3 DOOR CONSTRUCTION

- A. Core (Solid, Non-Rated): AWI Section 1300, Particle Core LD 2 5 ply.
- B. Core (Solid, Fire Rated): AWI Section 1300, Type FD 1-1/2 5 ply.

2.4 FLUSH DOOR FACING

- A. Veneer Facing (Flush Interior Doors): AWI Rotary White Birch Species Prefinished Custom Grade Book Match with CE (compatible hardwood) edge. Finish transparent stain.

2.5 ADHESIVE

- A. Facing Adhesive Type II - Water resistant.

2.6 ACCESSORIES

- A. Glass stops: Wood, of same species wood as door facing at non-rated doors. Rolled steel type designed to conform to UL requirements at fire-rated doors; prepared for countersunk style tamperproof screws.

2.7 FABRICATION

- A. Fabricate non-rated doors in accordance with AWI Quality Standards

requirements.

- B. Fabricate fire rated doors in accordance with AWI Quality Standards and to UL Warnock-Hersey 10B requirements. Attach fire rating label to door.
- C. Premachine doors for finish hardware.
- D. Provide flush doors with 1/2 inch thick edge strips of wood species to match door finish.
- E. Astragals for double doors: Provide T-shaped metal astragals in one piece to conform with UL requirements for rating indicated on Schedule.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify frame opening conditions under provisions of Section 01039.
- 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.

3.2 INSTALLATION

- A. Install doors in accordance with manufacturer's instructions.
- B. Trim non-rated door width by cutting equally on both jamb edges.
- C. Trim door height by cutting top and bottom edges to a maximum of 3/4 inch (19 mm). Trim fire door height at bottom edge only, in accordance with fire rating requirements.
- D. Pilot drill screw and bolt holes. Use threaded through bolts for half surface hinges.
- E. Machine cut for hardware. Core for handsets and cylinders.
- F. Coordinate installation of doors with installation of frames specified in Section 08111 and hardware specified in Section 08712.

3.3 INSTALLATION TOLERANCES

- A. Conform to AWI requirements for fit and clearance tolerances.
- B. Conform to AWI Section 1300 requirements for maximum diagonal distortion.
- C. Maximum Diagonal Distortion (Warp): 1/16 inch measured with straight edge or taught string, corner to corner.

3.4 ADJUSTING

- A. Adjust work under provisions of Section 01700.
- B. Adjust door for smooth and balanced door movement.

END OF SECTION 08212

SECTION 08336

OVERHEAD COILING DOORS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Overhead coiling insulated doors.

1.2 RELATED SECTIONS

- A. Section 05500 - Metal Fabrications: Support framing and framed opening.
- B. Section 08710 - Door Hardware: Product Requirements for cylinder core and keys.
- C. Section 09900 - Painting: Field applied finish.

1.3 REFERENCES

- A. ANSI/DASMA 108 - American National Standards Institute Standard Method For Testing Sectional Garage Doors And Rolling Doors: Determination Of Structural Performance Under Uniform Static Air Pressure Difference.
- B. NFRC 102 - Test Procedure for Measuring the Steady-State Thermal Transmittance of Fenestration Systems.
- C. ASTM E 90 - Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Element.
- D. ASTM E 330 - Standard Test Method for Structural Performance of Exterior Windows, Doors, Skylights and Curtain Walls by Uniform Static Air Pressure Difference.
- E. ASTM A 653 - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
- F. ASTM A 666 - Standard Specification for Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar.
- G. ASTM A 924 - Standard Specification for General Requirements for Steel Sheet, Metallic-Coated by the Hot-Dip Process.
- H. ASTM B 221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes.
- I. NEMA 250 - Enclosures for Electrical Equipment (1000 Volts Maximum).
- J. NEMA MG 1 - Motors and Generators.

1.4 DESIGN / PERFORMANCE REQUIREMENTS

- A. Overhead coiling insulated doors:
 - 1. Wind Loads: Design door assembly to withstand wind/suction load as per structural load table without damage to door or assembly components in conformance with ASTM E 330.
 - 2. Operation: Design door assembly, including operator, to operate for not less than 20,000 cycles.

- B. Single-Source Responsibility: Provide doors, tracks, motors, and accessories from one manufacturer for each type of door. Provide secondary components from source acceptable to manufacturer of primary components.
- C. Products Requiring Electrical Connection: Listed and classified by Underwriters Laboratories, Inc. acceptable to authority having jurisdiction as suitable for purpose specified.

1.5 SUBMITTALS

- A. Submit under provisions of Section 01300.
- B. Product Data: Manufacturer's data sheets on each product to be used, including:
 - 1. Preparation instructions and recommendations.
 - 2. Storage and handling requirements and recommendations.
 - 3. Details of construction and fabrication.
 - 4. Installation instructions.
- C. Shop Drawings: Include detailed plans, elevations, details of framing members, anchoring methods, required clearances, hardware, and accessories. Include relationship with adjacent construction.
- D. Selection Samples: For each finish product specified, two complete sets of color chips representing manufacturer's full range of available colors and patterns.
- E. Verification Samples: For each finish product specified, two samples, minimum size 6 inches (150 mm) long, representing actual product, color, and patterns.
- F. Manufacturer's Certificates: Certify products meet or exceed specified requirements.
- G. Operation and Maintenance Data: Submit lubrication requirements and frequency, and periodic adjustments required.

1.6 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in performing Work of this section with a minimum of five years experience in the fabrication and installation of security closures.
- B. Installer Qualifications: Installer Qualifications: Company specializing in performing Work of this section with minimum three years and approved by manufacturer.
- C. Mock-Up: Provide a mock-up for evaluation of surface preparation techniques and application workmanship.
 - 1. Finish areas designated by Architect.
 - 2. Do not proceed with remaining work until workmanship, color, and sheen are approved by Architect.
 - 3. Refinish mock-up area as required to produce acceptable work.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Store products in manufacturer's unopened packaging until ready for installation.
- B. Protect materials from exposure to moisture. Do not deliver until after wet work is complete and dry.
- C. Store materials in a dry, warm, ventilated weathertight location.

1.8 PROJECT CONDITIONS

- A. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's absolute limits.

1.9 COORDINATION

- A. Coordinate Work with other operations and installation of adjacent materials to avoid damage to installed materials.

1.10 WARRANTY

- A. Warranty: Manufacturer's limited door and operator system, except the counterbalance spring and finish, to be free from defects in materials and workmanship for 3 years or 20,000 cycles, whichever occurs first.
- B. Warranty: Manufacturer's limited door system warranty for 2 years for all parts and components.
- C. PowderGuard Finish
 1. PowderGuard Premium Applied to curtain, guides, bottom bar, headplates: Manufacturer's limited Premium Finish warranty for 2 years.
 2. PowderGuard Zinc Base Coat applied to guides, bottom bar, headplates plus PowderGuard Premium applied to curtain and top coat for guides, bottom bar, headplates: Manufacturer's limited Zinc Finish warranty for 4 years.
 3. PowderGuard Textured: Applied to curtain, guides, bottom bar, headplates: Manufacturer's limited Textured Finish warranty for 3 years.
 4. PowderGuard Zinc Base Coat applied to guides, bottom bar, headplates plus PowderGuard Textured applied to curtain and top coat for guides, bottom bar, headplates: Manufacturer's limited Zinc Finish warranty for 4 years.
 5. PowderGuard Max: Applied to curtain, guides, bottom bar, headplates: Manufacturer's limited Max Finish warranty for 5 years.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Acceptable Manufacturer: Overhead Door Corp., 2501 S. State Hwy. 121, Suite 200, Lewisville, TX 75067. ASD. Tel. Toll Free: (800) 275-3290. Phone: (469) 549-7100. Fax: (972) 906-1499. Web Site: www.overheaddoor.com. E-mail: info@overheaddoor.com.
- B. Substitutions: Not permitted.
- C. Requests for substitutions will be considered in accordance with provisions of Section 01600.

2.2 INSULATED OVERHEAD COILING SERVICE DOORS

- A. Overhead Coiling Stormtite Insulated Service Doors: Overhead Door Corporation Model 625 (Size 12'-0"W x 12'-0"H)
 1. Curtain: Interlocking roll-formed slats as specified following. Endlocks shall be attached to each end of alternate slats to prevent lateral movement.
 - a. Flat profile type F-265i for doors up to 40 feet (12.19 m) wide.
 - b. Front slat fabricated of:
 - 1) 24 gauge galvanized steel.
 - c. Back slat fabricated of:
 - 1) 24 gauge galvanized steel.
 - d. Slat cavity filled with CFC-free foamed-in-place, polyurethane insulation.
 - 1) R-Value: 7.7, U-Value: 0.13.
 - 2) Sound Rating: STC-21.

2. Performance:
 - a. Through Curtain Sound Rating: Sound Rating: STC-28 (STC-30+ with HZ noise generator) as per ASTM E 90.
 - b. Installed System Sound Rating: STC-21 as per ASTM E 90.
 - c. U-factor: 0.91 NFRC test report, maximum U-factor of no higher than 1.00.
 - d. Air Infiltration: Meets ASHRAE 90.1 & IECC 2012/2015 C402.4.3 Air leakage <1.00 cfm/ft2.
3. Slats and Hood Finish:
 - a. Galvanized Steel: Slats and hood galvanized in accordance with ASTM A 653 and receive rust-inhibitive, roll coating process, including 0.2 mils thick baked-on prime paint, and 0.6 mils thick baked-on polyester top coat.
 - 1) Polyester Top Coat.
 - (a) Gray polyester.
 - (b) Tan polyester.
 - (c) White polyester.
 - (d) Brown polyester.
 - 2) Powder Coat:
 - (a) PowderGuard Premium powder coat color as selected by the Architect.
 - (b) PowderGuard Textured powder color as selected by the Architect.
 - (c) PowderGuard Max powder coat, color as selected by Architect.
 - 3) Non-galvanized exposed ferrous surfaces shall receive one coat of rust-inhibitive primer.
4. Weatherseals:
 - a. Vinyl bottom seal, exterior guide and internal hood seals.
 - b. Interior guide weatherseal.
 - c. Lintel weatherseal.
 - d. Air Infiltration Package, IECC 2012/2015 listed; product to meet C402.4.3 2012 Air leakage <1.00 cfm/ft2.
 - 1) Air infiltration perimeter seal package includes: guide cover, guide cap, dual brush exterior guide seal, 4 inch finned lintel brush seal and vinyl bottom seal.
5. Bottom Bar:
 - a. Two prime painted steel angles minimum thickness 1/8 inch (3 mm) bolted back to back to reinforce curtain in the guides.
 - b. Two galvanized steel angles minimum thickness 1/8 inch (3 mm) bolted back to back to reinforce curtain in the guides.
 - c. Two stainless steel angles minimum thickness 1/8 inch (3 mm) bolted back to back to reinforce curtain in the guides.
 - d. Extruded aluminum angle minimum thickness 1/8 inch (3 mm) bolted back to back to reinforce curtain in the guides.
6. Guides: Three structural steel angles.
7. Brackets:
 - a. Hot rolled prime painted steel to support counterbalance, curtain and hood.
 - b. Galvanized steel to support counterbalance, curtain and hood.
 - c. Stainless steel to support counterbalance, curtain and hood.
8. Finish; Bottom Bar, Guides, Headplate and Brackets:
 - a. Finish: Black powdercoat finish.
9. Counterbalance: Helical torsion spring type housed in a steel tube or pipe barrel, supporting the curtain with deflection limited to 0.03 inch per foot of span. Counterbalance is adjustable by means of an adjusting tension wheel.
10. Hood: Provide with internal hood baffle weatherseal.
 - a. 24 gauge galvanized steel with intermediate supports as required.
11. Electric Motor Operation: Provide UL listed electric operator, size as recommended by manufacturer to move door in either direction at not less than 2/3 foot nor more than 1 foot per second. RSX Operation with photo eye.
 - a. Sensing Edge Protection:
 - 1) Electric sensing edge.
 - b. Operator Controls:
 - 1) Push-button operated control stations with open, close, and stop buttons.

- 2) Controls flush mounted.
- c. Motor Voltage: 115/230 single phase, 60 Hz.
- 12. Windload Design:
 - a. See Structural Load Table
- 13. Locking:
 - a. Interior slide bolt lock for electric operation with interlock switch.
- 14. Wall Mounting Condition:
 - a. Between jambs mounting.
- 15. Insulated Vision Lites: Provide with uniformly spaced openings.
 - a. Size: 3 inch by 5/8 inch (76 mm by 16 mm)

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify opening sizes, tolerances and conditions are acceptable.
- B. Examine conditions of substrates, supports, and other conditions under which this work is to be performed.
- C. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

3.2 PREPARATION

- A. Clean surfaces thoroughly prior to installation.
- B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

3.3 INSTALLATION

- A. Install in accordance with manufacturer's instructions.
- B. Use anchorage devices to securely fasten assembly to wall construction and building framing without distortion or stress.
- C. Securely and rigidly brace components suspended from structure. Secure guides to structural members only.
- D. Fit and align assembly including hardware; level and plumb, to provide smooth operation.
- E. Coordinate installation of electrical service with Section 16150. Complete wiring from disconnect to unit components.
- F. Coordinate installation of sealants and backing materials at frame perimeter as specified in Section 07900.
- G. Install perimeter trim and closures.
- H. Instruct Owner's personnel in proper operating procedures and maintenance schedule.

3.4 ADJUSTING

- A. Test for proper operation and adjust as necessary to provide proper operation without binding or distortion.
- B. Adjust hardware and operating assemblies for smooth and noiseless operation.

3.5 CLEANING

- A. Clean curtain and components using non-abrasive materials and methods recommended by manufacturer.
- B. Remove labels and visible markings.
- C. Touch-up, repair or replace damaged products before Substantial Completion.

3.6 PROTECTION

- A. Protect installed products until completion of project.

END OF SECTION

SECTION 08410

METAL-FRAMED STOREFRONTS

PART 1 GENERAL

1.1 SUMMARY

A.

1. Section includes aluminum-framed storefronts including aluminum and glass doors and frames including door hardware and glass infill panels and components for both interior and exterior wall applications. **Impact Rated System**
2. Coordinate all hardware, panic hardware and electric strike locations

B. Related Sections:

1. Section 04810 - Unit Masonry Systems.
2. Section 05120 - Structural Steel: Steel fabricated attachment members and framed openings
3. Section 05400 - Cold Formed Metal Framing
4. Section 05500 - Metal Fabrications: Steel fabricated attachment devices.
5. Section 07840- Firestopping: Fire stop at system junction with structure.
6. Section 07900 - Joint Sealers: Joint sealers other than those integral with storefront.
7. Section 08710 - Door Hardware: Mortised hardware reinforcement requirements affecting framing members; hardware items other than specified in this section.
8. Section 08800 - Glazing.
9. Section 09900 - Paints and Coatings: Field painting of interior surface of infill panel surfaces.

1.2 REFERENCES

A. Aluminum Association:

1. AA ADM 1 - Aluminum Design Manual.

B. American Architectural Manufacturers Association:

1. AAMA 501 - Methods of Test for Exterior Walls.
2. AAMA 502 - Voluntary Specification for Field Testing of Windows and Sliding Glass Doors.
3. AAMA 503 - Voluntary Specification for Field Testing of Metal Storefronts. Curtain Wall and Sloped Glazing Systems.
4. AAMA 611 - Voluntary Specification for Anodized Architectural Aluminum.
5. AAMA 1503 - Voluntary Test Method for Thermal Transmittance and Condensation Resistance of Windows, Doors and Glazed Wall Sections.
6. AAMA 2603 - Voluntary Specification, Performance Requirements and Test Procedures for Pigmented Organic Coatings on Aluminum Extrusions and Panels.
7. AAMA 2604 - Voluntary specification, Performance Requirements and Test Procedures for High Performance Organic Coatings on Aluminum Extrusions and Panels.
8. AAMA 2605 - Voluntary Specification, Performance Requirements and Test Procedures for Superior Performing Organic Coatings on Aluminum

- Extrusions and Panels.
9. AAMA CW-10 - Care and Handling of Architectural Aluminum from Shop to Site.
 10. AAMA MCWM-1 - Metal Curtain Wall Manual.
 11. AAMA SFM-1 - Aluminum Store Front and Entrance Manual.
- C. American Society of Civil Engineers:
1. ASCE 7 - Minimum Design Loads for Buildings and Other Structures.
- D. ASTM International:
1. ASTM A36/A36M - Standard Specification for Carbon Structural Steel.
 2. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
 3. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
 4. ASTM B209 - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate.
 5. ASTM B221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes.
 6. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials.
 7. ASTM E283 - Standard Test Method for Determining the Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen.
 8. ASTM E330 - Standard Test Method for Structural Performance of Exterior Windows, Curtain Walls, and Doors By Uniform Static Air Pressure Difference.
 9. ASTM E331 - Standard Test Method for Water Penetration of Exterior Windows, Curtain Walls, and Doors By Uniform Static Air Pressure Difference.
 10. ASTM E547 - Standard Test Method for Water Penetration of Exterior Windows, Curtain Walls, and Doors by Cyclic Static Air Pressure Differential.
 11. ASTM E1105 - Standard Test Method for Field Determination of Water Penetration of Installed Exterior Windows, Curtain Walls, and Doors by Uniform or Cyclic Static Air Pressure Difference.
- E. National Fenestration Rating Council Incorporated:
1. NFRC 100 - Procedures for Determining Fenestration Product U-Factors.
- F. National Fire Protection Association:
1. NFPA 255 - Standard Method of Test of Surface Burning Characteristics of Building Materials.
- G. SSPC: The Society for Protective Coatings:
1. SSPC Paint 20 - Zinc-Rich Primers (Type I - Inorganic and Type II - Organic).
 2. SSPC Paint 25 - Red Iron Oxide, Zinc Oxide, Raw Linseed Oil, and Alkyd Primer.
- H. Underwriters Laboratories Inc.:
1. UL 723 - Tests for Surface Burning Characteristics of Building Materials.

1.3 SYSTEM DESCRIPTION

- A. Aluminum-framed storefront system includes tubular aluminum sections with supplementary internal support framing, aluminum and glass entrances, shop fabricated, factory finished, glass and glazing, related flashings, anchorage and attachment devices.
- B. System Assembly: Site assembled.

1.4 PERFORMANCE REQUIREMENTS

- A. System Design: Design and size components to withstand dead and live loads caused by positive and negative wind pressure acting normal to plane of wall, including building corners.
 - 1. As calculated in accordance with applicable code, as tested in accordance with ASTM E330.
- B. Wind-Borne Debris Loads: Design and size glass located less than 60 feet above grade to withstand the following loads:
 - 1. Glass Within 30 feet of Grade: ASTM 1996; large missile impact test.
 - 2. Glass Within 30 feet of Grade: ASTM 1996; small missile impact test.
- C. Deflection: Limit mullion deflection to 1/175 for spans under 13'-6" and 1/240 plus 1/4 inch for spans over 13'-6"; flexure limit of glass 3/4 inch of span; with full recovery of glazing materials.
- D. System Assembly: Accommodate without damage to components or deterioration of seals, movement within system, movement between system and peripheral construction, dynamic loading and release of loads, deflection of structural support framing.
- E. Air Infiltration: Limit air leakage through assembly to 0.06 cfm/min/sq ft of wall area, measured at reference differential pressure across assembly of 1.57 psf as measured in accordance with AAMA 501.
- F. Air and Vapor Seal: Maintain continuous air barrier and vapor retarder throughout assembly, primarily in line with inside pane of glass and heel bead of glazing compound.
- G. Vapor Seal: Limit vapor seal with interior atmospheric pressure of 1 inch sp, 72 degrees F, 40 Percent RH without seal failure.
- H. Condensation Resistance Factor: CRF of not less than 45 when measured in accordance with AAMA 1503.
- I. Water Leakage: None, when measured in accordance with AAMA 501, ASTM E331 and ASTM E547 with test pressure difference of 20 percent of design pressure, with minimum differential of 2.86 lbf/sq ft and maximum of 12.00 lbf/sq ft.
- J. Thermal Transmittance of Assembly (Excluding Entrances): Maximum U Value of 0.69 Btu/sq ft per hour per deg F when measured in accordance with AAMA 1503.
- K. Expansion / Contraction: Provide for expansion and contraction within system components caused by cycling temperature range of 170 degrees F over 12

hour period without causing detrimental effect to system components and anchorage.

- L. System Internal Drainage: Drain water entering joints, condensation occurring in glazing channels, or migrating moisture occurring within system, to exterior by weep drainage network.

1.5 SUBMITTALS

- A. Section 01330 - Submittal Procedures: Submittal procedures.
- B. Shop Drawings: Indicate system dimensions, framed opening requirements and tolerances, affected related Work and expansion and contraction joint location and details to include entrance door hardware.
- C. Product Data: Submit component dimensions, describe components within assembly, anchorage and fasteners, glass and infill, [door hardware,] and internal drainage details.
- D. Samples: Submit two samples 12 x 12 inches in size illustrating finished aluminum surface, glass units and glazing materials.
- E. Design Data: Indicate framing member structural and physical characteristics, calculations, and dimensional limitations.
- F. Manufacturer's Certificate: Certify products meet or exceed specified requirements.

1.6 QUALITY ASSURANCE

- A. Perform Work in accordance with AAMA MCWM-1 - Metal Curtain Wall, Window, Store Front and Entrance - Guide Specifications Manual.
- B. Surface Burning Characteristics:
 - 1. Foam Insulation: Maximum 75/450 flame spread/smoke developed index when tested in accordance with ASTM E84.
- C. Apply label from agency approved by authority having jurisdiction to identify each foam plastic insulation board.
- D. Perform Work in accordance with State of South Carolina standards.
- E. Maintain one copy of each document on site.

1.7 QUALIFICATIONS

- A. Manufacturer: Company specializing in manufacturing aluminum glazing systems with minimum three years documented experience.

1.8 PRE-INSTALLATION MEETINGS

- A. Section 01300 - Administrative Requirements: Pre-installation meeting.
- B. Convene minimum one week prior to commencing work of this section.

1.9 DELIVERY, STORAGE, AND PROTECTION

- A. Section 01600 - Product Requirements: Product storage and handling requirements.
- B. Handle Products of this section in accordance with AAMA MCWM-1 - Curtain Wall Manual #10.
- C. Protect finished aluminum surfaces with strippable coating. Do not use adhesive papers or sprayed coatings which bond when exposed to sunlight or weather.

1.10 ENVIRONMENTAL REQUIREMENTS

- A. Section 01600 - Product Requirements.
- B. Do not install sealants nor glazing materials when ambient temperature is less than 40 degrees F during and 48 hours after installation.

1.11 COORDINATION

- A. Section 01300 - Administrative Requirements: Coordination and project conditions.
- B. Coordinate the Work with installation of firestopping, air barrier, and components or materials.

1.12 WARRANTY

- A. Section 01700 - Execution Requirements: Product warranties and product bonds.
- B. Furnish five year manufacturer warranty for glazed units.

PART 2 PRODUCTS

2.1 ALUMINUM-FRAMED STOREFRONTS

- A. Manufacturers:
 - 1. **Kawneer Co., Inc.** (basis of design, no substitutions)
- B. Furnish materials in accordance with the State of South Carolina standards.
- C. Product Description:
 - 1. Aluminum Frame: 501 IR (screw spline system) 2-1/2" x 5" for window frame nominal dimension. Non-thermal: center glazed; interior structural glazed; seven spline fabrication; applies glazing stops; drainage holes' internal weep drainage system; angled corners; 1-5/16" impact resistant glazing

2.2 COMPONENTS

- A. Extruded Aluminum: ASTM B221; 6063 alloy, T5 temper typical, 6061 alloy, T6 temper for extruded structural members.
- B. Sheet Aluminum: ASTM B209, 5005 alloy, H15 or H34 temper.

- C. Sheet Steel: ASTM A653/A653M; galvanized to minimum G90.
- D. Steel Sections: ASTM A36/A36M; shaped to suit mullion sections, galvanized.
- E. Glass: Specified in Section 08800.
- F. Glazing Materials: As specified in Section 08800.
- G. Infill Panels:
 - 1. Insulated Panels: Manufacturer's standard insulated panel construction with aluminum outer and inner faces and special insulating core; 1 inch thick.
- H. Entrance System (at exterior locations for Doors 100):
 - 1. Aluminum Entrances: **Series 350IR Entrances**, Entrance member profile: 3-1/2" vertical stile, 3-1/2" top rail, 6-1/2" bottom rail with 1" insulated glass.
 - 2. Hardware: Standard Intermediate Pivot (Rixson M-19)
Door-O-Matic 1490 concealed vertical rod
LCN 2030 concealed overhead/single acting closer with hold open
CO-9 single acting pull
 - 3. Brake metal at aluminum store front as indicated on the drawings. Same finish and thickness as storefront system.
 - 4. Provide corner, junction, base, and miscellaneous shapes as defined on drawings for a complete installation.
 - 5. Hardware: Furnish manufacturer's standard hardware for types of doors and applications indicated, and as specified below:
 - 6. Weather Stripping: Wool pile, continuous and replaceable.
 - 7. Sill Sweep Strips.
 - 8. Threshold: Extruded aluminum, one piece for each door opening, ribbed, non-slip surface.
 - 9. Pivots: Offset type: top, intermediate, and bottom.
 - 10. Panic Device: Rim with profile type to fit door stiles; push pad type.
 - 11. Closer: Fully adjustable overhead, surface mount, modern style overhead closer.
 - 12. Finish: Exposed hardware to match hardware finishes specified in Section 08710.
 - 13. Lock Cylinders and Pulls: Specified in Section 08710
- I. Entrance System (at all exterior windows)
 - 1. Aluminum Frame: 501 IR (screw spline system) 2-1/2" x 5" for window frame nominal dimension. Non-thermal: center glazed; interior structural glazed; seven spline fabrication; applies glazing stops; drainage holes' internal weep drainage system; angled corners; 1-5/16" impact resistant

glazing

- J. Flashings: Minimum 0.032 inch thick aluminum to match mullion sections where exposed.
- K. Firestopping: Specified in Section 07840.
- L. Sealant and Backing Materials:
 - 1. Sealant Used Within System (Not Used for Glazing): Manufacturer's standard materials to achieve weather, moisture, and air infiltration requirements.
 - 2. Perimeter Sealant: Specified in Section 07900.
- M. Fasteners: Stainless steel.

2.3 FABRICATION

- A. Fabricate components with minimum clearances and shim spacing around perimeter of assembly, yet enabling installation and dynamic movement of perimeter seal.
- B. Accurately fit and secure joints and corners. Make joints flush, hairline, and weatherproof.
- C. Prepare components to receive anchor devices. Fabricate anchors.
- D. Arrange fasteners and attachments to conceal from view.
- E. Reinforce interior horizontal head rail to receive blind track brackets and attachments.
- F. Prepare components with internal reinforcement for door hardware.
- G. Reinforce framing members for imposed loads.

2.4 SHOP FINISHING

- A. Color Anodized Aluminum Surfaces: AAMA 611, AA-M10C22A44 non-specular as fabricated mechanical finish, medium matte chemical finish, and Architectural Class I 0.7 mils **medium bronze #28 as per Kawneer anodized coating.**
- B. Concealed Steel Items: Galvanized to ASTM A123/A123M; [minimum 2.0 oz/sq ft coating thickness; galvanize after fabrication. Primed with iron oxide paint.
- C. Apply bituminous paint to concealed aluminum and steel surfaces in contact with cementitious or dissimilar metals.
- D. Shop and Touch-Up Primer for Steel Components: SSPC Paint 25 red oxide.
- E. Touch-Up Primer for Galvanized Steel Surfaces: SSPC Paint 20 zinc rich.
- F. Extent of Finish:
 - 1. Apply factory coating to surfaces exposed at completed assemblies.
 - 2. Apply finish to surfaces cut during fabrication so no natural aluminum is visible in completed assemblies, including joint edges.

3. Apply touch-up materials recommended by coating manufacturer for field application to cut ends and minor damage to factory applied finish.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Section 01300 - Administrative Requirements: Coordination and project conditions.
- B. Verify dimensions, tolerances, and method of attachment with other Work.
- C. Verify wall openings and adjoining air and vapor seal materials are ready to receive Work of this Section.

3.2 INSTALLATION

- A. Install wall system in accordance with AAMA MCWM-1 - Window, Store Front and Entrance - Guide Specifications Manual.
- B. Attach to structure to permit sufficient adjustment to accommodate construction tolerances and other irregularities.
- C. Provide alignment attachments and shims to permanently fasten system to building structure.
- D. Align assembly plumb and level, free of warp or twist. Maintain assembly dimensional tolerances, aligning with adjacent Work.
- E. Provide thermal isolation where components penetrate or disrupt building insulation.
- F. Install sill flashings. Turn up ends and edges; seal to adjacent Work to form water tight dam.
- G. Coordinate attachment and seal of perimeter air and vapor retarder materials.
- H. Pack fibrous insulation in shim spaces at perimeter of assembly to maintain continuity of thermal barrier.
- I. Install integral flashings and integral joint sealers.
- J. Set thresholds [in bed of mastic and] secure.
- K. Install hardware using templates provided. Refer to Section 08710 for installation requirements.
- L. Coordinate installation of glass with Section 08800 ; separate glass from metal surfaces.
- M. Coordinate installation of perimeter sealants with Section 07900.
- N. Install hardware using templates provided. Refer to Section 08710 for installation requirements. Coordinate all hardware applications with Section

08710 Hardware Supplier.

3.3 ERECTION TOLERANCES

- A. Section 01400 - Quality Requirements: Tolerances.
- B. Maximum Variation from Plumb: 0.06 inches every 3 ft non-cumulative or 1/16 inches per 10 ft, whichever is less.
- C. Maximum Misalignment of Two Adjoining Members Abutting in Plane: 1/32 inch.

3.4 FIELD QUALITY CONTROL

- A. Section 01400 - Quality Requirements, 01700 - Execution Requirements: Field inspecting, testing, adjusting, and balancing.
- B. Inspection to monitor quality of installation and glazing.
- C. Test to AAMA 502 or 503, ASTM E1105 and AAMA 501.

3.5 ADJUSTING

- A. Section 01700 - Execution Requirements: Testing, adjusting and balancing.
- B. Adjust operating hardware for smooth operation.

3.6 CLEANING

- A. Section 01700 - Execution Requirements: Final cleaning.
- B. Remove protective material from pre-finished aluminum surfaces.
- C. Wash down surfaces with solution of mild detergent in warm water, applied with soft, clean wiping cloths. Take care to remove dirt from corners. Wipe surfaces clean.
- D. Remove excess sealant by method acceptable to sealant manufacturer.

3.7 PROTECTION OF INSTALLED CONSTRUCTION

- A. Section 01700 - Execution Requirements: Protecting installed construction.
- B. Protect finished Work from damage.

END OF SECTION 08410

SECTION 08710
DOOR HARDWARE
ALLOWANCE

PART 1 GENERAL

1.1 SUMMARY

- A. Section includes hardware for wood, steel, aluminum doors.
1. Provide door gaskets, including weatherstripping (except at aluminum doors) and seals, and thresholds.
- B. Related Sections:
1. Section 01200 – Price and Payment Procedures
 2. Section 06200 - Finish Carpentry: Wood door frames.
 3. Section 06410 - Custom Cabinets: Cabinet hardware.
 4. Section 08114 - Standard Steel Doors.
 5. Section 08115 - Standard Steel Frames: Silencers integral with steel frames.
 6. Section 08212 - Flush Wood Doors.
 7. Section 10440 - Interior Signage.
 8. Section 13710 - Intrusion Detection: Security system.
- C. **Allowances: Include under provisions of Section 01200 - Price and Payment Procedures.**
1. The General Contractor shall allow the sum of as indicated in Section 01200 for the furnishing of material. This sum does not include the overhead and profit of the General Contractor. The Architect reserves the right to assign a contract, or purchase order, to the General Contractor. The General Contractor **shall not issue a contract** on the allowance without the prior approval of the Architect. The installation of the hardware is part of base bid.

1.2 REFERENCE

- A. American National Standards Institute:
1. ANSI A156.1 - Butts and Hinges.
 2. ANSI A156.2 - Bored and Preassembled Locks and Latches.
 3. ANSI A156.3 - Exit Devices.
 4. ANSI A156.4 - Door Controls - Closures.
 5. ANSI A156.5 - Auxiliary Locks and Associated Products.
 6. ANSI A156.6 - Architectural Door Trim.
 7. ANSI A156.7 - Template Hinge Dimensions.
 8. ANSI A156.16 - Auxiliary Hardware.
 9. ANSI A156.18 - Materials and Finishes
- B. Builders Hardware Manufacturers Association:
1. BHMA Directory of Certified Products.
- C. National Fire Protection Association:
1. NFPA 80 - Standard for Fire Doors, Fire Windows.
- D. Underwriters Laboratories Inc.:
1. UL 10C - Fire Test.

2. UL 305 - Panic Hardware.
3. UL - Building Materials Directory.

- E. Intertek Testing Services (Warnock Hersey Listed):
1. WH - Certification Listings.

1.3 PERFORMANCE REQUIREMENTS

- A. Fire Rated Openings: Provide door hardware listed by UL or Intertek Testing Services (Warnock Hersey Listed), or other testing laboratory approved by applicable authorities.
1. Hardware: Tested in accordance with UL10C and UBC 7-2-1997.
 2. ASTM 2074-00 Fire Test.

1.4 SUBMITTALS

- A. Section 01330 - Submittal Procedures: Submittal procedures.
- B. Shop Drawings:
1. Indicate locations and mounting heights of each type of hardware, schedules, catalog cuts.
 2. Submit manufacturer's parts lists, and templates.
 3. Submit all shop drawings and schedules together at one time.
 4. Submit 6 copies of all required submittals
- C. Manufacturer's Installation Instructions: Submit special procedures, and perimeter conditions requiring special attention.

1.5 CLOSEOUT SUBMITTALS

- A. Section 01700 - Execution Requirements: Closeout procedures.
- B. Project Record Documents: Record actual locations of installed cylinders and their master key code.
- C. Operation and Maintenance Data: Submit data on operating hardware, lubrication requirements, and inspection procedures related to preventative maintenance.
- D. Keys: Deliver with identifying tags to Owner by security shipment direct from hardware supplier.

1.6 QUALITY ASSURANCE

- A. Perform Work in accordance with the following requirements:
1. ANSI A156 series.
 2. NFPA 80.
 3. UL 305.
- B. Furnish hardware marked and listed in BHMA Directory of Certified Products.
- C. Perform Work in accordance with Georgetown County, South Carolina standard.

- D. Maintain one (1) copy of each referenced document covering installation requirements on site.

1.7 QUALIFICATIONS

- A. Manufacturer: Company specializing in manufacturing products specified in this section with minimum five years documented experience.
- B. Hardware Supplier: Company specializing in supplying commercial and institutional door hardware with minimum five years documented experience, and an established distributor of the products being furnished.
- C. Hardware Installers shall provide a certificate of training from the manufactures of the following hardware products:
 - 1. Locksets.
 - 2. Closers.
 - 3. Exit Devices.
- D. Hardware Installers: Hardware trained personnel employed by the Hardware Supplier, trained hardware installer employed by the General Contractor, or trained independent hardware installer such as Wes Sparks, 843-222-4740.
- E. Hardware Supplier Personnel: The Supplier shall employ a certified Architectural Hardware Consultant (AHC) to assist in work of this section.
- F. Products Requiring Electrical Connection: Listed and classified by [Underwriters' Laboratories, Inc., testing firm acceptable to authority having jurisdiction as suitable for purpose specified and indicated.

1.8 PRE-INSTALLATION MEETINGS

- A. Section 01300 - Administrative Requirements: Pre-installation meeting.
- B. Convene minimum three weeks prior to commencing work of this section.
- C. Include suppliers of all related trades and all persons involved with installation of doors, frames, and hardware.
- D. Keying Conference: Conduct conference on-site to comply with requirements in Section 01300 for Project Meetings. Include the Owner's representative, Contractor, and hardware supplier. Incorporate keying conference decisions into final keying schedule. Submit four copies of the final keying schedule for final approval prior to ordering the keyed locks and cores.

1.9 DELIVERY, STORAGE, AND HANDLING

- A. Section 01600 - Product Requirements: Product storage and handling requirements.
- B. Package hardware items individually with necessary fasteners, instructions, and installation templates, when necessary; label and identify each package with door opening code to match hardware schedule.

1.10 COORDINATION

- A. Section 01300 - Administrative Requirements: Coordination and project conditions.
- B. Coordinate Work with other directly affected sections involving manufacture or fabrication of internal reinforcement for door hardware and recessed items.
 - 1. Provide templates or actual hardware as required to ensure proper preparation of doors and frames.
- C. Sequence installation to accommodate required utility connections.
- D. Coordinate Owner's keying requirements during course of Work.

1.11 WARRANTY

- A. Section 01700 - Execution Requirements: Product warranties and product bonds.
- B. Furnish five year minimum manufacturer warranty for locksets and exit devices. Furnish 10-year minimum manufacturer warranty for door closers. Furnish one-year manufacturer's warranty for balance of materials furnished.

1.12 MAINTENANCE MATERIALS

- A. Section 01700 - Execution Requirements: Maintenance materials.
- B. Furnish special wrenches and tools applicable for each different and for each special hardware component.
- C. Furnish maintenance tools and accessories supplied by hardware component manufacturer.

1.13 EXTRA MATERIALS

- A. Section 01700 - Execution Requirements: Spare parts and maintenance products.
- B. Furnish three extra keyed cores for each master keyed group.

PART 2 PRODUCTS

2.1 DOOR HARDWARE

- A. Manufacturers:
 - 1. Bommer Industries, Inc.
 - 2. Corbin-Russwin Locks, Closers and Exit Devices.
 - 3. Dorma Door Controls, Inc.
 - 4. Falcon Lock, Exit Device and Closers.
 - 5. Hager Companies.
 - 6. LCN Closers.

7. Precision Hardware Mfg Co Inc.
8. Reese Industries.
9. Schlage Lock Co.
10. Stanley Hardware.
11. Von Duprin, Inc.

B. Hinge Manufacturers:

1. Ives Model 5BB1 x sized specified in Sets.
2. Bommer Model BB5000/BB5002.
3. Hager Model BB1279/BB1199.
4. Stanley Model FBB179/FBB191.

C. Lockset , Latch Set, and Cylinder Manufacturers:

1. Falcon Lock Model T series.
2. Corbin-Russwin Model CL3300 series.
3. Dorma Model CL800 series.

D. Exit Device Manufacturers:

1. Falcon Model 25/24 series.
2. Corbin-Russwin Model 5200 series.
3. Dorma Model 9300 series.

E. Closers Manufacturers:

1. Falcon Model SC81 / SC61 series.
2. Corbin-Russwin Model CL3210 series.
3. Dorma 8600 / 7300 series.

F. Manual Bolts,]Protection Plates, Gaskets, Thresholds, and Trim Manufacturers:

1. Ives Model 8400 series
2. NGP Model 896V Thresholds; Model 5050 Gasket.
3. Substitutions: Section 01600 - Product Requirements.

2.2 COMPONENTS

A. General Hardware Requirements: Where not specifically indicated, comply with applicable ANSI A156 standard for type of hardware required. Furnish each type of hardware with accessories as required for applications indicated and for complete, finished, operational doors.

1. Templates: Furnish templates or physical hardware items to door and frame manufacturers sufficiently in advance to avoid delay in Work.
2. Reinforcing Units: Furnished by door and frame manufacturers; coordinated by hardware supplier or hardware manufacturer.
3. Fasteners: Furnish as recommended by hardware manufacturer and as required to secure hardware.
 - a. Finish: Match hardware item being fastened.
4. Fire Ratings: Provide hardware with UL or Intertek Testing Services (Warnock Hersey Listed) listings for type of application involved.
5. Electrical Devices: Make provisions and coordinate requirements for electrical devices and connections for hardware.

- B. Hinges: ANSI A156.1, full mortise type, template type, ANSI A156.7, complying with following general requirements unless otherwise scheduled.
1. Widths: Sufficient to clear trim projection when door swings 180 degrees.
 2. Number: Furnish minimum three hinges to 90 inches high, four hinges to 120 inches high for each door leaf.
 - a. Fire Rated Doors To 86 inches High: Minimum three hinges.
 3. Size and Weight: 4-1/2 inch heavy weight typical for 1-3/4 inch doors.
 - a. Doors Over 40 inches Wide: Extra heavy weight ball or oilite bearing hinges.
 - b. Doors 1-3/8 inch Thick: 3-1/2 inch size.
 - c. Doors 2 inch Thick: 5 inch extra heavy weight ball or oilite bearing.
 - d. Doors Over 48 inches Wide: 5 inch extra heavy weight ball or oilite bearing.
 4. Pins: Furnish nonferrous hinges with non-removable pins (NRP) at exterior and locked out-swinging doors, non-rising pins at interior doors.
 5. Tips: Flat button tips with matching plug Flush tips.
- C. Locksets: Furnish locksets compatible with specified cylinders. Typical 2-3/4 inch backset. Furnish standard strikes with extended lips to protect trim from being marred by latch bolt verify type of cutouts provided in metal frames.
1. Bored (Cylindrical) Locksets: ANSI A156.2, Series 4000, Grade 1 unless otherwise indicated.
 2. Auxiliary Locksets: ANSI A156.5, Grade 1, bored dead locks, unless otherwise indicated.
- D. Latch Sets: Match locksets. Typical 2-3/4 inch backset. Furnish standard strikes with extended lips to protect trim from being marred by latch bolt verify type of cutouts provided in metal frames.
1. Bored (Cylindrical) Latch Sets: ANSI A156.2, Series 4000, Grade 1 unless otherwise indicated.
- E. Exit Devices: ANSI A156.3, Grade 1 rim type, with push pad, unless otherwise indicated. Furnish standard roller strikes.
1. Types: Suitable for doors requiring exit devices.
- F. Cylinders: ANSI A156.5, Grade 1, 6-pin type, interchangeable core type cylinders at exterior doors and doors with exit device.
1. Keying: Keyed as directed by Owner. Key in groups as required and Master key.
 2. Include construction keyed temporary cores for all exterior doors. Temporary cores shall remain the property of the Hardware Supplier. The General Contractor shall replace the temporary cores with the keyed permanent cores at the completion of the project.
 3. Keys: Nickel silver. Stamp keys with "DO NOT DUPLICATE".
 4. Supply keys in the following minimum quantities:
 - a. 5 master keys.
 - b. 3 construction keys.
 - c. 2 control keys.
 - d. 2 change keys for each.
- G. Closers: ANSI A156.4 modern type with and without cover, surface mounted; full rack and pinion type with steel spring and non-freezing hydraulic fluid; closers required for fire rated doors unless otherwise indicated.

1. Adjustability: Furnish controls for regulating closing, latching, speeds, and back checking.
 2. Arms: Type to suit individual condition; parallel-arm closers at reverse bevel doors and where doors swing full 180 degrees.
 3. Location: Mount closers on inside of exterior doors, room side of interior doors typical; mount on pull side of other doors.
 4. Operating Pressure: Maximum operating pressure as follows.
 - a. Interior Doors: Maximum 5 pounds.
 - b. Exterior Doors: Maximum [10] [8.5] pound.
 - c. Fire Rated Doors: As required for fire rating, maximum 15 pounds.
- H. Manual Bolts, Gaskets, Thresholds, and Trim: Furnish as indicated in Schedule, with accessories as required for complete operational door installations.
1. Manual Bolts: ANSI A156.16 Grade 1 top bolt.
 2. Kickplates: ANSI A156.6, metal; height indicated in Schedule by 2 inch less than door width; minimum 0.050 inch thick stainless steel.
 3. Weatherstripping: Furnish continuous weatherstripping at top and sides of exterior doors.
 4. Fire Rated Gaskets: Furnish continuous fire rated gaskets at top and sides of fire rated doors.
 5. Thresholds: Maximum 1/2 inch height.
 6. Wall Stops: ANSI A156.1, Grade 1, 3 inch wall stop; convex pad wall stop.
 7. Floor Stops: ANSI A156.1 Grade 1 dome type; furnish with accessories as required for applications indicated.

2.3 ACCESSORIES

- A. Lock Trim: Furnish levers with rose as indicated in Schedule.
- B. Through Bolts: Verify the use of through bolts and grommet nuts on door faces in occupied areas.
- C. Key Cabinet:
1. Cabinet Construction: Sheet steel construction, piano hinged door with wafer cylinder type lock manufactured by American, series 7122D.
 2. Cabinet Size: Size for Project keys plus sufficient room to allow for 10 percent growth.
 3. Furnish complete system with labels and index for key hook labeling. Finish: Powder coat enamel.

2.4 FINISHING

- A. Finishes: ANSI A156.18; furnish following finishes except where otherwise indicated in Schedule at end of section.
1. Hinges:
 - a. BHMA 630 and 652, satin finish.
 2. Typical Interior Door Hardware:
 - a. BHMA 652, satin chromium plated steel.
 - b. BHMA 626, satin chromium plated brass or bronze.
 - c. BHMA 630, satin finished stainless steel.
 3. Closers: Finish appearance to match door hardware on same face of door.
 4. Thresholds:
 - a. BHMA 628, satin aluminum, clear anodized.

5. Other Items: Furnish manufacturer's standard finishes to match similar hardware types on same door, and maintain acceptable finish considering anticipated use and BHMA category of finish.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Section 01300 - Administrative Requirements: Coordination and project conditions.
- B. Verify doors and frames are ready to receive door hardware and dimensions are as indicated on shop drawings.
- C. Verify electric power is available to power operated devices and is of correct characteristics.

3.2 INSTALLATION

- A. Coordinate mounting heights with door and frame manufacturers. Use templates provided by hardware item manufacturer.
- B. Mounting Heights From Finished Floor to Center Line of Hardware Item: Comply with manufacturer recommendations and applicable codes where not otherwise indicated.

3.3 FIELD QUALITY CONTROL

- A. Section 01400 - Quality Requirements 01700 - Execution Requirements: Field inspecting, testing, adjusting, and balancing.
- B. Architectural Hardware Consultant shall inspect installation and certify hardware and installation has been furnished and installed in accordance with manufacturer's instructions and as specified.

3.4 ADJUSTING

- A. Section 01700 - Execution Requirements: Testing, adjusting, and balancing.
- B. Adjust hardware for smooth operation.

3.5 PROTECTION OF INSTALLED CONSTRUCTION

- A. Section 01700 - Execution Requirements: Protecting installed construction.
- B. Do not permit adjacent work to damage hardware or hardware finish.

3.6 SCHEDULES

- A. To be determined

END OF SECTION 08710

SECTION 08800
GLAZING

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Glass and glazing for Sections referencing this Section for products and installation.

1.2 RELATED SECTIONS

- A. Section 06200 - Finish Carpentry.
- B. Section 07900 - Joint Sealers: Sealant and back-up material.
- C. Section 08410 - Metal Framed Storefront

1.3 REFERENCES

- A. ANSI/ASTM E330 - Structural Performance of Exterior Windows, Curtain Walls, and Doors by Uniform Static Air Pressure Difference.
- B. ANSI Z97.1 - Safety Performance Specifications and Methods of Test for Safety Glazing Used in Buildings.
- C. ASTM C1036 - Flat Glass.
- D. ASTM C1048 - Heat-Treated Flat Glass - Kind HS, Kind FT Coated and Uncoated Glass.
- E. ASTM E546 - Test Method For Frost Point of Sealed Insulating Glass Units.
- F. ASTM E576 - Test Method For Dew/Frost Point of Sealed Insulating Glass Units in Vertical Position.
- G. ASTM E773 - Test Method for Seal Durability of Sealed Insulating Glass Units.
- H. ASTM E774 - Sealed Insulating Glass Units.
- I. FGMA - Glazing Manual.
- J. FGMA - Sealant Manual.
- K. FS TT-C-00598 - Caulking Compound, Oil and Resin Base Type.
- L. FS TT-S-001657 - Sealing Compound, Single Component, Butyl Rubber Based, Solvent Release Type.
- M. FS TT-S-00227 - Sealing Compound, Rubber Base, Two Component.
- N. FS TT-S-00230 - Sealing Compounds, Synthetic-Rubber Base, Single Component, Chemically Curing.
- O. FS TT-S-01543 - Sealing Compound, Silicone Rubber Base.
- P. FS TT-G-410 - Glazing Compound, Sash (Metal) for Back Bedding and Face

Glazing (Not for Channel or Stop Glazing).

- Q. Laminators Safety Glass Association - Standards Manual.
- R. SIGMA - Sealed Insulated Glass Manufacturers Association.

1.5 PERFORMANCE REQUIREMENTS

- A. Glass and glazing materials of this Section shall provide continuity of building enclosure vapor and air barrier:
 - 1. In conjunction with materials described in Section 07900 and Section 09260.
 - 2. To utilize the inner pane of multiple pane sealed units for the continuity of the air and vapor seal.
 - 3. Maintain continuous air and vapor barrier throughout glazed assembly from glass pane to heel bead of glazing sealant.
- B. Size glass to withstand dead loads and positive and negative live loads acting normal to plane of glass calculated in accordance with Standard Building Code.
- C. Limit glass deflection to flexure limit of glass with full recovery of glazing materials, whichever is less.

1.6 SUBMITTALS

- A. Submit under provisions of Section 01330.
- B. Product Data on Glass Types Specified: Provide structural, physical and environmental characteristics, size limitations, special handling or installation requirements.
- C. Product Data on Glazing Compounds: Provide chemical, functional, and environmental characteristics, limitations, special application requirements. Identify available colors.
- D. Samples: Submit two samples, 12 x 12 inch in size, illustrating glass units, coloration and design.
- E. Samples: Submit 4 inch long bead of glazing sealant, color as selected.
- F. Manufacturer's Installation Instructions: Indicate special precautions required.
- G. Manufacturer's Certificate: Certify that sealed insulated glass, meet or exceed specified requirements.

1.8 QUALITY ASSURANCE

- A. Perform Work in accordance with FGMA Glazing Manual, FGMA Sealant Manual, SIGMA and Laminators Safety Glass Association - Standards Manual for glazing installation methods.
- B. Perform Work in accordance with State of South Carolina standards.
- C. Maintain one (1) copy of each document on site.

1.9 ENVIRONMENTAL REQUIREMENTS

- A. Do not install glazing when ambient temperature is less than 50 degrees F.
- B. Maintain minimum ambient temperature before, during and 24 hours after installation of glazing compounds.

1.10 FIELD MEASUREMENTS

- A. Verify that field measurements are as indicated on Shop Drawings.

1.11 COORDINATION

- A. Coordinate Work under provisions of Section 01039.
- B. Coordinate the Work with glazing frames, wall openings, and perimeter air and vapor seal to adjacent Work.

1.12 WARRANTY

- A. Provide five year manufacturer's warranty under provisions of Section 01700.
- B. Warranty: Include coverage for sealed glass units from seal failure, interpane dusting or misting, and replacement of same.

PART 2 PRODUCTS

2.1 FLAT GLASS MATERIALS

- A. Safety Glass (Type FG-B): ASTM C1048, Kind FT fully tempered with horizontal tempering Condition A uncoated, Type 1 transparent flat, Class 1 clear, Quality q3 glazing select; conforming to ANSI Z97.1; 1/4 inch thick minimum.
- B. **Hurricane Resistant Sealed Insulated Glass Units (Type HR-IG):**
 - 1. **Total unit thickness 1-5/16 inch.**
 - 2. **Double Pane Insulated Glass Units Type IG-DP: ASTM E774 Class A and E773; with glass elastomer edge seal; place reflective film within unit; purge interpane space with dry hermetic air.**
 - a. **Outer Pane: Glass Type: 1/4 inch heated strengthened with low "E" coating (PPG Solar Ban 70, SHGC 0.27 and U factor 0.286)**
 - b. **Spacer: 1/2 inch air space laminated.**
 - c. **Inboard Lite: 1/4 inch clear plate glass with laminated .100 liquid resin to 1/4 inch clear plate glass to form a 9/16 inch laminated glass.**

2.3 GLAZING COMPOUNDS

- A. Butyl Sealant (Type GC-B): FS TT-S-001657; Shore A hardness of 10-20 white color; non-skinning.
- B. Acrylic Sealant (Type GC-C): Single Component, solvent curing, cured Shore A hardness of 15-25; non-bleeding; color as selected.

2.4 GLAZING ACCESSORIES

- A. Setting Blocks: Neoprene 80 - 90 Shore A durometer hardness, length of 0.1 inch for each square foot of glazing or minimum 4 inch x width of glazing rabbet space minus 1/16 inch x height to suit glazing method and pane weight and area.
- B. Spacer Shims: Neoprene 50 - 60 Shore A durometer hardness, minimum 3 inch long x one half the height of the glazing stop x thickness to suit application, self adhesive on one face.
- C. Glazing Tape: Preformed butyl compound with integral resilient tube spacing device; 10 - 15 Shore A durometer hardness; coiled on release paper; black color.
- D. Glazing Splines: Resilient polyvinyl chloride extruded shape to suit glazing channel retaining slot; white color.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify prepared openings under provisions of Section 01039.
- B. Verify that openings for glazing are correctly sized and within tolerance.
- C. Verify that surfaces of glazing channels or recesses are clean, free of obstructions, and ready to receive glazing.

3.2 PREPARATION

- A. Clean contact surfaces with solvent and wipe dry.
- B. Seal porous glazing channels or recesses with substrate compatible primer or sealer.
- C. Prime surfaces scheduled to receive sealant.

3.3 EXTERIOR - WET/DRY METHOD (PERFORMED TAPE AND SEALANT)

- A. Cut glazing tape to length and set against permanent stops, 3/16 inch below sight line. Seal corners by butting tape and dabbing with butyl sealant.
- B. Apply heel bead of butyl sealant along intersection of permanent stop with frame ensuring full perimeter seal between glass and frame to complete the continuity of the air and vapor seal.
- C. Place setting blocks at 1/4 points with edge block no more than 6 inches from corners.
- D. Rest glazing on setting blocks and push against tape and heel bead of sealant] with sufficient pressure to attain full contact at perimeter of pane or glass unit.
- E. Install removable stops, with spacer strips inserted between glazing and applied stops, 1/4 inch. Place glazing tape on glazing pane or unit with tape flush with sight line.

- F. Fill gap between glazing and stop with 6C-A type sealant to depth equal to bite of frame on glazing, but not more than 3/8 inch below sight line.
- G. Apply cap bead of GC-A type sealant along void between the stop and the glazing, to uniform line, flush with sight line. Tool or wipe sealant surface smooth.

3.4 CLEANING

- A. Clean work under provisions of Section 01700.
- B. Remove glazing materials from finish surfaces.
- C. Remove labels after work is complete.
- D. Clean glass.

3.5 PROTECTION OF FINISHED WORK

- A. Protect finished Work under provisions of Section 01500.
- B. After installation, mark pane with an "X" by using removable plastic tape or paste.

3.6 SCHEDULE

- A. Type FG-B - at all interior wood doors and interior windows.
- B. Type HR-IG – at all exterior metal framed storefront units and doors.

END OF SECTION 08800

SECTION 08830
MIRROR GLASS

PART 1 GENERAL

1.1 SCOPE

- A. Perform all work required to complete the Mirror Glass indicated by the Contract Documents and furnish all supplementary items necessary for their proper installation.
- B. The requirements of Division 0 - "Bidding Requirements" and Division 1 "General Requirements" of this Project Manual shall apply to all Work required for this Section.

1.2 SUBMITTALS

- A. Shop Drawings:
 - 1. Submit manufacturer's literature and mark sufficiently to indicate compliance with these specifications. Show locations, methods of supporting, methods of anchoring and finishes.

1.3 QUALITY ASSURANCE

- A. Perform Work in accordance with State of South Carolina standards.
- A. Maintain one (1) copy of each document on site.

1.4 WARRANTY

- A. Mirrors shall be warranted for a period of five (5) years against silver spoilage.

PART 2 PRODUCTS

2.1 MATERIALS

- A. Mirror: Float glass, 1/4" thick, with silvering hermetically sealed by electrolytic copper plating, wiped (seamed) edges, without frames.
- B. Mounting Mastic: Palmer "Mirror Mastic", by Palmer Products Corporation, P.O. Box 7155, Louisville, Kentucky 40207. Phone: (502) 893-3668.

PART 3 EXECUTION

3.1 INSTALLATION

- A. Install mirrors in locations indicated.
- B. Exercise extreme caution to avoid scratching silvering on mirror back during installation. Mirrors which are scratched, cracked, chipped or in any manner damaged shall be removed and shall be replaced with new, undamaged mirrors, at no cost to the Owner.

- C. Install mirrors with mastic in exact accordance with mastic manufacturer's recommendations.

3.2 CLEANING

- A. Remove all manufacturer's temporary labels or marks of identification. Clean and polish to remove all oil, grease and foreign material. Leave mirrors in a clean, neat, and orderly condition acceptable to the Architect.

3.3 SCHEDULE

- A. At all Bathrooms as indicated on plans.

END OF SECTION 08830

SECTION 09260
GYPSUM BOARD SYSTEMS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Metal stud wall framing
- B. Acoustical insulation
- C. Gypsum board: Level 5 finish
- D. Taped and sanded joint treatment
- E. Reglets

1.2 RELATED SECTIONS

- A. Section 06193- Plate Connected Wood Trusses.
- B. Section 06112 - Framing and Sheathing.
- C. Section 07213 - Batt Insulation: Thermal Insulation.
- D. Section 08112 - Standard Steel Frames.
- E. Section 09300 – Ceramic Wall Tile: installation of Cementitious Backer Board.
- F. Section 09900 - Painting: Surface finish.

1.3 REFERENCES

- A. ASTM C36 - Gypsum Wallboard.
- B. ASTM C475 - Joint Treatment Materials for Gypsum Wallboard Construction.
- C. ASTM C514 - Nails for the Application of Gypsum Wallboard.
- D. ASTM C630 - Water Resistant Gypsum Backing Board.
- E. ASTM C645 - Non-Load (Axial) Bearing Steel Studs, Runners (Track), and Rigid Furring Channels for Screw Application of Gypsum Board.
- F. ASTM C665 - Mineral Fiber Blanket Thermal Insulation for Light Frame Construction and Manufactured Housing.
- G. ASTM C754 - Installation of Framing Members to Receive Screw Attached Gypsum Wallboard, Backing Board, or Water Resistant Backing Board.
- H. ASTM C840 - Application and Finishing of Gypsum Board.
- I. ASTM C1002 - Steel Drill Screws for the Application of Gypsum Board.

- J. ASTM E90 - Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions.
- K. ASTM E119 - Fire Tests of Building Construction and Materials.
- L. GA-201 - Gypsum Board for Walls and Ceilings.
- M. GA-216 - Recommended Specifications for the Application and Finishing of Gypsum Board.
- N. GA-600 - Fire Resistance Design Manual.

1.4 SUBMITTALS

- A. Submit under provisions of Section 01330.
- B. Product Data: Provide data on metal framing, gypsum board, joint tape.

1.5 QUALITY ASSURANCE

- A. Perform Work in accordance with ASTM C840, GA-201, GA-216 and GA-600.
- A. Perform Work in accordance with State of South Carolina standards.
- B. Maintain one (1) copy of each document on site.
- C. **Single Source Responsibility for the Metal Stud Framing Section 05400, Gypsum Board installation Section 09260 and Acoustical Ceiling Tile Section 09510**

1.6 QUALIFICATIONS

- A. Applicator: Company specializing in performing the work of this section with minimum ten (10) years experience. The specialized company cannot be the General Contractor without receiving prior approval from the Architect. Approval will require documented information of previous installations and previous purchasing of materials on a consistent basis for the duration required.

1.7 REGULATORY REQUIREMENTS

- A. Conform to applicable code for fire rated assemblies as follows:
 - 1. Fire Rated Partitions: Listed assembly by UL No. 306, one hour fire rated partition.

PART 2 PRODUCTS

2.1 MANUFACTURERS - GYPSUM BOARD SYSTEM

- A. U.S. Gypsum.
- B. Gold Bond. Building Products Division National Gypsum Co.

- C. Georgia - Pacific Corporation.

2.02 FRAMING MATERIALS

- A. Studs: ASTM A525, non-load bearing rolled steel, channel shaped, punched for utility access, as scheduled.
- B. Runners: Of same material and thickness as studs, bent leg retainer notched to receive studs. Ceiling Runners; with extended leg retainer.
- C. Furring and Bracing Members: Of same material as studs; thickness to suit purpose.
- D. Fasteners: Self drilling, self tapping screws.
- E. Sheet Metal Backing: 18 gage steel for reinforcement as required or as indicated on Structural Drawings, whichever is more stringent.
- F. Anchorage Devices: Power actuated, drilled expansion bolts.
- G. Acoustic Sealant: As specified in Section 09260.

2.3 GYPSUM BOARD MATERIALS

- A. Standard Gypsum Board: ASTM C36; 5/8 inch thick, maximum permissible length; ends square cut, tapered edges.
- B. Fire Rated Gypsum Board: ASTM C36; fire resistive type, UL rated; 5/8 inch thick, maximum permissible length; ends square cut, tapered edges.
- C. Moisture Resistant Gypsum Board: ASTM C630; 5/8 inch thick, maximum permissible length; ends square cut, tapered edges.
- D. Exterior Gypsum Board.

2.4 ACCESSORIES

- A. Acoustical Insulation: ASTM C665; preformed glass fiber, friction fit type, unfaced as indicated on drawings. Owens Corning, sound attention batt fiberglass 3-1/2" thickness, or to accommodate associated wall thickness.
- B. Acoustical Sealant: Non-hardening, non-skinning, for use in conjunction with gypsum board.
- C. Corner Beads: Metal.
- D. Edge Trim: GA 201 and GA 216;
- E. Joint Materials: ASTM C475; GA 201 and GA 216; reinforcing tape, joint compound, adhesive, and water.
- F. Fasteners: ASTM C1002, Type GA-216.
- G. Reglets: Fry Reglet; as indicated on drawings.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify site conditions under provisions of Section 01039.
- B. Verify that site conditions are ready to receive work.
- C. The existing wallpaper shall be removed and the existing Gypsum Board shall be prepared to receive a Level 5 finish as defined below.

3.2 METAL STUD FRAMING INSTALLATION

- A. Align and secure top and bottom runners at 16 inches o.c..
- B. Place two beads of acoustic sealant between runners and substrate.
- C. Install studs vertically at 16 inches o.c. unless otherwise noted.
- D. Align stud web openings horizontally.
- E. Secure studs to tracks using fastener method. Do not weld.
- F. Stud splicing not permissible.
- G. Fabricate corners using a minimum of three studs.
- H. Double stud at wall openings, door and window jambs, not more than 2 inches (50 mm) from each side of openings.
- I. Brace stud framing system rigid.
- J. Coordinate erection of studs with requirements of door frames, window frames, and install supports and attachments.
- K. Coordinate installation of wood bucks, anchors, and wood blocking with electrical, mechanical work and fire extinguishers to be placed within or behind stud framing.
- L. Blocking: Secure wood blocking to studs. Secure steel channels to studs. Install blocking for support of plumbing fixtures, toilet partitions, wall cabinets, toilet accessories, hardware to meet ADA, ANSI 1117.1 (86) requirements for supportive devices and height for handicapped.
- M. Refer to drawings for indication of partitions extending to finished ceiling only and for partitions extending through the ceiling to the structure above. Maintain clearance under structural building members to avoid deflection transfer to studs.
Provide extended leg ceiling runners.
- N. Coordinate placement of insulation in stud spaces made inaccessible after stud framing erection.

3.3 INSTALLATION TOLERANCES

- A. Maximum Variation From True Position: 1/8 inch.

- B. Maximum Variation of any Member from Plane: 1/8 inch.
- C. Maximum Variation From Plumb: 1/8 inch.

3.4 GYPSUM BOARD INSTALLATION

- A. Install gypsum board in accordance with GA-201, GA-216, GA-214 and GA-600 and manufacturer's instructions. All new and existing walls shall be prepared to receive a **Level 5** finish. No marks or ridges. Entire surface covered with skim coat of compound which shall completely cover the paper and ready to for drywall primer before applying finish painting.
 - 1. **Level 5** – All appropriately prepared gypsum board surfaces shall have one coat of drywall primer applied to yield a properly painted surface. Two separate coats of topcoat material shall be applied over the drywall primer to yield a properly painted surface. Paint shall be applied to the mil film thickness and application conditions specified by the paint manufacturer. Note that this level is recommended where the best paint finish is required, such as under critical lighting conditions or when paints that have a glossy surface are used.
- B. Erect single layer standard gypsum board in most economical direction, with ends and edges occurring over firm bearing unless conflicting with UL assembly requirements.
- C. Erect single layer fire rated gypsum board vertically, with edges and ends occurring over firm bearing.
- D. Use screws when fastening gypsum board to metal furring or framing.
- E. Treat cut edges and holes in moisture resistant gypsum board with sealant.
- F. Place corner beads at external corners as indicated. Use longest practical length. Place edge trim where gypsum board abuts dissimilar materials.
- G. Install sound insulation where indicated, prior to gypsum board.
- H. Where sound insulation is installed in partitions. Seal construction at perimeters, openings and penetrations with a continuous bead of acoustical sealant including a bead at both faces of partitions.

3.05 JOINT TREATMENT

- A. Tape, fill, and sand exposed joints, edges, and corners to produce smooth surface ready to receive finishes.
- B. Feather coats onto adjoining surfaces so that camber is maximum 1/32.
- C. Erect in accordance with manufacturer's instructions.

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 09260

SECTION 09510
ACOUSTICAL CEILINGS

PART 1 GENERAL

1.1 SUMMARY

- A. Section includes suspended metal grid ceiling system and perimeter trim; acoustic tile.
- B. Related Sections:
 - 1. Section 01700 - Execution Requirements: Execution requirements for placement of special anchors or inserts for suspension system specified by this section.
 - 2. Section 07213 - Batt Insulation.
 - 3. Section 07900 - Joint Sealers.
 - 4. Section 08310 - Access Doors and Panels: Access panels.
 - 5. Section 15550 - Fire Protection: Sprinkler heads in ceiling system.
 - 6. Section 15850 - Air Outlets and Inlets: Air diffusion devices in ceiling system.
 - 7. Section 16500 - Light Fixtures and Accessories: Light fixtures in ceiling system.
 - 8. Section 16702 - Fire Alarm: Fire alarm components in ceiling system.
 - 9. Division 16 - Speakers in ceiling system.

1.2 REFERENCES

- A. ASTM International:
 - 1. ASTM C635 - Standard Specification for the Manufacture, Performance, and Testing of Metal Suspension Systems for Acoustical Tile and Lay-in Panel Ceilings.
 - 2. ASTM C636 - Standard Practice for Installation of Metal Ceiling Suspension Systems for Acoustical Tile and Lay-In Panels.
 - 3. ASTM C665 - Standard Specification for Mineral-Fiber Blanket Thermal Insulation for Light Frame Construction and Manufactured Housing.
 - 4. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials.
 - 5. ASTM E119 - Standard Test Methods for Fire Tests of Building Construction and Materials.
 - 6. ASTM E580 - Standard Practice for Application of Ceiling Suspension Systems for Acoustical Tile and Lay-in Panels in Areas Requiring Seismic Restraint.
 - 7. ASTM E1264 - Standard Classification for Acoustical Ceiling Products.
- B. Ceilings and Interior Systems Construction Association:
 - 1. Cisca - Acoustical Ceilings: Use and Practice.
- C. Intertek Testing Services (Warnock Hersey Listed):
 - 1. WH - Certification Listings.
- D. National Fire Protection Association:
 - 1. NFPA 255 - Standard Method of Test of Surface Burning Characteristics of Building Materials.

2. NFPA 286 - Standard Methods of Fire Tests for Evaluating Contribution of Wall and Ceiling Interior Finish to Room Fire Growth.

- E. Underwriters Laboratories Inc.:
1. UL - Fire Resistance Directory.
 2. UL 723 - Tests for Surface Burning Characteristics of Building Materials.

1.3 PERFORMANCE REQUIREMENTS

- A. Suspension System: Rigidly secure acoustic ceiling system according to Seismic Design Category D.
- B. The ceilings shall be installed according to Seismic Design Category D.

1.4 SUBMITTALS

- A. Section 01330 - Submittal Procedures: Submittal procedures.
- B. Shop Drawings: Indicate grid layout and related dimensioning, junctions with other work or ceiling finishes, interrelation of mechanical and electrical items related to system and indicate seismic conditions. Indicate method of suspension where interference exists.
- C. Coordination Drawings: Reflected ceiling plans, drawing to scale, on which the following items are shown and coordinated with each other, based on input from installers of the items involved:
1. Ceiling suspension system members.
 2. Method of attaching hangers to building structure.
 - a. Furnish layouts for cast-in-place anchors, clips, and other ceiling attachment devices whose installation is specified in other Sections.
 3. Ceiling-mounted items including lighting fixtures, diffusers, grilles, speakers, sprinklers, access panels, and special moldings.
 4. Minimum Drawing Scale: 1/8 inch = 1 foot.
- D. Product Data: Submit data on metal grid system components and acoustic units.
- E. Samples: Submit two full size samples illustrating material and finish of acoustic units and parabolic louver.
- F. Samples: Submit two samples each, 6 inches long, of suspension system main runner, cross runner, and perimeter molding.
- G. Manufacturer's Installation Instructions: Submit special procedures, and perimeter conditions requiring special attention.

1.5 QUALITY ASSURANCE

- A. Conform to CISCA requirements. Comply with Guidelines for Seismic Restraints of Direct Hung Suspended Ceiling Assemblies Seismic Zone 3 and Zone 4 and Seismic Design Category D or E. Provide all perimeter tees with hanger wires attached in accordance with guidelines.
- B. Source Limitations:

1. Acoustical Ceiling Panel: Obtain each type through one source from a single manufacturer.
2. Suspension System: Obtain each type through one source from the same manufacturer.
 - a. Panels, grid and wall moldings to be supplied by same manufacturer to maximize warranty.
- C. Surface Burning Characteristics: Maximum 25/450 flame spread/smoke developed index when tested in accordance with ASTM E84.
- D. Perform Work in accordance with State of South Carolina standards.
- E. Maintain one copy of each document on site.
- F. **Single Source Responsibility for the Metal Stud Framing Section 05400, Gypsum Board installation and finishing Section 09260 and Acoustical Ceiling Tile Section 09510.**

1.6 QUALIFICATIONS

- A. Manufacturer: Company specializing in manufacturing products specified in this section with minimum three years documented experience.
- B. Installer: Company specializing in performing work of this section with minimum 5 years documented experience approved by manufacturer.
- C. Provide seismic design of suspended ceiling under direct supervision of Professional Engineer experienced in design of this Work and licensed in State of South Carolina.

1.7 PRE-INSTALLATION MEETINGS

- A. Section 01300 - Administrative Requirements: Pre-installation meeting.
- B. Convene minimum one week prior to commencing work of this section.

1.8 ENVIRONMENTAL REQUIREMENTS

- A. Section 01600 - Product Requirements.
- B. Maintain uniform temperature of minimum 60 degrees F, and maximum humidity of 40 percent prior to, during, and after acoustic unit installation.

1.9 SEQUENCING

- A. Section 01100 - Summary: Requirements for sequencing.
- B. Sequence Work to ensure acoustic ceilings are not installed until building is enclosed, sufficient heat is provided, dust generating activities have terminated, and overhead work is completed, tested, and approved.
- C. Install acoustic units after interior wet work is dry and panels have reached room temperature and a stabilized moisture content.

1.10 COORDINATION

- A. Coordinate layout and installation of acoustical panels and suspension system with other construction that penetrates ceilings or is supported by them, including light fixtures, HVAC equipment, fire-suppression system, and partition assemblies.

1.11 EXTRA MATERIALS

- A. Section 01700 - Execution Requirements: Spare parts and maintenance products.
- B. Furnish 225 sq. ft. of attic stock tile to Owner.

PART 2 PRODUCTS

2.1 SUSPENDED ACOUSTICAL CEILINGS

- A. Manufacturers:
 - 1. USG Interiors.
 - 2. Substitutions: Section 01600 - Product Requirements: Requests must include certification that products are classified as formaldehyde free or low formaldehyde according to standards set by ASHRAE, ANSI and CHPS .

2.2 COMPONENTS

- A. All acoustic tile panels to conform with ASTM E1264, conforming to the following:
 - 1. ACT 1 - Astro ClimaPlus #8223
 - a. Size: 24 in. x 24 in.
 - b. Thickness: 5/8 inch
 - c. Composition: Mineral, Class A
 - d. Light Reflectance (LR): Not less than .86
 - e. Noise Reduction Coefficient (NRC) Range: Not less than .55
 - f. CAC Minimum: 35
 - g. EDGE: SLT, Shadowline Tapered
 - h. Surface Color: White
 - i. Surface Finish: Fine Texture - Non-Perforated
 - j. Recycle Content: Minimum 62%
 - k. Grid: USG Donn DX 26 HD Grid - 15/16 inch with MS 274 2" Shadow moulding
- B. Broad Spectrum Antimicrobial Fungicide and Bactericide Treatment: Provide acoustical panels treated with manufacturer's standard antimicrobial formulation that inhibits fungus, mold, mildew, and gram-positive and gram-negative bacteria and showing no mold, mildew, or bacterial growth when tested according to ASTM D3273 and evaluated according to ASTM D3274. Provide 30-year written warranty against growth of mold and mildew.
- C. Grid
 - 1. Non-Fire Rated Grid: ASTM C635, heavy duty, exposed T/one direction; components die cut and interlocking.

2. Grid Materials: Commercial quality cold rolled steel with galvanized coating.
3. Exposed Grid Surface Width: 15/16 inch.
4. Grid Finish: White
5. Accessories: Stabilizers bars, clips, splices, perimeter moldings, and hold down clips required for suspended grid system.
6. Support Channels and Hangers: Galvanized steel; size and type to suite application, seismic requirements, and ceiling system flatness requirement specified.

2.3 ACCESSORIES

- A. Acoustic Batt Insulation: Specified in Section 07213.
- B. Acoustic Sealant For Perimeter Moldings: Specified in Section 07900.
- C. Touch-up Paint: Type and color to match acoustic and grid units.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Section 01300 - Administrative Requirements: Coordination and project conditions.
- B. Verify layout of hangers will not interfere with other work.

3.2 INSTALLATION

- A. Lay-In Grid Suspension System:
 1. Install suspension system in accordance with ASTM C635, ASTM C636 and as supplemented in this section.
 2. Install system in accordance with Seismic Design Category D.
 3. Install system capable of supporting imposed loads to deflection of 1/360 maximum.
 4. Locate system on room axis according to reflected plan.
 5. Install after major above ceiling work is complete. Coordinate location of hangers with other work.
 6. Install hanger clips during steel deck erection. Install additional hangers and inserts as required.
 7. Hang suspension system independent of walls, columns, ducts, pipes and conduit. Where carrying members are spliced, avoid visible displacement of face plane of adjacent members.
 8. Where ducts or other equipment prevent regular spacing of hangers, reinforce nearest affected hangers and related carrying channels to span extra distance.
 9. Do not support components on main runners or cross runners when weight causes total dead load to exceed deflection capability. Support fixture loads by supplementary hangers located within 6 inches of each corner; or support components independently.
 10. Do not eccentrically load system, or produce rotation of runners.
 11. Perimeter Molding: Donn MS 274 Shadow Molding.

- a. Install edge molding at intersection of ceiling and vertical surfaces into bed of acoustic sealant.
 - b. Use longest practical lengths.
 - c. Miter and rivet corners.
 - d. Install at junctions with other interruptions.
12. Form expansion joints to accommodate plus or minus 1 inch movement. Maintain visual closure.
- B. Suspend ceiling hangers from building's structural members and as follows:
1. Where width of ducts and other construction within ceiling plenum produces hanger spacings that interfere with location of hangers at spacings required to support standard suspension system members, install supplemental suspension members and hangers in form of trapezes or equivalent devices.
 2. Secure wire hangers to ceiling suspension members and to supports above with a minimum of three tight turns. Connect hangers directly either to structures or to inserts, eye screws, or other devices that are secure and appropriate for substrate and that will not deteriorate or otherwise fail due to age, corrosion, or elevated temperatures.
 3. Do not support ceilings directly from permanent metal forms or floor deck. Fasten hangers to cast-in-place hangers inserts, postinstalled mechanical or adhesive anchors, or power-actuated fasteners that extend through forms into concrete.
 4. When steel framing does not permit installation of hanger wires at spacing required, install carrying channels or other supplemental support for attachment of hanger wires.
 5. Do not attach hangers to steel deck tabs.
 6. Do not attach hangers to steel roof deck. Attach hangers to structural members.
 7. Space hangers not more than 48 inches oc along each member supported directly from hangers, unless otherwise indicated; provide hangers not more than 8 inches from ends of each member.
 8. Size supplemental suspension members and hangers to support ceiling loads within performance limits established by referenced standards and publications.
- C. Secure bracing wires to ceiling suspension members and to supports with a minimum of four tight turns. Suspend bracing from building's structural members as required for hangers, without attaching to permanent metal forms, steel deck, or steel deck tabs. Fasten bracing wires into concrete with cast-in-place or postinstalled anchors.
- D. Where area of ceiling exceeds 2500 square feet provide seismic separation joints as indicated, or if not indicated, as directed by Architect.
- E. Install edge moldings and trim of type indicated at perimeter of acoustical ceiling area and where necessary to conceal edges of acoustical panels.
1. Install USG Shadow Molding in accordance with manufacturer's written recommendations with all accessories necessary to comply with ICC Report ESR-1308.
 2. Apply acoustical sealant in a continuous ribbon concealed on back of vertical legs of moldings before they are installed.
 3. Screw attach moldings to substrate at intervals not more than 16 inches oc and not more than 3 inches from ends, leveling with ceiling

- suspension system to a tolerance of 1/8 inch in 12 feet. Miter corners accurately and connect securely.
4. Do not use exposed fasteners, including pop rivets, on moldings and trim
- F. Install suspension system runners so they are square and securely interlocked with one another. Remove and replace dented, bent, or kinked members.
- G. Install acoustical panels with undamaged edges and fit accurately into suspension system runners and edge moldings. Scribe and cut panels at borders and penetrations to provide a neat, precise fit.
- H. Acoustic Units:
1. Fit acoustic units in place, free from damaged edges or other defects detrimental to appearance and function.
 2. Lay directional patterned units one way with pattern parallel to longest room axis. Fit border trim neatly against abutting surfaces.
 3. Install units after above ceiling work is complete.
 4. Install acoustic units level, in uniform plane, and free from twist, warp, and dents.
 5. Cutting Acoustic Units:
 - a. Cut to fit irregular grid and perimeter edge trim.
 - b. Cut bevel edges to field cut units.
 - c. Double cut and field paint exposed edges of tegular units.
 6. Where bullnose concrete block corners or round obstructions occur, install preformed closures to match perimeter molding.
 7. Lay acoustic insulation for distance of 48 inches on both sides of acoustic partitions as indicated on Drawings.

3.3 ERECTION TOLERANCES

- A. Section 01400 - Quality Requirements: Tolerances.
- B. Maximum Variation from Flat and Level Surface: 1/8 inch in 10 feet.
- C. Maximum Variation from Plumb of Grid Members Caused by Eccentric Loads: 2 degrees.

3.4 SCHEDULES

- A. See Room Finish Schedule.

END OF SECTION 09510

SECTION 09651

RESILIENT TILE FLOORING
ALLOWANCE

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Resilient tile flooring and accessories.
- B. **Allowances: Include under provisions of Section 01200 - Price and Payment Procedures.**
The General Contractor shall allow the sum of as indicated in Section 01200 for the furnishing and installation of sheet carpet. This sum does not include the overhead and profit of the General Contractor. The Architect reserves the right to assign a contract, or purchase order, to the General Contractor. The General Contractor **shall not issue a contract** on the allowance without the prior approval of the Architect.

1.1 RELATED SECTIONS

- A. Section 03300 - Cast in Place Concrete: Concrete substrate.
- B. Section 06100 - Rough Carpentry: Plywood subflooring and underlayment.
- C. Section 09650 – Resilient Flooring

1.2 REFERENCES

- A. American Association of Textile Chemists and Colorists, AATCC 134 - Electrostatic Propensity of Carpets.
- B. ASTM International (ASTM):
 1. ASTM C 1028 - Standard Test Method for Determining the Static Coefficient of Friction of Ceramic Tile and Other Like Surfaces by the Horizontal Dynamometer Pull-Meter Method.
 2. ASTM D 2859 - Standard Test Method for Ignition Characteristics of Finished Textile Floor Covering Materials.
 3. ASTM D 3884 - Standard Guide for Abrasion Resistance of Textile Fabrics (Rotary Platform, Double-Head Method), Abrasion Wheels- H18 with 1000grams load.
 4. ASTM E 492 - Standard Test Method for Laboratory Measurement of Impact Sound Transmission Through Floor-Ceiling Assemblies Using the Tapping Machine.
 5. ASTM E 662 - Standard Test Method for Specific Optical Density of Smoke Generated by Solid Materials.
 6. ASTM E 648 - Standard Test Method for Critical Radiant Flux of Floor-Covering Systems Using a Radiant Heat Energy Source.
 7. ASTM E 989 - Standard Classification for Determination of Impact Insulation Class (IIC).
 8. ASTM F 137 - Standard Test Method for Flexibility of Resilient Flooring Materials with Cylindrical Mandrel Apparatus.
 9. ASTM F 386 - Standard Test Method for Thickness of Resilient Flooring Materials Having Flat Surfaces.
 10. ASTM F 925 - Standard Test Method for Resistance to Chemicals of Resilient Flooring.

11. ASTM F 970 - Standard Test Method for Static Load Limit.
12. ASTM F 1514 - Standard Test Method for Measuring Heat Stability of Resilient Flooring by Color Change.
13. ASTM F 1515 - Standard Test Method for Measuring Light Stability of Resilient Flooring by Color Change.
14. ASTM F 1700 - Standard Specification for Solid Vinyl Floor Tile.
15. ASTM F 1869 - Standard Test Method for Measuring Moisture Vapor Emission Rate of Concrete Subfloor Using Anhydrous Calcium Chloride.
16. ASTM F 1914 - Standard Test Methods for Short-Term Indentation and Residual Indentation of Resilient Floor Covering.
17. ASTM F 2055 - Standard Test Method for Size and Squareness of Resilient Floor Tile by Dial Gage Method.
18. ASTM F 2170 - Standard Test Method for Determining Relative Humidity in Concrete Floor Slabs Using in situ Probes.
19. ASTM F 2199 - Standard Test Method for Determining Dimensional Stability of Resilient Floor Tile after Exposure to Heat.

1.3 SUBMITTALS

- A. Submit under provisions of Section 01300.
- B. Product Data: Provide detailed data on each product to be used including but not limited to the following information as applicable:
 1. Preparation instructions and recommendations.
 2. Storage and handling requirements and recommendations.
 3. Installation methods.
 4. Maintenance recommendations.
- C. Selection Samples: For each finish product specified, two sets of each type, colors and finish of resilient flooring and accessory required, indicating full range of color and pattern variation.
- D. Verification Samples: For each finish product specified, two sets of each type, colors and finish of resilient flooring and accessory required, indicating color and pattern of actual product, including variations, as proof of application compliance.
- E. Closeout Submittals: Submit three copies of the following:
 1. Maintenance and operation data includes - methods for maintaining installed products, and precautions against cleaning materials and methods detrimental to finishes and performance.
 2. Documentation of warranty specified herein.
- F. Flame Spread Certification: Submit manufacturer's certification that resilient flooring furnished for areas indicated to comply with required flame spread rating has been tested and meets or exceeds indicated or required standard.

1.4 QUALITY ASSURANCE

- A. Installer Qualifications: Minimum two years experience and completed at least three projects of similar magnitude, material and complexity. Upon request, provide project references including contact names and telephone numbers for three projects.
- B. Mock-Up: Provide a mock-up for evaluation of surface preparation techniques and application workmanship.
 1. Finish areas designated by Architect.
 2. Do not proceed with remaining work until workmanship, color, sheen and

finished appearance are approved by Architect.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Store products in manufacturer's unopened packaging until ready for installation.
- B. Flooring material and adhesive shall be acclimated to the installation area for a minimum of 48 hours prior to installation.
- C. Store cartons of tile products flat and squarely on top of one another, not on edge.
- D. Store tubes of feature strips and borders in a horizontal position. Storage in a vertical or inclined position causes uneven weight distribution, which will spaghetti the ends of the feature strips. Store all tubes laying flat.

1.6 PROJECT CONDITIONS

- A. Environmental Requirements/Conditions: In accordance with manufacturer's recommendations. Areas to receive flooring shall be clean, fully enclosed, weather tight with the permanent HVAC set at a uniform temperature of at least 65 degrees F (18 degrees C) and less than 85 degrees (30 degrees C) 48 hours prior to and during and for not less than 48 hours after installation. The flooring material shall be conditioned in the same manner prior to installation.
- B. Close spaces to traffic during resilient flooring installation and for a period of time after installation as recommended in writing by the manufacturer.
- C. Install resilient flooring materials and accessories after other finishing operations, including painting, have been completed.
- D. Where demountable partitions and other items are indicated for installation on top of sheet resilient flooring material, install flooring material before these items are to be installed.
- E. Concrete substrates should not exceed 82 percent RH and/or 6 lbs. X 24 hrs. X 1000 sf. moisture vapor emissions rate tested in accordance to ASTM F 2170 and ASTM F 1869.
- F. Store tubes of feature strips and borders in a horizontal position. Storage in a vertical or inclined position causes uneven weight distributions, which will spaghetti the ends of the feature strips. Store all tubes laying flat.

1.7 WARRANTY

- A. Warranty Period: Manufacturer's standard warranty against manufacturing defects and wearing for flooring and as follows:
 - 1. 10 year commercial warranty.

1.8 EXTRA MATERIALS

- A. Deliver to Owner extra materials from same production run as products installed. Package products with protective covering and identify with descriptive labels. Comply with Division 1 closeout submittals requirements.
 - 1. Quantity: Furnish quantity of flooring units equal to 2 percent of amount installed. Storage and Protection: Comply with Owner's requirements for delivery, storage and protection of extra materials.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Acceptable Manufacturer: Mohawk Select Step Luxury Vinyl Tile, which is located at: 160 S. Industrial Blvd, Calhoun, GA 30701; Toll Free Tel: 888-740-6936; Web: www.mohawkgroup.com
- B. Substitutions: Not permitted.
- C. Requests for substitutions will be considered in accordance with provisions of Section 01600.

2.2 RESILIENT TILE FLOORING (LVT)

Resilient Tile Flooring: Mohawk Select Step Luxury Vinyl Tile (Basis of Design)

- 1. Dimensions: 48 inches by 6 inches
- 2. Material Compliance: ASTM F 1700, BS EN 649, BSEN 654.
 - a. Reaction to Fire: ASTM E 662, ASTM E 648.
 - b. Slip Resistance: ASTM C 1028, R9 classification.
- 3. Antimicrobial Properties: AATCC Method 174, Part 174.
- 4. Wear Layer Thickness: 20 mil (0.5 mm).
- 5. Tile Thickness: 3 mm.
- 6. Edge: Non-beveled edge.
- 7. Item Number and Name:
 - a. TBD from standard colors

2.3 ACCESSORIES

- A. Manufacturer's Floor Care Kit with cleaning and maintenance products in quantities appropriate to size and scope of resilient flooring application are available but not required.
- B. Adhesive: Manufacturer's recommended adhesive as follows.
 - 1. Manufacturer's Epoxy adhesive.
 - a. Provide manufacturer's recommended concrete floor sealer for high moisture applications.
 - 2. Manufacturer's 332 acrylic "wet set" adhesive.
 - a. Provide manufacturer's recommended concrete floor sealer for high moisture applications.
 - 3. Manufacturer's pressure sensitive adhesive.
 - a. Provide manufacturer's recommended concrete floor sealer for high moisture applications.
- C. Portland based cementitious base leveler. Gypsum based not acceptable.
- D. Manufacturer approved substrate board

PART 3 EXECUTION

3.1 EXAMINATION

- A. Inspect floor to be installed immediately upon arriving at job site; perform a moisture test.
- B. Do not begin installation until substrates have been properly prepared.
- C. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

- D. The installation of the resilient flooring shall not begin until the work of all other trades has been completed, particularly wet and overhead trades.
- E. Areas to receive flooring shall be adequately lighted during all phases of the installation process.

3.2 PREPARATION

- A. Clean surfaces thoroughly prior to installation.
- B. Using Portland based cementitious base leveler fill and cover all seams, nail heads, voids, cracks, and expansion joints. Achieve smooth, even, firmly attached substrate for best finish results. Gypsum based underlayment not acceptable with Vinyl Flooring unless it is first properly prepared.
 - 1. Encapsulate the gypsum with a premium latex primer/sealer.
 - 2. Float with a Portland cement compound using a latex additive (as recommended by the manufacturer) instead of water.
 - 3. Once substrate levelness is achieved continue with the next step.
- C. Apply concrete floor sealer to substrate in accordance with manufacturer's recommendations.
- D. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.
- E. Concrete Substrates: The Contractor shall verify to the Owner and installer a minimum of 30 days prior to the scheduled resilient flooring installation the following substrate conditions. All substrate testing shall be documented and submitted to the Architect and Owner before commencement of the flooring installation.
 - 1. Verify that substrates are dry, free of debris, and that all curing compounds, sealers, and hardeners have properly cured.
 - 2. Remove substrate coatings and other substances that are incompatible with adhesives and that contain soap, wax, oil, or silicone, using mechanical methods recommended by manufacturer. Do not use solvents.
 - 3. Alkalinity and Adhesion Testing: Perform tests recommended by manufacturer. Proceed with installation only after substrates pass testing.
 - 4. Moisture Testing: Perform tests recommended by manufacturer and as follows. Proceed with installation only after substrates pass testing.

3.3 INSTALLING RESILIENT TILES AND PLANKS

- A. General:
 - 1. Permanent HVAC system shall be turned on and set to a minimum of 65 degrees F (20 degrees C) for a minimum of 48 hours prior to, during and 48 hours after installation. After the installations, the maximum temperature should not exceed 125 degrees F (37 degrees C).
 - 2. All products must be allowed to acclimate at least 24 to 48 hours before installation. This means product must be placed in the same room as the install that is taking place and removed from its factory packaging.
 - 3. Material shall be visually inspected prior to installation.
 - 4. Ensure that all recommendations for sub-floor and jobsite conditions are met prior to beginning the installation. Once the installation is started, Contractor and installer have accepted those conditions.
 - 5. Install in accordance with manufacturer's installation instructions for each product type and application specified.

- B. Layout and Installation:
1. In order to achieve a random natural wood look, take planks and cut nominal lengths to be used on the first course; example: 10 inches, 40 inches, 15 inches, 25 inches, 8 inches. At the end of the first course, all cut planks remaining should be used on the next course. Position planks so the end seams are no closer than the width of the plank being installed. Maintain this approach to staggering the planks throughout the entire installation.
 2. Center tiles or planks in rooms and hallways so borders are not less than half a tile or plank when possible.
 3. Cut edges shall always be installed against a wall.
 4. Install using tile and plank installation techniques recommended by manufacturer.
 5. Install tiles, planks, borders and feature strips in locations and configurations indicated on the Drawings.
- C. Adhesive Application:
1. Any spread glue has to be covered with material and rolled within the recommended time frame described on the adhesive container.
 2. If troweled adhesive skims over, scrape up and reapply.
 3. Install in accordance with adhesive manufacturer's recommendations.
 4. Refer to manufacturer's literature for selection criteria for trowel size, type.
 5. Using proper trowel size, apply adhesive in accordance with label on adhesive.
 6. Spread a 4 inch wide band of adhesive around the perimeter of the area designated as an extreme condition area.
 7. An additional 4 inch band should be spread at approximately 10 foot (3 m) intervals.
 8. For transitional areas, from loose lay to another floor covering of a different height, a 4 inch band of adhesive should be spread across the length of the transition.

3.4 CLEANING

- A. Wipe off any adhesive on floor as installation proceeds. Wait 48 hours before applying the cleaning and maintenance products.
- B. Prior to installation of permanent fixtures or furniture, remove all dirt, debris, or residual adhesive and clean the floor. If desired, a protective coating may be applied at this time. Specific products and instructions are available from the manufacturer.

3.5 PROTECTION

- A. Protect installed products until completion of project.
- B. Touch-up, repair or replace damaged products before Substantial Completion.

3.6 MAINTENANCE

- A. Comply with manufacturers instructions for proper cleaning and maintenance of the products.

3.7 SCHEDULE

- A. Refer to the Room Finish Schedule on the architectural drawings for VCT2.

END OF SECTION

SECTION 09900
PAINTS AND COATINGS

PART 1 GENERAL

1.1 SUMMARY

- A. Section includes surface preparation and field application of paints, stains, varnishes, and other coatings.
- B. Paint and stain all surfaces that are primed for painting. Do not paint any surfaces that are factory primed unless noted otherwise.
- C. Related Sections:
 - 1. Section 05500 - Metal Fabrications: Shop primed items.
 - 2. Section 08111 - Standard Steel Doors and Frames
 - 3. Section 09260 - Gypsum Wallboard Assemblies
 - 4. Section 15075 - Identification for Plumbing Piping and Equipment.
 - 5. Section 15076 - Identification for HVAC Piping and Equipment.
 - 6. Section 16075 - Identification for Electrical Systems.
 - 7. Section 16076 - Identification for Communications Systems.

1.2 REFERENCES

- A. ASTM International:
 - 1. ASTM D16 - Standard Terminology Relating to Paint, Varnish, Lacquer, and Related Products.
 - 2. ASTM D4442 - Standard Test Methods for Direct Moisture Content Measurement of Wood and Wood-Base Materials.
 - 3. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials.
- B. National Fire Protection Association:
 - 1. NFPA 255 - Standard Method of Test of Surface Burning Characteristics of Building Materials.
- C. Painting and Decorating Contractors of America:
 - 1. PDCA - Architectural Painting Specification Manual.
- D. SSPC: The Society for Protective Coatings:
 - 1. SSPC - Steel Structures Painting Manual.
- E. Underwriters Laboratories Inc.:
 - 1. UL 723 - Tests for Surface Burning Characteristics of Building Materials.

1.3 DEFINITIONS

- A. Conform to ASTM D16 for interpretation of terms used in this section.

1.4 SUBMITTALS

- A. Section 01330 - Submittal Procedures: Submittal procedures.
- B. Product Data: Submit data on finishing products. Samples:

1. Submit color charts for selection by architect for review not less than four weeks before painting is scheduled to start.
- C. Manufacturer's Installation Instructions: Submit special surface preparation procedures, substrate conditions requiring special attention.

1.5 CLOSEOUT SUBMITTALS

- A. Section 01700 - Execution Requirements: Closeout procedures.
- B. Operation and Maintenance Data: Submit data on cleaning, touch-up, and repair of painted and coated surfaces.

1.6 QUALITY ASSURANCE

- A. Surface Burning Characteristics:
 1. Fire Retardant Finishes: Maximum 25/450 flame spread/smoke developed index when tested in accordance with ASTM E84.
- B. Perform Work in accordance with State of South Carolina standards.
- C. Maintain one copy of each document on site.
- D. Surface Preparation: Surface preparation will be based upon comparison with: "Pictorial Surface Preparation Standards for Painting Steel Surfaces", SSPC-Vis-1 and ASTM Designation D2200; "Standard Methods of Evaluating Degree of Rusting on Painted Steel Surfaces" SSPC-Vis-2 and ASTM Designation D610; "Visual Standard for Surfaces of New Steel Airblast Cleaned with Sand Abrasive" or "Guideline for Selecting and Specifying Concrete Surface Preparation for Sealers, Coating and and Polymer Overlays" and ICRI CSP Surface Profile Chips.
- E. Application: No coating or paint shall be applied: When the surrounding air temperature or the temperature of the surface to be coated is below the minimum required temperature for the specified product; to wet or damp surfaces or in fog or mist; when the temperature is less than 5 degrees F. above the dewpoint; when the air temperature is expected to drop below 40 degrees F. within six hours after application of coating. Dewpoint shall be measured by use of an instrument such as a Sling Psychrometer in conjunction with U.S. Department of Commerce Weather Bureau Psychrometric Tables. If above conditions are prevalent, coating or painting shall be delayed or postponed until conditions are favorable. The day's coating or painting shall be completed in time to permit the film sufficient drying time prior to damage by atmospheric conditions.

1.7 QUALIFICATIONS

- A. Manufacturer: Company specializing in manufacturing products specified in this section with minimum ten years documented experience.
- B. Applicator: Company specializing in performing work of this section with minimum ten years documented experience and approved by manufacturer.

- 1.8 MOCKUP/FIELD SAMPLES
- A. Section 01400 - Quality Requirements: Mock-up and Field Sample requirements.
 - B. Construct field sample on actual walls as directed by architect, 6 feet long by 6 feet wide, illustrating coating color, texture, and finish. Repaint field sample until all colors are selected. Provide a field sample for each color selected by the architect. Provide finish lighting conditions where sample is to be painted. Ample time to review the samples shall be incorporated.
 - C. Locate where directed by Architect/Engineer.
 - D. Incorporate accepted mockup as part of Work.
- 1.9 PRE-INSTALLATION MEETINGS
- A. Section 01300 - Administrative Requirements: Pre-installation meeting.
 - B. Convene minimum one week prior to commencing work of this section. **Do not proceed with remaining work until Architect approves of the mark-up samples.**
- 1.10 DELIVERY, STORAGE, AND HANDLING
- A. Section 01600 - Product Requirements: Product storage and handling requirements.
 - B. Deliver products to site in sealed and labeled containers; inspect to verify acceptability.
 - C. 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.
 - D. Paint Materials: Store at minimum ambient temperature of 45 degrees F and maximum of 90 degrees F, in ventilated area, and as required by manufacturer's instructions.
- 1.11 ENVIRONMENTAL REQUIREMENTS
- A. Section 01600 - Product Requirements.
 - B. Do not apply materials when surface and ambient temperatures are outside temperature ranges required by paint product manufacturer.
 - C. Do not apply exterior coatings during rain or snow when relative humidity is outside humidity ranges, or moisture content of surfaces exceed those required by paint product manufacturer.
 - D. Minimum Application Temperatures for Latex Paints: 45 degrees F for interiors; 50 degrees F for exterior; unless required otherwise by manufacturer's instructions.
 - E. Minimum Application Temperature for Varnish and Finishes: 65 degrees F for interior or exterior, unless required otherwise by manufacturer's instructions.

- F. Provide lighting level of 80 ft candle measured mid-height at substrate surface.

1.12 SEQUENCING

- A. Section 01100 - Summary: Work sequence.
- B. Sequence application to the following:
 1. Do not apply finish coats until paintable sealant is applied.
 2. Back prime wood trim before installation of trim.

1.13 WARRANTY

- A. Section 01700 - Execution Requirements: Product warranties and product bonds.
- B. Furnish five year manufacturer warranty for paints and coatings.

1.14 EXTRA MATERIALS

- A. Section 01700 - Execution Requirements: Spare parts and maintenance products.
- B. Supply 1 gallon of each color, type, and surface texture; store where directed.
- C. Label each container with color, type, texture, room locations, in addition to manufacturer's label.

PART 2 PRODUCTS

2.1 PAINTS AND COATINGS

- A. Manufacturers: Paint, Transparent Finishes, Stain, Primer Sealers, Block Filler, Field Catalyzed Coatings.
 1. Sherman Williams (basis for design)
 2. Devoe Paint Co.
 3. Duron Inc.
 4. The Glidden Co.
 5. PPG Architectural Finishes
 6. Substitutions: Section 01600 - Product Requirements

2.2 COMPONENTS

- A. Coatings: Ready mixed, except field catalyzed coatings. Prepare coatings:
 1. To soft paste consistency, capable of being readily and uniformly dispersed to homogeneous coating.
 2. For good flow and brushing properties.
 3. Capable of drying or curing free of streaks or sags.
 4. Exterior: GC-03
 5. Clear Wood Finishes: SCAQMD Rule 113
 6. Interior: Maximum Volatile Organic Compound Content in accordance with GS-11 with a maximum of 50 g/L for flat paints and coatings and 150 g/L for non-flat paints and coatings.

- B. Accessory Materials: Linseed oil, shellac, turpentine, paint thinners and other materials not specifically indicated but required to achieve finishes specified; commercial quality.
- C. Patching Materials: Latex filler. Fastener Head Cover Materials: Latex filler.

Exterior Steel and Associated Items (new and existing)

Surface Preparation: Power wash the entire exterior surface using 3,500 PSI with a rotating turbo nozzle to remove all loose paint, rust, dirt, scale and foreign matter. Great Lakes Laboratories Extra Muscle Prepaint Cleaner, CHLOR*WASH or equal shall be used with the power washing to help remove all the existing contaminants from the surface prior to painting. SSPC-SP3 Power Tool Cleaning or Blast Clean all rust and corrosion, feather the edges, and spot prime all cleaned areas with a Sherwin Williams Steel spec FHP Universal Primer/Finish. The surface shall be clean and dry before painting.

1st and 2nd Coat: Steel Spec FHP Universal Primer/Finish B50WV800, B50WV8002 White/Gray
Steel Spec FHP Universal Primer/Finish at 2.0 – 4.0 dry mils.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Section 01300 - Administrative Requirements: Coordination and project conditions.
- B. Verify surfaces and substrate conditions are ready to receive Work as instructed by product manufacturer.
- C. Examine surfaces scheduled to be finished prior to commencement of work. Report conditions capable of affecting proper application.
- D. Test shop applied primer for compatibility with subsequent cover materials.
- E. Measure moisture content of surfaces using electronic moisture meter. Do not apply finishes unless moisture content of surfaces are below the following maximums:
 - 1. Plaster and Gypsum Wallboard: 12 percent.
 - 2. Masonry, Concrete, and Concrete Unit Masonry: 12 percent.
 - 3. Interior Wood: 15 percent, measured in accordance with ASTM D4442.
 - 4. Exterior Wood: 15 percent, measured in accordance with ASTM D4442.
 - 5. Concrete Floors: 8 percent.

3.2 PREPARATION

- A. Surface Appurtenances: Remove electrical plates, hardware, light fixture trim, escutcheons, and fittings prior to preparing surfaces or finishing.
- B. Surfaces: Correct defects and clean surfaces capable of affecting work of this section.

- C. Marks: Seal with shellac those which may bleed through surface finishes.
- D. Impervious Surfaces: Remove mildew by scrubbing with solution of tri-sodium phosphate and bleach. Rinse with clean water and allow surface to dry.
- E. Aluminum Surfaces Scheduled for Paint Finish: Remove surface contamination by steam or high pressure water. Remove oxidation with acid etch and solvent washing. Apply etching primer immediately following cleaning.
- F. Asphalt, Creosote, or Bituminous Surfaces Scheduled for Paint Finish: Remove foreign particles to permit adhesion of finishing materials. Apply compatible sealer or primer.
- G. Insulated Coverings: Remove dirt, grease, and oil from canvas and cotton.
- H. Concrete Floors: Remove contamination, acid etch, and rinse floors with clear water. Verify required acid-alkali balance is achieved. Allow to dry.
- I. Copper Surfaces Scheduled for Paint Finish: Remove contamination by steam, high pressure water, or solvent washing. Apply vinyl etch primer immediately following cleaning.
- J. Copper Surfaces Scheduled for Natural Oxidized Finish: Remove contamination by applying oxidizing solution of copper acetate and ammonium chloride in acetic acid. Rub on repeatedly for required effect. Once attained, rinse surfaces with clear water and allow to dry.
- K. Gypsum Board Surfaces: Fill minor defects with filler compound. Spot prime defects after repair.
- L. Galvanized Surfaces: Remove surface contamination and oils and wash with solvent. Apply coat of etching primer.
- M. Concrete and Unit Masonry Surfaces Scheduled to Receive Paint Finish: Remove dirt, loose mortar, scale, salt or alkali powder, and other foreign matter. Remove oil and grease with solution of tri-sodium phosphate; rinse well and allow to dry. Remove stains caused by weathering of corroding metals with solution of sodium metasilicate after thoroughly wetting with water. Allow to dry.
- N. Plaster Surfaces: Fill hairline cracks, small holes, and imperfections with latex patching plaster. Make smooth and flush with adjacent surfaces. Wash and neutralize high alkali surfaces.
- O. Uncoated Steel and Iron Surfaces: Remove grease, mill scale, weld splatter, dirt, and rust. Where heavy coatings of scale are evident, remove by power tool wire brushing or sandblasting; clean by washing with solvent. Apply treatment of phosphoric acid solution, ensuring weld joints, bolts, and nuts are similarly cleaned. Spot prime paint after repairs.
- P. Shop Primed Steel Surfaces: Sand and scrape to remove loose primer and rust. Feather edges to make touch-up patches inconspicuous. Clean surfaces with solvent. Prime bare steel surfaces. Prime metal items including shop primed items.

- Q. Interior Wood Items Scheduled to Receive Paint Finish: Wipe off dust and grit prior to priming. Seal knots, pitch streaks, and sappy sections with sealer. Fill nail holes and cracks after primer has dried; sand between coats.
- R. Interior Wood Items Scheduled to Receive Transparent Finish: Wipe off dust and grit prior to sealing, seal knots, pitch streaks, and sappy sections with sealer. Fill nail holes and cracks after sealer has dried; sand lightly between coats.
- S. Exterior Wood Scheduled to Receive Paint Finish: Remove dust, grit, and foreign matter. Seal knots, pitch streaks, and sappy sections. Fill nail holes with tinted exterior paintable caulking compound after prime coat has been applied.
- T. Exterior Wood Scheduled to Receive Transparent Finish: Remove dust, grit, and foreign matter; seal knots, pitch streaks, and sappy sections with sealer. Fill nail holes with tinted exterior caulking compound after sealer has been applied.
- U. Wood Doors Scheduled for Painting: Seal wood door top and bottom edge surfaces with clear sealer.
- V. Metal Doors Scheduled for Painting: Prime metal door top and bottom edge surfaces.

3.3 EXISTING WORK

- A. Extend existing paint and coatings installations using materials and methods compatible with existing installations and as specified.

3.4 APPLICATION

- A. Do not apply finishes to surfaces that are not dry. Allow applied coats to dry before next coat is applied.
- B. Apply each coat to uniform appearance. Apply each coat of paint slightly darker than preceding coat unless specified otherwise.
- C. Sand wood and metal surfaces lightly between coats to achieve required finish.
- D. Vacuum clean surfaces of loose particles. Use tack cloth to remove dust and particles just prior to applying next coat.
- E. Where clear finishes are required, tint fillers to match wood. Work fillers into grain before set. Wipe excess from surface.
- F. Prime concealed surfaces of interior and exterior woodwork with primer paint.
- G. Prime concealed surfaces of interior wood surfaces scheduled to receive stain or varnish finish with gloss varnish reduced 25 percent with thinner.
- H. Finishing Mechanical And Electrical Equipment:
 - 1. Refer to Division 15 and Division 16 for schedule of color coding and identification banding of equipment, duct work, piping, and conduit.
 - 2. Paint shop primed equipment.
 - 3. Remove unfinished louvers, grilles, covers, and access panels on mechanical and electrical components and paint separately.

4. Prime and paint insulated and exposed pipes, conduit, boxes, insulated and exposed ducts, hangers, brackets, collars and supports, except where items are shop finished.
5. Paint interior surfaces of air ducts visible through grilles and louvers with one coat of flat black paint to visible surfaces. Paint dampers exposed behind louvers, grilles, to match face panels.
6. Paint exposed conduit and electrical equipment occurring in finished areas.
7. Paint both sides and edges of plywood backboards for electrical and telephone equipment before installing equipment.
8. Color code equipment, piping, conduit, and exposed duct work in accordance with requirements indicated. Color band and identify with flow arrows, names, and numbering.
9. Reinstall electrical cover plates, hardware, light fixture trim, escutcheons, and fittings removed prior to finishing.

3.5 FIELD QUALITY CONTROL

- A. Section 01400 - Quality Requirements and 01700 - Execution Requirements: Field inspecting, testing, adjusting, and balancing.

3.6 CLEANING

- A. Section 01700 - Execution Requirements: Final cleaning.
- B. Collect waste material which may constitute fire hazard, place in closed metal containers, and remove daily from site.

3.7 SCHEDULE - SHOP PRIMED ITEMS FOR SITE FINISHING

- A. Metal Fabrications (Section 05500): Exposed surfaces of lintels, elevator pit ladders.
- B. Metal Stairs (Section 05510): Exposed surfaces of stringers exposed vertical risers.

3.8 SCHEDULE - EXTERIOR SURFACES

- A. Pavement Markings: See Division Two
- B. Steel - Unprimed:
 1. One coat of (1) Steel Spec FHP Universal Primer/Finish.
 2. One coats of (1) Steel Spec FHP Universal Primer/Finish.
- C. Steel - Galvanized:
 1. One coat All Surface latex Primer A41 Series.
 2. Two coats of alkyd semi-gloss.
- D. Fiber Cementitious Siding & Trim – Brush Applied Only – No spray application allowed
 1. Unprimed: Prime with first coat 100% acrylic primer Loxon A24W300. Prime all cut edges in accordance with manufacturer's recommendations
 2. Topcoat: Two coats of Exterior Super Paint A80 series flat.
 - a. Trim Color will differ from siding color

3.9 SCHEDULE - INTERIOR SURFACES

- A. Steel - Unprimed:
 - 1. One coat of (1) Steel Spec FHP Universal Primer/Finish.
 - 2. One coats of (1) Steel Spec FHP Universal Primer/Finish.
- B. Steel - Galvanized:
 - 1. One coat All Surface latex Primer A41 Series.
 - 2. Two coats of alkyd semi-gloss.
- C. Gypsum Board Walls:
 - 1. One coat of SW Preprite primer 200 B28200 Series.
 - 2. Two coats of SW Cashmere Low Lustre D17 Series
- D. Gypsum Board Ceilings:
 - 1. One coat of SW Preprite primer 200 Series B28200.
 - 2. Two coats of SW Promar 400 Series B30W400 Flat.
- E. Interior wood trim
 - 1. One coat of SW Preprite primer 200 B28200 Series.
 - 2. Two coats of SW Cashmere Low Lustre D17 Series

3.10 SCHEDULE – COLORS

- 1. See Finish Schedule on the Drawings for rooms and spaces scheduled to receive paint and coatings.
- 2. A color schedule showing colors selected will be prepared after the Contract has been awarded. The Contractor is to allow for multiple selection of paint in multiple rooms. A maximum of five different wall colors is anticipated. Multiple colors will be used on the exterior walls.
- 3. Existing Steel – all existing steel shall be cleaned, prepped and primed. Any exposed steel shall be required to have finish coat to include underside of exposed metal deck in Workshop Room 121.

END OF SECTION 09900

SECTION 10170
TOILET COMPARTMENTS

PART 1 GENERAL

1.1 SUMMARY

- A. Section includes solid plastic toilet compartments and urinal screens.
- B. Related Sections:
 - 1. Section 05500 - Metal Fabrications: Concealed steel support members.
 - 2. Section 06114 - Wood Blocking: Concealed wood framing and blocking for compartment support.
 - 3. Section 10800 - Toilet, Bath, and Laundry Accessories.

1.2 REFERENCES

- A. ASTM International:
 - 1. ASTM A666 - Standard Specification for Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar.

1.3 SUBMITTALS

- A. Section 01330 - Submittal Procedures: Submittal procedures.
- B. Shop Drawings: Indicate partition plan, elevation views, dimensions, details of wall and floor supports, door swings.
- C. Product Data: Submit data on panel construction, hardware, and accessories.
- D. Manufacturer's Installation Instructions: Submit special procedures, perimeter conditions requiring special attention.

1.4 COORDINATION

- A. Section 01300 - Administrative Requirements: Coordination and project conditions.
- B. Coordinate Work with placement of support framing and anchors in wall.

PART 2 PRODUCTS

2.1 SOLID PLASTIC TOILET COMPARTMENTS

- A. Manufacturers:
 - 1. Bobrick
 - 2. Atlanta Sunbelt Products
 - 3. Columbia Partitions
 - 4. Lambaton/Universal
 - 5. Substitutions: Section 01600 - Product Requirements.

- B. Product Description: Floor mounted overhead braced.

2.2 COMPONENTS

- A. Toilet Compartments: Solid molded plastic panels, doors, and pilasters, floor-mounted headrail-braced.
1. Color: Single color as selected.
- B. Door and Panel Dimensions:
1. Thickness: 1 inch
 2. Door Width: 24 inch
 3. Accessible Door Width: 36 inch, out-swinging.
 4. Height: 58 inch
 5. Thickness of Pilasters: 1-1/4 inch.
- C. Urinal Screens: Wall mounted with two panel brackets, and floor-to-ceiling vertical upright consisting of tubular headrail stock and sockets anchored to floor and ceiling.

2.3 ACCESSORIES

- A. Pilaster Shoe: Formed chromed steel with satin finish, ASTM A666 Type 304 stainless steel with No. 4 finish, 3 inch high, concealing floor fastenings. Provide adjustment for floor variations with screw jack through steel saddles integral with pilaster.
- B. Head Rails: Hollow stainless steel tube, 1 x 1-5/8 inch size, with cast socket wall brackets.
- C. Brackets: Stainless steel color as selected.
- D. Attachments, Screws, and Bolts: Stainless steel, tamper proof type.
1. For attaching panels and pilasters to brackets: Through-bolts and nuts; tamper proof.
- E. Hardware: Stainless steel:
1. Pivot hinges, gravity type, adjustable for door close positioning; two for each door.
 2. Nylon bearings.
 3. Thumb turn door latch.
 4. Door strike and keeper with rubber bumper; mounted on pilaster in alignment with door latch.
 5. Coat hook with rubber bumper; one for each compartment, mounted on door panel.
 6. Furnish door pull for out-swinging doors.
 7. Furnish metal heat sink at bottom of doors and partitions.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Section 01300 - Administrative Requirements: Coordination and project conditions.

- B. Verify field measurements are as indicated on shop drawings.
- C. Verify correct spacing of and between plumbing fixtures.
- D. Verify correct location of built-in framing, anchorage, and bracing.

3.2 INSTALLATION

- A. Maintain 3/8 to 1/2 inch space between wall and panels and between wall and end pilasters.
- B. Attach panel brackets securely to walls using anchor devices.
- C. Attach panels and pilasters to brackets.
- D. Field touch-up of scratches or damaged finish will not be permitted. Replace damaged or scratched materials with new materials.

3.3 ERECTION TOLERANCES

- A. Section 01400 - Quality Requirements: Tolerances.
- B. Maximum Variation From Indicated Position: 1/4 inch.
- C. Maximum Variation From Plumb: 1/8 inch.

3.4 ADJUSTING

- A. Section 01700 - Execution Requirements: Testing, adjusting, and balancing.
- B. Adjust and align hardware to uniform clearance at vertical edge of doors, not exceeding 3/16 inch.
- C. Adjust hinges to position doors in full closed position when unlatched. Return out-swinging doors to closed position.
- D. Adjust adjacent components for consistency of line or plane.

END OF SECTION 10170

SECTION 10523
FIRE EXTINGUISHERS AND CABINETS

PART 1 GENERAL

1.1 SUMMARY

- A. Section includes fire extinguishers; fire blankets; fire extinguisher cabinets; and brackets for wall mounting.
- B. Related Sections:
 - 1. Section 06114 - Wood Blocking and Curbing: Wood blocking and shims.
 - 2. Section 09900 - Paints and Coatings: Field applied paint finish.
 - 3. Division 15: Mechanical: - Standpipes and Hoses: Cabinet enclosure for extinguishers.

1.2 REFERENCES

- A. National Fire Protection Association:
 - 1. NFPA 10 - Standard for Portable Fire Extinguishers.
- B. Underwriters Laboratories Inc.:
 - 1. UL - Fire Protection Equipment Directory.

1.3 PERFORMANCE REQUIREMENTS

- A. Conform to NFPA 10 and applicable code.
- B. Provide extinguishers classified and labeled by Underwriters Laboratories Inc. for purpose specified and indicated.
- C. Provide fire extinguisher cabinets classified and labeled by Underwriters Laboratories Inc. for purpose specified and indicated.

1.4 SUBMITTALS

- A. Section 01330 - Submittal Procedures: Submittal procedures.
- B. Shop Drawings: Indicate cabinet physical dimensions, rough-in measurements for recessed cabinets, wall bracket mounted measurements, location, and fire ratings.
- C. Product Data: Submit extinguisher operational features, color and finish, and anchorage details.
- D. Manufacturer's Installation Instructions: Submit special criteria and wall opening coordination requirements.
- E. Manufacturer's Certificate: Certify Products meet or exceed specified requirements.

1.5 QUALITY ASSURANCE

- A. Perform Work in accordance with State of South Carolina standards.
- B. Maintain one copy of each document on site.

1.6 CLOSEOUT SUBMITTALS

- A. Section 01700 - Execution Requirements: Closeout procedures.
- B. Operation and Maintenance Data: Submit test, refill or recharge schedules and re-certification requirements.

1.7 ENVIRONMENTAL REQUIREMENTS

- A. Section 01600 - Product Requirements: Environmental conditions affecting products on site.
- B. Do not install extinguishers when ambient temperature is capable of freezing extinguisher ingredients.

PART 2 PRODUCTS

2.1 FIRE EXTINGUISHERS

- A. Manufacturers:
 - 1. JL Industries
 - 2. Larsen's Manufacturing Co.
 - 3. Potter Roemer
 - 4. Substitutions: Section 01600 - Product Requirements.
- B. Furnish materials in accordance with State of South Carolina standards.
- C. Water Type: UM Series, Water Mist, WM 2-1/2 to be installed with standard bracket #864.
- D. Dry Chemical Type: Cast steel tank, with pressure gage; Class B: C, Size 10. Model MP 10.
- E. Extinguisher Finish: Stainless steel, satin chrome finish.

2.2 FIRE EXTINGUISHER CABINETS

- A. Manufacturers:
 - 1. Larsens Model 24096R-Semi Recessed.
 - 2. Substitutions: Section 01600 - Product Requirements.
- B. Configuration: Semi-recessed type, sized to accommodate accessories.
- C. Trim Type: Flat returned to wall surface, with 4 inch projection.
- D. Door: 0.016 inch thick, reinforced for flatness and rigidity; latch, full glass access.
- E. Door Glazing: Glass, clear, 1/8 inch thick tempered.

- F. Cabinet Mounting Hardware: Appropriate to cabinet.
- G. Form cabinet enclosure with right angle inside corners and seams. Form perimeter trim.
- H. Pre-drill for anchors.
- I. Hinge doors for 180 degree opening with continuous piano hinge. Furnish nylon catch.
- J. Weld, fill, and grind components smooth.
- K. Glaze doors with resilient channel gasket glazing.
- L. Finishing Cabinet Exterior Trim and Door: Satin chrome color as selected.

2.3 ACCESSORIES

- A. Fire Blanket: Fire retardant treated wool.
- B. Extinguisher Brackets: Formed steel, chromed finish.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Section 01300 - Administrative Requirements: Coordination and project conditions.
- B. Verify rough openings for cabinet are correctly sized and located.

3.2 INSTALLATION

- A. Install cabinets plumb and level in wall openings, maximum 48 inches from finished floor to top of extinguisher handle.
- B. Install wall brackets, maximum 48 inches from finished floor to top of extinguisher handle.
- C. Secure rigidly in place.
- D. Place extinguishers and accessories in cabinets on wall brackets.
- E. Position cabinet signage as required by authorities having jurisdiction.

3.3 SCHEDULES

- A. Quantity as indicated on floor plan, final location to be determined in field with Architect and local Fire Marshall.

END OF SECTION 10523

SECTION 10800
TOILET AND BATH ACCESSORIES

PART 1 GENERAL

1.1 SUMMARY

- A. Section includes toilet accessories; custodial accessories.
- B. Related Sections:
 - 1. Section 06114-Wood Blocking: In-wall framing and plates for support of accessories.
 - 2. Section 08830 - Mirrors: Other mirrors.
 - 3. Section 09300 - Tile: Ceramic washroom accessories.
 - 4. Section 10170 - Toilet Compartments.

1.2 REFERENCES

- A. ASTM International:
 - 1. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
 - 2. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware.
 - 3. ASTM A269 - Standard Specification for Seamless and Welded Austenitic Stainless Steel Tubing for General Service.
 - 4. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
 - 5. ASTM A666 - Standard Specification for Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar.
 - 6. ASTM B456 - Standard Specification for Electrodeposited Coatings of Copper Plus Nickel Plus Chromium and Nickel Plus Chromium.
 - 7. ASTM C1036 - Standard Specification for Flat Glass.
- B. Federal Specification Unit:
 - 1. FS A-A-3002 - Mirrors, Glass.

1.3 DESIGN REQUIREMENTS

- A. Designs grab bars, and attachments to resist minimum 250 lb concentrated load applied at any point in any direction, forces as required by applicable code.

1.4 SUBMITTALS

- A. Section 01330 - Submittal Procedures: Submittal procedures.
- B. Product Data: Submit data on accessories describing size, finish, details of function, attachment methods.
- C. Manufacturer's Installation Instructions: Submit special procedures, and conditions requiring special attention.

1.5 QUALITY ASSURANCE

- A. Flame Resistant Fabric: Passes when tested in accordance with NFPA 701, Test 1 or Test 2.
- B. Perform Work in accordance with State of South Carolina standards.
- C. Maintain one copy of each document on site.

1.6 COORDINATION

- A. Section 01300 - Administrative Requirements: Coordination and project conditions.
- B. Coordinate the Work with placement of internal wall reinforcement and reinforcement of toilet partitions to receive anchor attachments.

PART 2 PRODUCTS

2.1 TOILET AND BATH ACCESSORIES

- A. Manufacturers:
 - 1. A & J Washroom Accessories
 - 2. American Specialties, Inc.
 - 3. Bobrick Washroom Accessories
 - 4. Bradley Corp.
 - 5. Substitutions: Section 01600 - Product Requirements.

2.2 COMPONENTS

- A. Accessories - General: Shop assembled, free of dents and scratches and packaged complete with anchors and fittings, steel anchor plates, adapters, and anchor components for installation.
 - 1. Grind welded joints smooth.
 - 2. Fabricate units made of metal sheet of seamless sheets, with flat surfaces.
- B. Keys: Furnish Four keys for each accessory to Owner; master key.
- C. Stainless Steel Sheet: ASTM A666, Type 304.
- D. Stainless Steel Tubing: ASTM A269, stainless steel.
- E. Galvanized Sheet Steel: ASTM A653, G90 Z180 Hot-Dip zinc coating.
- F. Mirror Glass: Float glass, Type I, Class 1, Quality q2 (ASTM C 1036), with silvering, copper coating, and suitable protective organic coating to copper backing in accordance with FS A-A-3002.
- G. Adhesive: Two component epoxy type, waterproof.
- H. Fasteners, Screws, and Bolts: Hot dip galvanized, tamper-proof.

- I. Expansion Shields: Fiber, lead, or rubber as recommended by accessory manufacturer for component and substrate.

2.3 TOILET ROOM ACCESSORIES

- A. See Schedule on drawings. The Owner will provide the toilet paper and paper towel dispensers.

2.4 FACTORY FINISHING

- A. Stainless Steel: No. 4 satin brushed finish, unless otherwise noted.
- B. Galvanizing for Items Other than Sheet: ASTM A123/A123M; minimum 2.0 oz/sq ft coating thickness]; galvanize after fabrication.
- C. Galvanizing for Nuts, Bolts and Washers: ASTM A153/A153M.
- D. Shop Primed Ferrous Metals: Pretreat and clean, spray apply one coat primer and bake.
- E. Back paint components where contact is made with building finishes to prevent electrolysis.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Section 01300 - Administrative Requirements: Coordination and project conditions.
- B. Verify exact location of accessories for installation.
- C. Verify field measurements are as indicated on product data and instructed by manufacturer.
- D. See Section 06114 for installation of blocking, reinforcing plates and concealed anchors in walls and ceilings.

3.2 PREPARATION

- A. Deliver inserts and rough-in frames to site for timely installation.
- B. Provide templates and rough-in measurements as required.

3.3 INSTALLATION

- A. Install plumb and level, securely and rigidly anchored to substrate.
- B. Mounting Heights and Locations: As required by accessibility regulations ANSI 111.7 ADA A6 and as indicated on Drawings.

3.4 SCHEDULES: See Accessory List on Plans.

END OF SECTION 10800

SECTION 15010

MECHANICAL GENERAL PROVISIONS

PART 1: GENERAL

1.1 SCOPE:

a. Applicable requirements of the General Conditions, Supplementary General Conditions, and Special Conditions bound at the front of these specifications shall govern work under this heading.

b. The Contractor shall coordinate the work and equipment of this Division with the work and equipment specified elsewhere in order to assure a complete and satisfactory installation. Work such as excavation, backfill, concrete, flashing, wiring, etc., which is required by the work of this section shall be performed in accordance with the requirements of the applicable section of the specifications.

c. It is the intention of these specifications and drawings to call for finished work, tested and ready for operation. Whenever the word "provide" is used, it shall mean "furnish and install complete and ready for use".

d. Minor details not usually shown or specified, but necessary for the proper installation and operation, shall be included in the work, the same as if herein specified or shown.

e. This Contractor is referred to the General and Special Conditions of the Contract which shall form a part and be included in this section of the specification and shall be binding on this Contractor.

f. Some items of equipment are specified in the singular; however, the Contractor shall provide and install the number of items or equipment as indicated on the drawings, and as required for complete systems.

1.2 DEFINITION:

a. The word "Contractor" as used in this section of the specification refers to the HVAC and Plumbing unless specifically noted otherwise. The word "provide" means furnish, fabricated, complete, install, erect, including labor and incidental materials necessary to complete in place and ready for operation or use the item referred to or described herein and/or shown or referred to on the Contract Drawings.

1.3 CONTRACTOR'S QUALIFICATIONS:

a. It is assumed that the Contractor has had sufficient general knowledge and experience to anticipate the needs of a construction of this nature. The Contractor shall furnish all items required to complete the construction in accordance with reasonable interpretation of the intent of the Drawings and Specifications. Any minor items required by code, law or regulations shall be provided whether or not specified or specifically shown where it is a part of a major item of equipment, or of the control system specified or shown on the plans.

PART 2: PRODUCTS

2.1 MATERIALS AND WORKMANSHIP:

a. All materials and apparatus required for the work, except as specifically specified otherwise, shall be new, of first-class quality, and shall be furnished, delivered, erected, connected and finished in every detail, and shall be so selected and arranged as to fit properly into the building spaces. Where no specific kind or quality of material is given, a first-class standard article as approved by the Architect shall be furnished.

b. The Contractor shall furnish the services of an experienced superintendent, who shall be constantly in charge of the installation of the work, together with all skilled workmen, fitters, metal workers, helpers and labor required to unload, transfer, erect, connect-up, adjust, start, operate and test each system.

c. Unless otherwise specifically indicated on the plans or specifications, all equipment and material shall be installed with the approval of the Architect in accordance with the recommendations of the manufacturer. This shall include the performance of such tests as the manufacturer recommends.

d. All work must be done by first-class and experienced mechanics properly supervised and it is understood that the Architect has the right to stop any work that is not being properly done and has the right to demand that any workman deemed incompetent by the Architect be removed from the job and a competent workman substituted therefor.

2.2 EQUIPMENT APPLICATION AND PERFORMANCE:

a. The Contractor and/or Equipment Supplier shall be responsible to see that equipment supplied is correct for the intended application and will perform within the limits of capacity, noise, life expectancy, pressure drop and space limitations intended for that equipment as shown on the plans or described in the specifications. The shop drawings shall show the capacity and operating characteristics of the equipment.

2.3 EQUIPMENT DEVIATIONS:

a. Where the Contractor proposes to use an item of equipment other than that specified or detailed on the drawings, which requires any redesign of the structure, partitions, foundations, piping, wiring or any other part of the mechanical, electrical, or architectural layout, all such redesign, and all new drawings and detailing required therefor, shall be prepared by the Sub-contractor at his own expense and submitted for approval by the Architect.

b. Where such approved deviation requires a different quantity and arrangement of ductwork, piping, wiring, conduit, and equipment from that specified or indicated on the drawings, the Contractor shall furnish and install any such ductwork, piping, structural supports, insulation, controllers, motors, starters, electrical wiring and conduit, and any other additional equipment required by the system, at no additional cost to the Owner.

2.4 MOTORS:

a. Motors shall be built in accordance with the latest standards of NEMA and as specified. Motors shall be tested in accordance with standards of A.S.A. C40 and conform thereto for installation resistance and dielectric strength. Each motor shall be provided with conduit terminal box, adequate starting and protective equipment as specified or required. The capacity shall be sufficient to operate associate driven devices under all conditions of operation and load and without overload, and at least shall be the horsepower indicated or specified. Each motor shall be selected for quiet operation. Motors 1 HP or more shall have a minimum acceptable nominal full load efficiency not less than the minimum as stated in the energy code.

2.5 DRIVES:

a. Machinery drives shall be provided for all power driven equipment specified in this section.

b. Drives shall be V-belt and shall be selected to overcome the starting inertia of the equipment without slippage, but in no case shall be less than 150% of the full motor load. Drives 1/2 HP and smaller may be provided with single belts. Drives 3/4 HP and larger shall be provided with the number of belts necessary to transmit the required power with 95% minimum efficiency.

c. Where adjustable type sheaves are indicated they shall be selected such that the schedule speed of the driven equipment is at the midpoint in the adjustment range of the sheave.

d. Where fixed type sheaves are indicated the Contractor shall include in his price changing sheave sizes once during the balancing period to achieve proper air quantities.

e. Sheaves shall be machined cast iron of the same manufacturer as the belt provided. Shop drawings shall be submitted of each drive which shall include actual transmission capacity of each drive.

2.6 FOUNDATIONS, SUPPORTS, PIERS, ATTACHMENTS:

a. This Contractor shall furnish and install all necessary foundations, supports, pads, bases and piers required for all air conditioning equipment, piping and for all other equipment furnished under this contract, and shall submit drawings to the Architect for approval before purchase, fabrication or construction of same.

b. Construction of foundations, supports, pads, bases, and piers where mounted on the floor, shall be of the same materials and same quality of finish as the adjacent and surrounding flooring material.

c. All equipment, unless otherwise shown, shall be securely attached to the building structure in an approved manner. Seismic restraint shall be provided in accordance with the Standard Building Code.

2.7 VIBRATION ISOLATION:

a. All work shall operate under all conditions of loads without any sound or vibration which is objectionable in the opinion of the Architect. If

requested, the Contractor shall record sound power level readings in all areas adjacent to mechanical rooms, over, under or beside, after all equipment is fully operational and all wall and ceiling systems are completed. Sound level readings shall not exceed NC levels as recommended in Table 2, Chapter 43 of 1995 ASHRAE Applications Handbook.

b. The readings are to be tabulated in the Maintenance and Operating Instruction Booklets.

c. Sound or vibration conditions in excess of listed quantities shall be corrected in an approved manner by the Contractor at his expense.

d. Unless otherwise noted mechanical equipment over one horsepower shall be isolated from the structure with resilient vibration and noise isolators supplied by one manufacturer to the Mechanical Contractor. Where isolator type and required deflection are not shown, equipment shall be isolated in accordance with the 1995 ASHRAE Applications Handbook, Chapter 43, Table 42. Submittals shall include complete design for the equipment bases, a tabulation of the design data for the isolators, including lateral stiffness, O.D., free operating and solid height of the spring isolators, free and operating height of the neoprene or fiberglass isolators. Selection of isolators for proper loading to obtain desired efficiency shall be the responsibility of the manufacturer of isolating units to suit the equipment being supplied on the job and shall be fully guaranteed by this supplier. All vibration isolation equipment complete with thorough selection data shall be submitted. Units shall be Vibration Eliminator Company, Mason, Peabody, or approved equal.

e. Flexible duct connections shall be provided at inlet and outlet of all fans or cabinets containing fans and shall be constructed such as to allow a minimum movement of 2 inches in any direction and will not restrict normal movement of any equipment.

2.8 DRAINS AND VENTS:

a. In addition to the drains and vents indicated on the plans and piping details, the Contractor shall install additional drains and vents as required to remove all water and air from the piping systems.

2.9 MOTOR STARTERS AND DISCONNECTS:

a. Individual motor controllers complete with auxiliary contacts, control transformers, push buttons, selector switches and remote push button stations not specifically specified to be furnished with the equipment shall be provided under this section. Motor controllers shall comply with NEMA Standards and be complete with proper size heaters and auxiliary contacts and shall be in NEMA enclosures as required. Unless otherwise noted, push button stations shall be oil-tight heavy duty type. Controllers shall be manual, magnetic, or combination type with disconnect switch or circuit breaker as indicated on the drawings or where required by the NEC. Controllers shall include motor overcurrent protection in each phase conductor. Each motor controller shall be provided with phenolic nameplate, black with 1/4" high letters and white border, indicating equipment served, attached using counter sunk screws.

b. The Electrical Contractor shall furnish and install all disconnecting switches unless otherwise indicated or specified. Where disconnecting

switches are indicated to be furnished under this Section, they shall be General Electric, Type TH in NEMA 1 enclosures, with voltage and amperage rating appropriate to the application. Unless otherwise noted, fuses shall be Buss "Fusetrons", or approved equal. Unfused motor disconnecting switches shall be Type TH in NEMA 1 or 4 applicable enclosures. Similar and equivalent equipment as manufactured by I.T.E., Square D, or Westinghouse is equally acceptable. Switches used as service switches shall bear such U.L. Label and nameplate on switch shall so indicate.

2.10 PAINTING:

a. Paint material shall be selected from the products listed below and, insofar as practical, products of only one manufacturer shall be used. Contractor shall submit to the Architect the listed manufacturer he proposes to use in the work. Should the Contractor desire to use products of a manufacturer not listed below, or products made by a listed manufacturer but not scheduled herein, Contractor shall submit complete technical information on the proposed products to the Architect for approval. Only products approved by the Architect shall be used.

1. Rust Inhibitive Primer:

- a. Devoe: Ready-Mixed Red No. 20.
- b. Duron: Deluxe Red Primer.
- c. Glidden: Rustmaster Tank and Structure Primer.
- d. Pittsburgh: Inhibitive Red Primer.

2. Galvanized Metal Primer:

- a. Devoe: Devoe Zinc Dust Primer.
- b. Duron: Duron Deluxe Galvanized Metal Primer
- c. Glidden: Rustmaster Galvanized Iron Metal Primer.
- d. Pittsburgh: Speedhigh Galvanized Steel Primer.

PART 3: EXECUTION

3.1 DUTIES OF CONTRACTOR:

a. Contractor shall furnish and install all materials called for in these Specifications and accompanying drawings, and must furnish the apparatus complete in every respect. Anything called for in the specifications and not shown on the drawings or shown on the drawings and not called for in the specifications, must be furnished by the Contractor.

b. Contractor is responsible for familiarizing himself with the details of the construction of the building. Work under these specifications installed improperly or which requires changing due to improper reading or interpretation of building plans shall be corrected and changed as directed by the Architect without additional cost to the Owner.

c. The Contractor shall follow drawings in laying out work and check drawings of other trades to verify spaces in which work will be installed. Maintain maximum headroom and space conditions at all points. Where headroom or space condition appear inadequate, Architect shall be notified before proceeding with installation.

d. The plans are diagrammatic and are not intended to show each and every fitting, valve, pipe, pipe hanger, or a complete detail of all the work to be done; but are for the purpose of illustrating the type of system, showing pipe sizes, etc., and special conditions considered necessary for the experienced mechanic to take off his materials and lay out his work. This Contractor shall be responsible for taking such measurements as may be necessary at the job and adapting his work to local conditions.

e. Conditions sometimes occur which require certain changes in drawings and specifications. In the event that such changes in drawings and specifications are necessary, the same are to be made by the Contractor without expense to the Owner, providing such changes do not require furnishing more materials, or performing more labor than the true intent of the drawings and specifications demands. It is understood that while the drawings are to be followed as closely as circumstances will permit, the Contractor is held responsible for the installation of the system according to the true intent and meaning of the drawings. Anything not entirely clear in the drawings and specification will be fully explained if application is made to the Architect. Should, however, conditions arise where in the judgment of the Contractor certain changes will be advisable, the Contractor will communicate with the Architect and secure his approval of these changes before going ahead with the work.

f. The right to make any responsible change in location of apparatus, equipment, routing of piping up to the time of roughing in, is reserved by the Architect without involving any additional expense to the Owner.

g. It shall be the duty of the Contractors to visit the job site and familiarize themselves with job conditions. No extras will be allowed because of additional work necessitated by, or changes in plans required because of evident job conditions, that are not indicated on the drawings.

h. Contractor shall determine the schedule of work as laid down by the General Contractor and must schedule his work to maintain the building construction schedule so as not to interfere with or hold up any other Contractors.

i. Contractor shall leave the premises in a clean and orderly manner upon completion of the work, and shall remove from the premises all debris that has accumulated during the progress of the work.

3.2 CODES, RULES, PERMITS AND FEES:

a. The Contractor shall give all necessary notices, obtain all permits and pay all sales taxes, fees and other costs, including utility connections or extensions, in connection with his work; file all necessary plans prepare all documents and obtain all necessary approvals of all authorities having jurisdiction. Obtain all required certificates of inspection for his work and deliver same to the Architect before request for acceptance and final payment of the work.

b. The Contractor shall include in his work, without extra cost to the Owner, any labor, materials, service, apparatus, drawings, in order to comply with all applicable laws, ordinances, rules and regulations, whether or not shown on drawings and/or specified.

c. All materials furnished and all work installed shall comply with the National Fire Codes of the National Fire Protection Association, and with the requirements of all governmental departments having jurisdiction.

d. All materials and equipment for the electrical portion of the mechanical system shall bear the approval label, and shall be listed by the Underwriters' Laboratories, Inc..

e. All work shall be done in accordance with the IBC Code, and requirements of governmental agencies having jurisdiction.

3.3 COOPERATION WITH OTHER TRADES:

a. This Contractor shall give full cooperation to other trades and shall furnish any information necessary to permit the work of all trades to be installed satisfactorily and with the least possible interference or delay.

b. Where the work of the Contractor will be installed in close proximity to, or may interfere with the work of other trades, he shall assist in working out space conditions to make a satisfactory adjustment. If so directed by the Architect, the Contractor shall prepare composite working drawings and sections at a suitable scale not less than $3/8" = 1'-0"$, clearly showing how his work is to be installed in relation to the work of other trades. If the Contractor installs his work before coordination with other trades, or so as to cause any interference with work of other trades, he shall make the necessary changes in his work to correct the condition without extra charge.

c. The Contractor shall furnish to other trades, as required, all necessary templates, patterns, setting plans, and shop details for the proper installation of work and for the purpose of coordinating adjacent work.

3.4 RECORD DRAWINGS:

a. The Contractor shall furnish drawings showing dimensioned location and depths of all exterior piping and structures, and shall indicate any and all changes in location of piping, ductwork, equipment or valves from that shown on the Contract Drawings. The drawings shall consist of clean, legible sepia prints of the Contract Drawings, available from the Architect on which the Contractor shall mark all notes, dimensions, sizes and information required. The sepias shall be kept for this purpose only. Before final inspection the Contractor shall submit to the Architect eight (8) sets of black line prints of the sepias.

3.5 SURVEYS AND MEASUREMENTS:

a. This Contractor shall base all measurements, both horizontal and vertical, from established bench marks. All work shall agree with these established lines and levels. Verify all measurements at the site and check the correctness of same as related to the work.

b. Should the Contractor discover any discrepancy between actual measurements and those indicated, which prevents following good practice or the intent of the drawings and specifications, he shall notify the Architect through the General Contractor, and shall not proceed with his work until he

has received instructions from the Architect.

3.6 SAFETY REQUIREMENTS:

a. All systems shall be installed so as to be safe operating and all moving parts shall be covered where subject to human contact. All rough edges of equipment and materials shall be made smooth.

b. All safety controls shall be checked under the supervision of the Architect's representative and eight (8) copies of test data showing setting and performance of safety controls shall be submitted to the Architect. All pressure vessels shall be ASME stamped and shall have stamped relief valves. Water heaters shall be provided with ASME stamped T & P relief valve.

3.7 SHOP DRAWINGS:

a. Contractor shall submit within ten (10) days after award of contract eight (8) copies of a complete list of all manufacturers to be used on the job. No substitutions will be allowed after this date except in extenuating circumstances as determined by the Architect.

b. Submission of a manufacturer's name or equipment number on this list shall not be considered as equipment approved by the Architect.

c. The Contractor shall submit for approval eight (8) sets of detailed shop drawings of all equipment and all material required to complete the project, and no materials or equipment may be delivered to the job site or installed until the Contractor has in his possession the approved shop drawings for the particular material or equipment. The shop drawings shall be complete as described herein. The Contractor shall furnish the number of copies required by the General and Special Conditions of the Contract, but in no case less than eight (8) copies.

d. Prior to delivery of any material to the job site, and sufficiently in advance of requirements to allow the Architect ample time for checking, submit for approval detailed, dimensioned drawings or cuts, showing construction, size, arrangement, operating clearances, performance, characteristics and capacity. Each item of equipment proposed shall be standard catalog product of an established manufacturer and of equal quality, finish, performance, and durability to that specified.

e. Samples, drawings, specifications, catalogs, submitted for approval, shall be properly labeled indicating specific service for which material or equipment is to be used, Section and Article number of specification governing, Contractor's Name and Name of Job.

f. Catalogs, pamphlets, or other documents submitted to describe items on which approval is being requested, shall be specific and identification in catalog, pamphlet, etc. of item submitted shall be clearly marked. Data of a general nature will not be accepted. Data shall include eight (8) copies of computation sheets indicating how unit capacity was determined where ratings are at other than standard conditions. No payment for any equipment or labor will be allowed until all major pieces of equipment specified have been submitted to the Architect for approval.

g. Static pressure drops across fittings, dampers, heaters, attenuators, etc. shall not exceed minimum ASHRAE Standards when not specified.

h. The submittal of shop drawings shall be with the Contractor stamp affixed, this shall assure the Engineer that they are being submitted in accordance with Sub-Paragraph 4.13.4 in AIA Document A201. This stamp indicates that the Contractor, by approving and submitting shop drawings, represents that he has determined and verified all field measurements and quantities, field construction criteria, material, catalog material, and similar data that he has reviewed and coordinated information in the shop drawings with the requirements of the work and the Contract Documents. It, also, indicates that any deviation from the Contract Documents has been shown on the submittal and clearly defines the deviations from the specifications.

j. Approval rendered on shop drawings shall not be considered as a guarantee of quantities, measurements, or building conditions. Where drawings are approved, said approval does not mean that drawings have been checked in detail: said approval does not in any way relieve the Contractor from his responsibilities or necessity of furnishing material or performing work as required by the contract drawings and specifications.

k. Failure of the Contractor to submit shop drawings in ample time for checking shall not entitle him to an extension of Contract time, and no claim for extension by reason of default will be allowed.

l. All shop drawings and submittals are to be in the office of the Architect within 30 days after the Contracts have been awarded. Contractor shall be financially responsible for any price increase of shop drawing items from the time these drawings are issued until they are returned to the Contractor for purchase of items.

m. Contractor shall keep on the job at all times copies of all approved shop drawings.

3.8 OBSERVATION:

a. The project will be observed periodically as construction progresses. The Contractor will be responsible for notifying the Architect at least 72 hours in advance when any work to be covered up is ready for inspection. No work will be covered up until after observation has been completed on such items as piping and insulation, etc..

3.9 PERMITS, INSPECTION FEES, ETC.:

a. Contractor shall obtain and pay for all permits required, give all legal notices and pay all fees for inspection or otherwise required for the work.

3.10 ACCESSIBILITY:

a. Contractor shall be responsible for the sufficiency of the size of shafts and chases, the adequate clearance in double partitions and hung ceilings for the proper installation of his work. He shall cooperate with the General Contractor and all other Contractors whose work is in the same space, and shall advise the General Contractor of his requirements. Such spaces and

clearances shall; however, be kept to the minimum size required.

b. The Contractor shall locate all equipment which must be serviced, operated, or maintained in fully accessible positions. Equipment shall include but not be limited to valves, traps, cleanouts, motors, controllers, switch-gear, and drain points. If required for better accessibility, furnish access doors for this purpose. Minor deviations from drawings may be made to allow for better accessibility and any change shall be submitted for approval.

c. The Contractor shall provide the General Contractor with exact locations of access panels for each concealed valve, control damper or other device requiring service. Access panels shall be provided and installed by the General Contractor and as specified in the Architectural sections of the specifications. Locations of these panels shall be submitted in sufficient time to be installed in the normal course of work.

3.11 CONCEALED PIPE:

a. In general, all pipe in finished spaces shall be run concealed in floors, walls, partitions and above ceilings.

b. Concealment of pipe and covering of same shall not be done until authorized by the Architect, after proper tests have been made. This applies to all interior work and exterior work.

3.12 CUTTING AND PATCHING:

a. This Contractor shall provide all cutting and patching necessary to install the work specified in this section.

b. No structural members shall be cut without the approval of the Architect and all such cutting shall be done in a manner directed by him.

c. This Contractor shall arrange for proper openings in building to admit his equipment. If it becomes necessary to cut any portion of building to admit his equipment, portions cut must be restored to their former condition by this Contractor through agreeable arrangement with the General Contractor.

3.13 SLEEVES AND PLATES:

a. Sleeves shall be provided for all mechanical piping passing through concrete floor slabs and concrete, masonry, tile and gypsum wall construction.

b. Where pipe motion due to expansion and contraction will occur, make sleeves of sufficient diameter to permit free movement of pipe. Where sleeves pass insulated pipes, the sleeves shall be large enough to pass the pipe and insulation. Check floor and wall construction finishes to determine proper length of sleeves for various locations; make actual lengths to suit the following:

1. Terminate sleeves flush with walls, partitions and ceiling.

c. Sleeves shall be constructed of schedule 40 black steel pipe unless otherwise indicated on the drawings.

d. Where piping penetrates fire rated floors or walls, penetrations shall be sealed with a U.L. approved fire stopping system. System shall be as manufactured and detailed by 3M Company or approved equal.

e. Escutcheon plates shall be provided for all exposed pipes and all exposed conduit passing through walls, floors and ceilings. Plates shall be nickel plated, of the split ring type, of size to match the pipe or conduit. Where plates are provided for pipes passing through sleeves which extend above the floor surface, provide deep recessed plates to conceal the pipe sleeves.

3.14 SCAFFOLDING, RIGGING, HOISTING:

a. This Contractor shall furnish all scaffolding, rigging, hoisting and services necessary for erection and delivery into the premises of any equipment and apparatus furnished. Remove same from premises when no longer required.

3.15 ELECTRICAL CONNECTIONS:

a. The Electrical Contractor shall furnish and install all wiring except: (1) temperature control wiring; (2) equipment control wiring and (3) interlock wiring. The Electrical Contractor shall receive from the Mechanical Contractor and mount all individually mounted motor starters and provide all power wiring to the motor terminals unless otherwise indicated. The Electrical Contractor will provide branch circuit protection and disconnects unless otherwise indicated or specified. The Mechanical Contractor shall provide all other control and protective devices, and perform all control and interlock wiring required for the operation of the equipment. Power wiring, from nearest panel, for control components (dampers, panels, etc.) shall be provided by the Mechanical Contractor unless specifically called for by Division 16.

b. After all circuits are energized and complete, the Electrical Contractor shall be responsible for all power wiring, and all control wiring shall be the responsibility of this Contractor. Motors and equipment shall be provided for current characteristics as shown on the drawings.

c. Motors less than $\frac{3}{4}$ HP shall be 115 volts, single phase. Motors $\frac{3}{4}$ HP and larger shall be 208 volts, 3 phase unless otherwise indicated.

d. It shall be the responsibility of this Contractor to check with the Electrical Contractor on service outlets provided for this Contractor, to determine that the switches and wiring provided are of adequate size to meet Code requirements for this Contractor's equipment. Any discrepancy shall be brought to the attention of the Architect before work is installed. Otherwise, any cost for changes shall be at the expense of this Contractor, and in any case electrical cost increase due to equipment substitution of different electrical characteristics shall be this Contractor's expense.

3.16 PIPE WORK:

a. All pipe work shown on the drawings and/or specifications or implied herein and required for a complete and operating system shall be done by experienced mechanics in a neat and workmanlike manner and subject to the approval of the Architect.

b. Because of the small scale of the drawings, it is not possible to

indicate all offsets, fittings and accessories which may be required and it shall be the responsibility of the Contractor to furnish and install all materials and equipment required for the operating systems.

c. The piping shall be installed as shown on the plans with strict conformity to the sizes listed and due provisions for expansion and contraction.

3.17 LUBRICATION:

a. All bearing, except those specifically requiring oil lubrication, shall be pressure lubricated. All lubrication points shall be readily accessible, away from locations dangerous to workmen. In areas where lubrication points are not readily accessible Contractor shall provide extended lubrication tubes to positions where lubrication can be easily accomplished. Pressure grease lubrication fittings shall be "Zerk-Hydraulic" type as made by the Stewart-Warner Corporation, or approved equal, for each type of grease required.

b. The Contractor shall furnish lubrication charts or schedules for each piece of equipment or machinery. The charts or schedules shall designate each point of lubrication. Eight (8) copies of charts and schedules shall be submitted to the Architect prior to final inspection and approved copies of each schedule and chart shall be framed by the Contractor in metal frames with glass front and installed in the Equipment Room.

3.18 PROTECTION:

a. The Contractor shall protect all work and material from damage, and shall be liable for all damage during construction.

b. The Contractor shall be responsible for work and equipment until all construction is finally inspected, tested and accepted. He shall protect work against theft, injury or damage; and shall carefully store material and equipment received on site which is not immediately installed. He shall close open ends of work including pipe, duct, or equipment with temporary covers or plugs during storage and construction to prevent entry of obstructing materials or dust and debris.

c. Provide a protective covering of not less than 0.004" thick vinyl sheeting (or a similar approved material) to be used in covering all items of equipment, immediately after the equipment has been set in place, (or if in a place of storage within the building under construction) to prevent the accumulation of dirt, sand, cement, plaster, paint or other foreign materials from collecting on the equipment and/or fouling working parts.

3.19 CLEANING:

a. Clean from all exposed insulation and metal surfaces grease, debris or other foreign material.

b. Chrome plated fittings, fixtures, piping and trim shall be polished upon completion.

3.20 LABELS AND INSTRUCTIONS:

a. Label all switches and controls furnished under this Section with engraved bakelite permanent labels to indicate the function of each and the apparatus serviced.

b. Post in the Equipment Room framed under glass the following:

1. Lubrication instructions listing all equipment which requires lubrication, the type of lubricant to be used and the frequency of lubrication.

2. Photostatic copy of wiring diagram of temperature controls.

3. Step-by-step operating instruction for each piece of equipment with control sequence description.

c. All units shall be marked with unit numbers in three inch high letters with unit designated numbers.

d. A tabulation shall be made of each panel number and circuit number serving each air conditioning unit, fan or other device with electrical service. This list shall be prepared and be ready to turn over to inspectors prior to calling for final inspection.

3.21 EQUIPMENT SERVICEABILITY:

a. All equipment shall be serviceable. All equipment shall be installed so that it can be removed. All equipment in or connected to piping systems shall have valves to isolate this equipment from the piping system. This includes, but not necessarily limited to control valves, water heaters, sensors, switches, pumps, traps and strainers. Unions (screwed or flanged) shall be provided so that all equipment is removable.

b. Equipment installed in walls, ceilings or floors shall be accessible for service or removal without cutting walls, etc..

c. Equipment requiring periodic service shall be installed to allow clearance for service and have removable panels, access doors, etc. through which the service is to be performed.

d. Elevated equipment shall have service platforms.

3.22 ACCEPTANCE OF EQUIPMENT:

a. In the event that the Architect considers it impractical, because of unsuitable test conditions, or some other factors, to execute simultaneous final acceptance of all equipment portions of the installation may be certified by the Architect for final acceptance when that portion of the system is complete and ready for operation.

b. Contractor shall make all necessary tests, trial operation balancing and balance tests, etc., as may be required as directed by the engineer to prove that all work under these plans and specification is in complete serviceable condition and will function as intended.

c. Upon completion of all work the system shall be tested to determine if

any excess noise or vibration is apparent during operation of the system. If any such objections are detected in the system or noisy equipment found, the Contractor shall be responsible for correcting same. Ducts, plenums and casings shall be cleaned of all debris and blown free of all particles of rubbish and dust before installing outlet faces. Equipment shall be wiped clean with all traces of oil, dust, dirt and paint spots removed. Temporary filters shall be provided for all fans that are operated during construction and after all construction dirt has been removed from the building, new filters shall be installed. Bearings shall be lubricated as recommended by the equipment manufacturer. All control valves and equipments shall be adjusted to setting indicated. Fans shall be adjusted to the speed indicated by the manufacturer to meet specified conditions.

3.23 GUARANTEE:

a. The Contractor shall guarantee the complete mechanical system against defect due to faulty materials, faulty workmanship or failure due to negligence of the Contractor. This guarantee will exclude normal wear and tear, maintenance lubrication, replacement of expendable components, or abuse. The guarantee period shall begin on the date of the final acceptance and shall continue for a period of 12 months during which time the Contractor shall make good such defective workmanship and materials and any damage resulting therefrom, within a reasonable time of notice given by the Owner.

b. The period of Guarantee for equipment driven by electrical motors, etc., shall be 12 months from the date of acceptance. Refrigeration compressors shall have a five (5) year warranty.

3.24 OPERATING AND MAINTENANCE INSTRUCTIONS:

a. Submit 5 sets of complete operating and maintenance instructions.

b. Bind each set in plain black vinyl-covered, hard back, 3-ring binder. Individual paper shall be Boorum and Pease Reinforced Ring Book Sheet, No. S-212-101 or equivalent.

c. Organize material in the following format:

1. Section I:

- (a) Name of Project
- (b) Address
- (c) Owner's Name
- (d) General Contractor's Name and Address
- (e) Mechanical or Plumbing Contractor's Name and Address
- (f) Control Subcontractor's Name and Address (Mechanical Only)
- (g) Warranty Dates

2. Section II:

- (a) Description of System

3. Section III:

- (a) Major Equipment List (name, manufacturer, serial no., H.P. and

- voltage) (include all equipment with motors)
- (b) Control Sequence Description (Mechanical Only)
- (c) Routine Maintenance Instructions in Step-by-Step form
- (d) Lubrication Charts and Schedules
- (e) Valve Schedules
- (f) Test and Balance Reports (Mechanical Only)
- (g) Sound Power Level Readings (Where Required)

4. Section IV:

- (a) Operating and Maintenance Instructions by Manufacturer
- (b) Shop Drawings (Major Requirement)
- (c) Wiring Diagrams
- (d) Control Drawings (Mechanical Only)

3.25 PAINTING:

- a. Painting shall be performed as detailed in Division 9.
- b. All surfaces to receive paint shall be dry and clean.
- c. Before priming, all surfaces shall be thoroughly cleaned of all dirt, oil, grease, rust, scale and other foreign matter. Cleaning shall be done with sandpaper, steel scraper, or wire brush where appropriate and necessary. Metallic surfaces which have been soldered shall be cleaned with benzol and all other metal surfaces washed with benzine.
- d. Mixing shall be in galvanized iron pans. Paint shall be mixed in full compliance with manufacturer's directions. Thinning shall be done only in full compliance with manufacturer's directions.
- e. Workmanship shall be highest quality, free from brush marks, laps, streaks, sags, unfinished patches, or other blemishes. Edges where paint joins other material or colors shall be sharp and clean without overlapping. Paint shall be brushed or sprayed on in strict compliance with manufacturer's directions and shall work evenly and be allowed to dry at least 48 hours before subsequent coating. Paint shall not be applied in damp or rainy weather or until surface has thoroughly dried. Contractor shall furnish and lay drop-cloths in all areas where painting is done as necessary to protect work of other trades. Varnish and enamel shall not be applied when temperature in the area is less than 60 degrees Fahrenheit nor paint when under 50 degrees Fahrenheit. Prior to final acceptance, Contractor shall touch up or restore any damaged finish. All insulation materials shall be provided with a paint suitable jacket.
- f. The following materials and equipment require painting as noted:
 - 1. All concealed piping, sheet metal, hangers and accessories except galvanized sheet metal or piping and tar coated cast iron piping:
 - (a) One coat rust-inhibitive primer except where exterior insulation is provided.
 - 2. All exposed, exterior and interior, piping, sheet metal, hangers and accessories, air handling units, etc. except galvanized sheet metal or

piping and tar coated cast iron piping:

(a) One coat rust-inhibitive primer except where exterior insulation is provided.

3. All concealed galvanized sheet metal, piping and accessories.

(a) One coat galvanized metal primer on threaded portions of piping and any damaged galvanized surfaces.

4. All exposed, exterior and interior galvanized sheet metal, piping and accessories.

(a) One coat galvanized metal primer except where exterior insulation is provided.

5. All tar coated cast iron piping, and accessories.

(a) Two coats tar coat paint on any damaged surfaces.

6. All exposed, exterior and interior, insulation equipment.

(a) Two coats exterior glass enamel over paint suitable insulation jacket.

SECTION 15180

TESTING, ADJUSTING, AND BALANCING

PART 1: GENERAL

1.1 SCOPE:

- a. The provisions of Section 15010 apply to all the work in this Section.
- b. Work shall be performed by technicians competent in the trade of testing and balancing environmental systems and shall be done in an organized manner utilizing appropriate test and balance forms.

1.2 SUBMITTALS: Submit the following in accordance with Section 15010:

- a. Manufacturer's cut sheets for all equipment to be used.
- b. Sample balancing charts and forms.
- c. Completed final balancing data.

PART 2: PRODUCTS

2.1 INSTRUMENTATION:

a. Instruments for use in the test and balancing procedures shall be of first quality and be accurately calibrated at the time of use. The following list is provided to indicate the instruments expected, however, other instruments as necessary to properly perform the work will be provided and subject to approval of the Architect.

1. Inclined manometer calibrated in no less than .006-inch divisions.
2. Combination inclined and vertical manometer (0 to 10 inch is generally the most useful).
3. Pitot Tubes. (Usually 18 and 48 inch tube covers most balance requirements.
4. Tachometer. This instrument should be of the high quality self-timing type.
5. Clamp-on ampere meter with voltage scales.
6. Deflecting vane anemometer.
7. Rotating vane anemometer.
8. Thermal type (hot wire) anemometer.
9. Hook gage.
10. Dial and glass stem thermometers.

11. Sling psychrometer.

b. The accuracy of calibration of the field instruments used is of the utmost importance. All field instruments used in the balance should have been calibrated at least within the previous three months. Naturally, any suspect instruments should be checked more frequently.

PART 3: EXECUTION

3.1 SYSTEM START-UP:

a. Starting date for mechanical system shall be scheduled well in advance of expected completion date and shall be established a minimum of two weeks prior to acceptance date. The system shall be in full operation with all equipment functional prior to acceptance date.

b. Performance readings shall be taken and recorded on all air and water distribution devices and the system shall be balanced out prior to acceptance. Balancing of the system shall be accomplished with duct dampers and only minor adjustments made with grille dampers. Record and submit results in table form along side of scheduled quantities.

c. All controls shall be calibrated by qualified personnel prior to acceptance date. Thermostats shall be in close calibration with one another and shall operate their respective units without interference from adjacent units.

d. All units shall be checked out thoroughly and the following information recorded on each machine which shall include, but not be limited to information listed below. Check sheets shall be included in Operating and Maintenance instructional Manual.

1. Reciprocating Compressor:

- (a) Check General Condition
- (b) Check Sight Glass
- (c) Check Moisture Indicator
- (d) Check Oil Level
- (e) Read Oil Pressure
- (f) Read Head Pressure
- (g) Read Suction Pressure
- (h) Read Ambient Air
- (i) Read Motor Volts Each Phase
- (j) Read Motor Amps Each Phase
- (k) Lubricate Motor Bearing
- (l) Oil Safety Device Op.
- (m) Capacity Control Op.
- (n) Crankcase Heater Op.
- (o) Check Pressure Switch Op.
- (p) Check Superheat: Suction Temperature, Suction Pressure

2. Coils (Each):

- (a) Unit Number and Location
- (b) Manufacturer and Model No.

- (c) Return Air, Supply Air and Outside Air Temperature
- (d) Discharge Temperature, Cooling or Heating
- (e) Air Flow CFM, Entering and Leaving Static Pressure

3. Fans and Miscellaneous:

- (a) Unit No. and Use
- (b) Manufacturer and Model
- (c) Motor Nameplate Data
- (d) Motor Amps and Volts
- (e) Entering and Leaving Static Pressure
- (f) Fan RPM
- (g) Damper Operation

e. Contractor shall have in his possession a copy of a letter from the responsible Control Representative stating that the controls have been installed according to the plans; that the control sequence has been checked and that all controls have been calibrated.

f. Each unit shall be marked with 3" high letters in accordance with mechanical plan designation. Each panel and breaker number for all equipment shall be marked. Each control device shall be labeled.

SECTION 15250

INSULATION

PART 1: GENERAL

1.1 DESCRIPTION:

a. This section of specifications and related drawings describe requirements pertaining to insulation.

b. Provide all insulation in conjunction with equipment, piping and ductwork furnished under this division.

c. The provisions of Section 15010 apply to all the work in this section.

1.2 QUALITY ASSURANCE:

a. Products of the manufacturers listed under MATERIALS will be acceptable for use for the specific functions noted. Adhesives, sealers, vapor barriers, and coatings shall be compatible with the materials to which they are applied, and shall not corrode, soften or otherwise attack such material in either the wet or dry state.

b. Materials shall be applied subject to their temperature limits. Any methods of application of insulating materials or finishes not specified in detail herein shall be in accordance with the particular manufacturer's published recommendations.

c. Insulation shall be applied by experienced workers regularly employed for this type of work.

1.3 SUBMITTALS: Submit the following in accordance with Section 15010:

- a. Catalog cuts.
- b. Materials ratings.
- c. Insulation instructions.

1.4 RATING:

a. Insulation and accessories such as adhesives, mastics, cements, tape and jackets, unless specifically expected, shall have a flame spread rating of not more than 25 and a smoke developed rating of not more than 50. Materials that are factory applied shall be tested individually. No fugitive or corrosive treatments shall be employed to impart flame resistance.

b. Flame spread and smoke developed ratings shall be determined by Method of Test of Surface Burning Characteristics of Building Materials, NFPA No. 255, ASTM E-84, UL 723.

c. Products of their shipping cartons shall bear a label indicating that flame and smoke ratings do not exceed above requirements.

d. Treatment of jackets or facings to impart flame and smoke safety shall be permanent. The use of water-soluble treatment is prohibited.

e. Certify in writing, prior to installation, that products to be used will meet RATING criteria.

PART 2: PRODUCTS

2.1 PIPE INSULATION:

a. Materials shall be heavy density fiberglass with an all-service jacket composed of an outer layer of vinyl, fiberglass scrim cloth, aluminum foil, and kraft paper, in that order, from outside to inside of pipe covering. To be used on all lines from -60°F. to 450°F., (asbestos-free calcium silicate) for temperatures over 450°F.

1. Domestic cold water supply and hot water supply and return.

2. Refrigerant Suction Piping - flexible foamed elastomeric plastic tubing with a density of 6 lbs./CF, K of 0.27 @ 70 degrees F., self-extinguishing, and a water vapor transmission of less than 0.05 perm in., flame spread rating 25 or less, smoke developed rating of 50 or less (ASTM E84-75).

b. Thicknesses:

1. Domestic cold water supply, - all pipe sizes 1".

2. Domestic hot water supply and return: Pipe size 2-1/2" and larger - 1-1/2", Pipe size 2" and smaller - 1".

2.3 DUCT INSULATION:

a. Materials. Insulation shall be Owens-Corning as specified hereinafter or products of Certain-Teed/St. Gobain or Manville. Adhesives shall be as manufactured by 3-M Foster or Insulation Manufacturer. Insulation shall have composite (insulation, jacket and adhesive) fire and smoke hazard rating as tested by ASTM E-84, not exceeding Flame Spread -25 and Smoke Developed -50.

PART 3: EXECUTION

3.1 PIPE INSULATION:

a. Application:

1. Insulation and surfaces to be insulated shall be clean and dry when insulation is installed and during the application of any finish.

b. Refrigerant Piping.

1. End joint strips and overlap seams shall be adhered with a vapor barrier mastic. Valves, fittings, and flanges shall be insulated with strips of pipe insulation, and finished with tape and vapor barrier mastic. Seal off vapor barrier to pipe at all fittings, hangers, and every 20 feet on straight runs.

c. Drain Pipe Insulation:

1. 1/2" Armaflex type insulation for all interior runs.

c. Fiberglass Insulation:

1. All fiberglass pipe covering shall be furnished with self-seal lap and 3" wide butt joint strips. The release paper is pulled from adhesive edge, pipe covering closed tightly around pipe and self-seal lap rubbed hard in place with the blunt edge of an insulation knife. This procedure applies to longitudinal as well as circumferential joints. Under no circumstances will staples be allowed. Care shall be taken to keep jacket clean, as it is the finish on all exposed work. All adjoining insulation sections shall be firmly butted together before butt joint strip is applied, and all chilled water and cold water service lines shall have vapor seal mastic thoroughly coated to pipe at butt joints every 21' and at all fittings. All insulation outside shall be protected with aluminum weather-proof jacketing with lap-seal, and factory attached moisture barrier. The aluminum shall be .016 gauge (3303-H14 alloy) of embossed pattern. It shall be applied with a 2" circumferential and 1-1/2" longitudinal lap and be secured with aluminum bands 3/8" wide 8" o.c.. All elbows shall be covered with the same .016 aluminum with factory applied moisture barrier. All fittings, valve bodies, unions, and flanges shall be finished as follows:

(a) Apply molded or segmental insulation to fittings equal in thickness to the insulation on adjoining pipe and wire in place with 2#14 copper wires.

(b) Apply a skim coat of insulating cement to the insulated fitting, if needed, to produce a smooth surface. After cement is dry, apply Owens-Corning Fiberglass Fitting Mastic, Type C, UL labeled.

(c) Wrap the fitting with fiberglass reinforcing cloth overlapping the preceding layer by 1 to 2". Also, overlap mastic and cloth by 2" on adjoining sections of pipe insulation.

(d) Apply a second coat of mastic over cloth, working it well into mesh of cloth and smooth the surface. Mastic to be applied at the rate of 40 square feet per gallon. All flanges and fittings on hot and cold lines in utility tunnels shall be insulated according to above. Omit insulation on flanges and unions over 60 degrees F. If painting is required, no sizing is necessary. To maintain the non-combustibility of the system only Glidden acrylic latex paint (#5370) is to be used.

3.2 DUCT INSULATION:

a. All vapor barriers and joints shall be sealed to prevent condensation. Clean and dry all ductwork before installing insulation. All weld joints shall be wire brushed and give one (1) coat of red primer before insulating. Staples will not be permitted in insulation.

b. Wrapped Duct:

1. All low pressure round ducts and all rectangular supply, return and outside air ducts unless noted otherwise on plans shall be insulated by

wrapping with 1-1/2" thick, minimum "R" value = 4.5, fiberglass with vapor barrier jacket with joints overlapped a minimum of two inches. Insulation shall be adhered to duct with non-combustible insulation bonding adhesive applied in 4" strips, 8" on center. All joints shall be secured with flare door staples on 3" centers through all laps over duct tape.

c. Ducts Installed In Unconditioned Spaces:

1. All supply and return air ducts that are to be installed in unconditioned spaces shall be wrapped with a layer of duct wrap as specified above if lined and shall have an additional layer of duct wrap if unlined. Ductboard in unconditioned spaces shall have a layer of ductwrap or be 2" thick. Minimum "R" value in attics as 8.

SECTION 15410

BASIC MATERIALS AND METHODS (PLUMBING)

PART 1: GENERAL

1.1 DESCRIPTION:

- a. The provisions of Section 15010 apply to all the work in this Section.
- b. This section of specifications and related drawings describe requirements pertaining to basic materials and methods.

1.2 SUBMITTALS: Submit the following in accordance with Section 15010:

- a. Manufacturer's cuts.
- b. Certified capacity ratings.
- c. Installation instructions.
- d. Operating and Maintenance Instructions.

PART 2: PRODUCTS

2.1 PIPE SPECIALTIES:

a. Pipe specialty equipment shall be provided on all piping on all piping system as specified or as required by code.

b. Provide dielectric unions on the inlet and outlet connection to water heaters storage tanks and at all places where dissimilar metals join in piping and plumbing systems. Use dielectric unions as manufactured by Watts Regulator Inc., Zurn/Wilkins, Victaulic or equal.

c. Vacuum breaker shall be provided on each hose outlet. This includes hose bibbs, service sinks, wall hydrants, etc.

d. A system of pulsation absorbers shall be installed, the system shall be selected in accordance with PDI Standard W-201. Absorbers shall be by JOSAM, ZURN, SMITH or approved equal.

e. Valves and Accessories:

1. Provide valves as indicated and required as scheduled below. Figure numbers are provided to indicate type and quality. Insofar as possible, all valves shall be by a single manufacturer as specified or approved equal.

<u>MANUFACTURER</u>	<u>GATES 125#</u>	<u>GLOBES 150#</u>	<u>CHECK 125#</u>
NIBCO	T134	T235-Y	T413-B
CRANE	428-UB	7	37
STOCKHAM	B-105	B-22	B-319

f. SOLDER ENDS, SCREWED BONNET GATES, UNION BONNET GLOBES, (Globes with

Teflon disc):

<u>MANUFACTURER</u>	<u>GATES 125#</u>	<u>GLOBES 150#</u>	<u>CHECK 125#</u>
NIBCO	S111	S235-Y	S413-B
CRANE	428-UB	-	1342
STOCKHAM	B-109	B-24	B-309

g. Hose end gate valves, 3/4 - 2" shall be JENKINS NO. 372, CRANE 451, POWELL 503 or approved equal.

h. Wall hydrants shall be cast brass non-freeze, heavy duty with polished chrome face, brass operating parts, adjustment locknut, renewable nylon seat, 3/4" standard hose outlet, locking cover.

2.2 HANGERS AND SUPPORTS:

a. Pipe supports shall be provided for all piping. Pipe support components shall conform to accepted standards.

1. Hangers shall adequately support the piping system. On horizontal, hangers shall be located near or at changes in piping direction and concentrated loads. They shall provide vertical adjustment to maintain pitch required for proper drainage. They shall allow for expansion and contraction of the piping.

(a) Horizontal lines of copper tubing shall be supported as below:

<u>Nominal Tubing Size</u>	<u>Rod Diameter</u>	<u>Maximum Spacing</u>
Up to 1 inch	3/8 inch	6 feet
1-1/4" and 1-1/2"	3/8 inch	8 feet
2 inches	3/8 inch	9 feet
2-1/2 inches	1/2 inch	9 feet
3 and 4 inches	1/2 inch	10 feet

(b) Horizontal cast iron soil pipe shall be supported with one hanger for each pipe length and at fittings as required for proper support with hanger located close to hub or joint.

2. Devices for attaching pipe supports to building structure shall be provided as required and shall be as herein specified.

(a) Hangers shall be as manufactured by Grinnell for wood construction. Equals by other manufacturers will be accepted.

3. Intermediate attachments shall be hanger rods of size herein before specified and with vibration control devices as specified in the separate section of the Division. Rods may be continuous threaded or threaded each end as required. No chain, wire or perforated strap hangers shall be used.

4. Pipe attachments and spring hangers shall be as specified in individual section of this Division of the specifications.

2.3 ESCUTCHEON PLATES:

a. Pipes entering finished or occupied areas shall be provided with polished chrome plated escutcheon plates, held in place with set screws. Escutcheon plates shall be Grinnell Figure 20 or approved equal.

PART 3: EXECUTION

3.1 GENERAL:

a. All products shall be installed as per the manufacturer's instructions.

3.2 CLEANING UP:

a. Cleaning up is the responsibility of the Contractor. During construction, the site shall be kept neat so as not to be a safety hazard. Upon completion of the work, all surplus construction materials and debris shall be removed from the property.

3.3 PIPE TEST:

a. All new soil, waste, drainage and vent piping shall be tested before fixtures are installed by capping or plugging the openings, and filling the entire system with water to a minimum height of 10 feet above grade or the highest fixture opening of the section being tested, and allowing it to stand thus filled for a period of four hours.

b. All water supply piping shall be tested before fixtures or faucets are connected by capping or plugging the opening and applying a hydrostatic test pressure of 150 psig.

c. Pipe found defective during tests shall be replaced at no additional cost to the Owner. Pipe joints found defective during tests shall be taken apart and remade.

d. The Contractor shall notify the Architect 72 hours before tests are to be made. Concealed work shall remain uncovered until specified tests are completed. All tests shall be conducted in the presence of the Architect or his representative. Repairs to defects disclosed by the test shall be made with new materials. Caulking of screwed joints, cracks or holes will not be permitted. Test shall be repeated until system is proven tight.

SECTION 15420

DOMESTIC WATER SUPPLY PIPING

PART 1: GENERAL

1.1 SCOPE:

a. The provisions of Section 15010 and 15250 apply to all the work in this Section.

b. Contractor shall furnish and install domestic water systems as shown on the plans complete in all respects.

c. Connect to water main and provide supply lines to all fixtures and equipment requiring water service.

1.2 SUBMITTALS: Submit the following in accordance with Section 15010:

a. Manufacturer's cuts.

PART 2: PRODUCTS

2.1 WATER PIPING AND FITTINGS:

a. Water Piping:

1. All water piping shall be hard drawn copper tubing ASTM B 88 Type "L" above grade, Type "K" below grade. Fittings for copper tubing shall be ANSI B16.18 or B16.22 solder joint fittings. Ends of pipe shall be reamed, pipe and fittings cleaned. Use only 95-5 (95% tin and 5% antimony) solder with non-corrosive flux on 1-1/4" and smaller and on 1-1/2" and larger use silver solder (Minimum 12% Silver), with a melting point greater than 1000°F. Submit solder for approval.

PART 3: EXECUTION

3.1 INSTALLATION:

a. Piping shall be installed so as to be free floating. 125 pound copper sweat pattern unions shall be provided in the piping as indicated on the drawings. Provide dielectric insulating unions where copper connects to ferrous piping. Use brass nipples or copper adapters at connections to fixtures.

b. Provide isolation valves for each individual riser and toilet group as required to service system.

c. Runouts:

1. Runouts to fixtures shall be held in place in the wall with copper straps at the fixture stop to prevent pipe movement at this point.

2. Runouts to urinal and water closet flush valves in stud walls shall have a piece of 1/2" copper flattened and soldered to the runout and

fastened to studs with 1/4" bolts with nuts and flat washers (two bolts each end).

d. Unions:

1. Unions shall be installed at each piece of equipment.

3.2 STERILIZATION OF WATER PIPING:

a. Sterilization of water piping shall be in accordance with AWWA Specification 0601. After the pressure tests have been made, the system shall be flushed with water. The chlorinating material shall be liquid chlorine-water mixture calcium hypochlorite, sodium hypochlorite, or chlorinated lime-water mixture. The solution shall have not less than 50 PPM available chlorine. The disinfecting solution shall be allowed to remain in the system for a minimum period of 24 hours. After disinfection, the system shall be flushed with clean water until residual chlorine content is not greater than .02 PPM. After the system is flushed, water samples shall be taken and tested at the Contractor's expense by an independent testing lab and reports shall be furnished to the engineer's for approval. If the water is found unsafe for human consumption, the disinfection procedure shall be repeated.

3.3 TESTING OF WATER PIPING:

a. All water supply piping shall be testing before fixtures or faucets are connected by capping or plugging the openings and applying a hydrostatic test pressure of 150 psig. Pressure shall hold constant (exception for temperature variation) for a period of 24 hours or as directed by the Engineer.

SECTION 15440

SOIL, WASTE, VENT AND DRAIN PIPING

PART 1: GENERAL

1.1 SCOPE:

- a. The provisions of Section 15010 apply to all the work in this Section.
- b. All fixtures and equipment specified as requiring waste shall be connected to the sewer system. The sewer system shall be extended as shown on the drawings.

1.2 SUBMITTALS: Submit the following in accordance with Section 15010:

- a. Manufacturer's cuts.
- b. Installation instructions.

PART 2: PRODUCTS

2.1 SOIL, WASTE, VENT AND DRAIN PIPING:

a. All cast iron soil pipe associated with the grease waste system shall be service weight ASTM A-74-69 bell and spigot, bearing the label of the Cast Iron Soil Pipe Institute and shall be listed by NSF International. The casings shall be gray iron of good quality made by Cupola, Air Furnace or Electric Furnace Process. The resultant pipe shall be compact, close grained metal, soft enough to permit cutting and drilling. Pipe shall have been hydrostatically tested at not less than 50 pounds per square inch gauge. Factory coated by heating to 300 degrees F. and dripping in a bath of coal tar pitch and oil.

b. Soil, waste, vent and drain piping not addressed in paragraph a. shall be solid wall PVC plastic drain, waste and vent pipe and fittings conforming to ASTM D 2665.

2.2 SPECIALTIES:

a. Cleanout Plugs: Cleanouts shall be of the same size as the pipe except that cleanout plugs larger than 4" will not be required. Cleanouts shall consist of long sweep fittings to an easily accessible place.

b. Traps: Each fixture and piece of equipment including floor drains and hub drains, requiring connections to the drainage system shall be equipped with a trap placed as near to the fixture as possible. No fixtures shall be double trapped. Traps for floor drains and hub drains shall be deep seal "P" traps. All other traps shall be supplied under the "Fixture Paragraph".

c. Floor Flanges: Floor flanges shall be provided for connection of all floor outlet water closets. The joint between the closet trap and the floor flange shall be made tight with red or black rubber as made by Grinnell fixture setting gasket.

d. Flashing: Vent pipes shall be flashed and made watertight at the roof. Flashing shall extend not less than 8" from the vent pipes in all directions. Minimum vent through the roof shall be 2" size.

e. Floor Drains: Floor drains shall be sized as indicated on the drawings, and shall be Josam or equal. See plans for model number and size. Drains by Zurn or Wade will be acceptable.

PART 3: EXECUTION

3.1 PIPE INSTALLATION:

a. Horizontal drain and waste piping with the building shall be given a grade of 1/8" per foot below ground and 1/8" per foot above ceilings unless otherwise indicated on the drawings. Piping 3" and smaller shall have minimum grade of 1/4" per foot. Main vertical soil and waste stacks shall be extended full size to the roof line and 12" above as vents, unless otherwise indicated on the drawings. Reduction of the size of drainage piping in the direction of flow is prohibited. Vent or tap tees will not be permitted on waste lines.

3.2 CLEANOUTS:

a. Cleanouts shall be installed where shown on the drawings but in no case shall they be more than 50 feet apart in piping 3" and under and 75 feet apart in piping 4" and larger.

3.3 PIPE TEST:

a. All new soil, waste, drainage and vent piping shall be tested before fixtures are installed by capping or plugging the openings, except for the highest opening, and filling the entire system with water. If the system is tested in sections the minimum acceptable head shall be 10 ft. of water column. In testing successive sections, at least the upper 10 ft. of the preceding section shall be tested so that no joint or pipe within the building (except the uppermost 10 ft. of the system) shall have been submitted to a test of less than 10 ft. head of water. The water column shall be allowed to stand thus filled for a period of four hours.

b. Pipe found defective during test shall be replaced at no additional cost to the Owner. Pipe joints found defective during tests shall be taken apart and remade.

SECTION 15450

PLUMBING FIXTURES AND EQUIPMENT

PART 1: GENERAL

1.1 DESCRIPTION:

- a. The provisions of Section 15010 apply to all work in this Section.
- b. The Contractor shall furnish and install all plumbing fixtures complete with all equipment, fittings, trimmings and supports as specified.

1.2 SUBMITTALS: Submit the following in accordance with Section 15010:

- a. Manufacturer's cuts.
- b. Certified capacity ratings.
- c. Installation instructions.
- d. Operating and Maintenance Instructions.

PART 2: PRODUCTS

2.1 FIXTURES:

- a. All fixtures shall be Grade "A". The name or trademark of the manufacturer shall be printed or pressed on all water closets and lavatories and a label, which cannot be removed without destroying it, containing the manufacturer's name and trademark and the quality of the fixtures, shall be affixed to all fixtures.
- b. Exposed metal parts of fixtures shall be chromium plated. Where fixtures are to be hung from the wall, the fixture or fixture hanger shall be supported by concealed 3" steel washers and through bolts. Furnish traps and supply fittings with stops for all fixtures.
- c. All faucets and supply fittings shall be of the same manufacturer as the fixture except as noted otherwise. All exposed supply and waste piping shall be chrome plated. Supply piping serving flush valves shall be equipped with chrome plated pipe cover.
- d. Fixtures shall be white or stainless steel as indicated on drawings.
- e. Direct connections between domestic water system and sanitary waste system will not be permitted.
- f. All enameled cast iron fixtures shall be Acid Resisting (AR) and shall bear manufacturer's symbol signifying AR materials.
- g. All flush valves shall be quiet acting, non-hold open feature and shall have sweat solder adaptor kit. Escutcheon shall be chrome plated brass with set screws.

h. Threaded adapters serving lavatory supply piping shall be concealed in walls. Runouts to fixture shall be chrome plated brass pipe.

i. All exposed waste piping serving fixtures, except service sinks, shall be 17 gauge chrome plated brass pipe with cast brass P-trap. Under Counters will be considered exposed areas.

j. Cut-Off Stops: All fixtures shall have individual loose key cut-off stops on cold and/or hot water lines except as specified hereinafter or indicated on the drawings.

k. Provide appropriate wall hangers for all wall-hung fixtures.

2.2 ELECTRIC WATER HEATER:

a. Type. The water heaters shall be electric with automatic controls

b. Capacity. The storage capacity and recovery capacity shall be shown on the drawings.

c. Tank. Tank shall be heavy gauge steel with inner lining of glass. Tank shall have insulation completely around tank, top and bottom. There shall be a hose thread drain valve at bottom of tank and any pipe nipples used in water connections shall have interior surface to match interior surface of tank. Dielectric unions shall be used to connect glass coated galvanized pipe nipples to cover water pipe. Unit shall be constructed in accordance with ASME Code Section VIII and shall bear the appropriate symbol and be listed with the National Board as required.

d. Jacket. The water heater shall have a jacket of cold rolled steel with white baked on enamel finish. Jacket shall have provisions for access to all controls and heating elements.

e. Relief Valve. The heater shall be equipped with an ASME approved T & P relief valve pipe to drain.

f. Mounting. The water heater shall be set dead level in both directions.

g. Cleaning. The water heater shall be cleaned and all construction dirt removed at the completion of the project.

h. Insulation shall meet requirements of latest ASHRAE Standard.

i. Units with a storage capacity of 120 gallons or more shall be constructed and stamped pursuant to the ASME Code, Section IV, or Section VIII, Division 1, as applicable.

PART 3: EXECUTION

3.1 GENERAL:

a. Install all fixtures as per manufacturer's requirements and local codes.

3.2 CAULKING:

a. Fixtures, fittings and accessories shall be caulked at floor and wall perimeter and behind flanges and fittings in a fashion that the wall openings are sealed, but no sealant is exposed.

SECTION 15620

PIPING (HVAC)

PART 1: GENERAL

1.1 SCOPE:

- a. The provisions of Section 15010 apply to all work in this Section.
- b. Furnish and install all refrigerant, and condensate drain piping as shall be required in order to provide a complete and satisfactory system.

PART 2: PRODUCTS

2.1 REFRIGERANT PIPING:

- a. All refrigerant piping shall be Type "K" hard drawn copper of "ACR" tubing with wrought copper sweat fittings. All joints are to be made with hard solder such as "Sil-Fos" or "Silver Solder."
- b. All joints in refrigeration pipe work shall be soldered with the use of nitrogen gas. Refrigerant piping shall be tested, evacuated, charged with nitrogen and completely dried before charging with freon.
- c. Refrigerant piping shall include best grade brass refrigerant fittings, consisting of expansion valve, solenoid valve, sight glass with moisture indicator, filter dryer, check valves and/or specialties as may be recommended or required by the manufacturer or as shown on the drawings.

2.2 DRAIN PIPING:

- a. All drain lines shall be run in schedule 40 weight PVC pipe or Type "L" hard drawn copper. Drains shall be run in a neat manner to the hub drain and turned down at the hub drain, unless otherwise indicated. Minimum of 1-1/4" unless otherwise shown.

PART 3: EXECUTION

3.1 PIPE AND PIPE FITTINGS:

- a. Provide all piping and connections to all items of equipment as shown and/or required to fully complete the system indicated, including drains and other connections. The drawings show the arrangement desired and the Contractor shall follow the drawings as accurately as possible. If conflict should arise, the Contractor shall verify all measurements on the job and cut pipe unless specifically noted for expansion loops. All piping shall be reamed or filed and cleaned to remove burrs and other obstructions.
- b. The Contractor shall be responsible for installing all piping work in a neat workmanlike manner. This shall be interpreted to mean that all piping shall be neatly aligned, installed and supported in equally spaced parallel runs using trapeze hangers where applicable, install square, true and plumb with walls, equipment or other related surfaces using standard fittings. Any pipe work installed in a disorderly or unworkmanlike manner as adjudged by the

Architect shall be corrected by the Contractor at the Contractor's expense.

3.2 BLOWING-OUT SYSTEM:

a. All piping and equipment shall be thoroughly blown-out under pressure and clean of all foreign matter wasting condensate through temporary connections so long as necessary to thoroughly clean before system is placed in operation. Use every precaution to prevent pipe compound, scale, dirt, welding and other objectionable matter getting into piping system and equipment.

3.3 HANGERS:

a. All piping shall be supported on not less than 10' centers and within 30" of each change of direction except that piping 1-1/4" size and smaller shall be supported on 8'-0" centers.

b. All piping shall be hung by means of split type wrought iron hanger rings similar to Grinnell Figure 104 except as otherwise noted. Copper piping not insulated shall be hung from copper plated hangers similar to Figure CT-97. All insulated piping shall be hung by means of clevis type hangers sized to fit outside of insulation, Grinnell Figure 260.

c. Pipe hangers shall be supported by means of iron hanger rods from the building construction or from structural steel members, and in an approved manner. Where required, piping shall be hung from angle iron slips or suitable brackets attached to sides of masonry construction.

d. All insulated piping shall be provided with insulating protection sheet metal saddles. These shall be 20 gauge galvanized iron. Saddles shall be of a length equal to two times the outside diameter of the insulation and shall extend to above the center line of the pipe.

e. Where piping passes through walls or floors, steel pipe sleeves shall be provided, sized to allow at least 1/2" clearance around pipe or insulation where pipe is insulated. Sleeves shall be flush with finished walls and extend 1/2" above finish floors. A watertight seal shall be provided between floor and sleeve and space between pipe and sleeve shall be caulked with lead wool.

SECTION 15665

SPLIT SYSTEM HEAT PUMP

PART 1: GENERAL

1.1 SCOPE:

- a. The provisions of Section 15010 apply to all the work in this Section.
- b. Furnish and install split system heat pump required to provide a complete and satisfactory job.

1.2 SUBMITTALS: Submit the following in accordance with Section 15010:

- a. Manufacturer's cuts.
- b. Certified capacity ratings.
- c. Installation instructions.
- d. Operating and Maintenance Instructions.

PART 2: PRODUCTS

2.1 SPLIT SYSTEM HEAT PUMP:

- a. Furnish and install an air-to-air electric heat pump (outdoor unit) in combination with a direct expansion fan-coil heat pump (indoor unit) in the location and manner shown on the plans.
- b. Coils shall be constructed with aluminum plate fins mechanically bonded to non-ferrous tubing with all joints brazed.
- c. Outdoor unit shall contain hermetically sealed compressor with automatically reversible oil pump, internal and external motor protection. Outdoor fan shall be propeller type, arranged for vertical discharge, and direct driven by a factory lubricated motor.
- d. Indoor unit shall operate properly in either vertical upflow or horizontal position with or without ductwork. Unit may be installed vertically or horizontally with electric resistance heater and shall contain refrigerant metering device and indoor fan relay. Fan shall be centrifugal type, direct driven.
- e. Controls and protective devices shall include a high pressurestat, 2 low pressurestats, crankcase heater, suction line accumulator and pressure relief device. Motor compressor shall have both thermal and current sensitive overload devices. Outdoor unit wiring shall incorporate a positive acting timer to prevent compressor short cycling if power is interrupted. Device shall prevent compressor from restarting for a five minute period. An automatic defrost control shall be included to accomplish defrosting (only if required) every 90 minutes for a period of not more than 10 minutes. A 24 volt transformer shall be factory installed and wired on outdoor units for external control circuit.

- f. Provide low ambient to 10°F.
- g. Provide programmable thermostats with the following features:
 - 1. Temperature setpoints 40°F - 90°F.
 - 2. Separate heating cooling setpoints.
 - 3. Automatic changeover from heat to cool.
 - 4. Minimum 4 hour override feature.
 - 5. Programmable fan (fan shall run continuously during occupied mode and off during unoccupied mode).
 - 6. 7 day programming.

PART 3: EXECUTION

3.1 INSTALLATION:

- a. Fan coil and heat pump shall be installed in accordance with the manufacturer's recommendations.
- b. Fan coil and heat pump shall be installed in fully accessible locations.

SECTION 15723

EXHAUST FANS

PART 1: GENERAL

1.1 SCOPE:

a. Furnish and install in-line fans as shown or required to provide a complete and satisfactory job.

b. The provisions of Section 15010 apply to all the work in this Section.

1.2 SUBMITTALS: Submit the following in accordance with Section 15010:

a. Manufacturer's Cuts.

b. Certified Capacity Ratings.

c. Installation Instructions.

d. Operating and Maintenance Instructions.

PART 2: PRODUCTS

2.1 CEILING EXHAUST FANS - DIRECT DRIVE:

a. Type: The fan shall have a forward curved centrifugal wheel.

b. Housing: The fan housing shall be constructed of heavy gauge galvanized steel. The housing interior shall be acoustically lined with ½" thick insulation. The discharge outlet shall be adaptable for horizontal or vertical mounting.

c. Motor: The motor shall be mounted on resilient elastic grommets.

d. Control: The fan shall be controlled as shown on the plans.

PART 3: EXECUTION

3.1 INSTALLATION:

a. Fans shall be installed in accordance with manufacturer's installation instructions.

b. Fan shall be installed in fully accessible locations.

SECTION 15762

ELECTRIC WALL HEATERS

PART 1: GENERAL

1.1 SCOPE:

- a. The provisions of Section 15010 apply to all the work in this Section.
- b. Furnish and install electric wall heaters as required to provide a complete and satisfactory job.

1.2 SUBMITTALS: Submit the following in accordance with Section 15010:

- a. Manufacturer's cuts.
- b. Certified capacity ratings.
- c. Installation instructions.
- d. Operating and Maintenance Instructions.

PART 2: PRODUCTS

2.1 ELECTRIC WALL HEATERS:

- a. Provide where shown on drawings, recessed electric wall insert heater. Unit shall have capacity noted and shall be UL labeled and installed in accordance with NEC.
- b. Unit shall be downflow type with concealed control adjustment, high limit cutout, integral thermostat and fan motor with internal thermal overload.
- c. Units shall be recessed mounted and tamperproof.

SECTION 15810

AIR DISTRIBUTION

PART 1: GENERAL

1.1 SCOPE:

a. Furnish and install all sheet metal work shown or called for including ductwork and connections to fans and equipment.

b. Ductwork shall be provided and installed as shown on the drawings. All details of ductwork are not indicated, and necessary bends, offsets and transformation must be furnished whether shown or not.

c. The provisions of Section 15010 apply to all the work in this Section.

1.2 SUBMITTALS: Submit the following in accordance with Section 15010:

a. Manufacturer's cuts.

b. Certified capacity ratings.

c. Installation instructions.

1.3 RELATED DOCUMENTS:

a. Section 15250 - Insulation.

PART 2: PRODUCTS

2.1 GENERAL:

a. All ductwork, plenums and casings shall be constructed of sheet metal, as herein specified. All sheet metal construction shall conform to the pressure classification shown on the contract drawings, or herein specified and shall be in accordance with the construction and installation details in Chapter 16 of the 1992 ASHRAE Systems and Equipment Handbook or the appropriate SMACNA Standards.

b. Duct sizes on drawings represent gross sheet metal dimensions. Allowance has been made, where applicable, for duct liner.

2.2 LOW PRESSURE DUCTWORK:

a. Low pressure ductwork shall be constructed of zinc coated sheet steel and shall conform to the 1st Edition of SMACNA HVAC Duct Construction Standards -Metal and Flexible, 1985, as follows:

1. Rectangular Duct:

(a) 1" w.g. pressure class - Table 1-4.

(b) 2" w.g. pressure class - Table 1-5.

Unless otherwise noted, all low pressure rectangular ductwork shall be constructed according to the 1" w.g. pressure class.

2. Round Duct:

(a) 2" w.g. pressure class - Table 3-2.

2.3 GENERAL EXHAUST DUCTWORK:

a. Unless otherwise noted, all exhaust ductwork shall be constructed the same as specified for low pressure ductwork.

2.4 FLEXIBLE DUCTWORK:

a. Flexible air duct for connections between medium pressure duct and terminals units and between low pressure duct to diffusers shall be equal to Thermaflex M-KE. Duct shall be listed by Underwriter's Laboratories under UL 181 standards as Class 1 flexible air duct material and shall comply with NFPA Standards 90A and 90B. Duct shall be rated to operate at pressures up to 6" w.g. for sizes 10" and 4" w.g. for sizes 12" and above. Maximum length of flexible air duct shall be 6 feet.

b. Duct shall be a factory fabricated assembly composed of a polymeric liner duct bonded permanently to a coated spring steel wire helix and supporting a fiberglass insulating blanket. Outer vapor barrier shall be of fiberglass reinforced film laminate. Connections shall be made with Thermaflex, or equal, duct straps.

2.5 FIRE DAMPERS:

a. Furnish and install, at locations shown on plans, or where required by code, fire dampers constructed and tested in accordance with UL Safety Standard 555. Each fire damper shall have 1-1/2 hour fire protection rating. In addition each fire damper shall include a 212°F fusible link, and shall include a UL label in accordance with established UL labeling procedures. Damper manufacturer's literature submitted for approval prior to installation shall include comprehensive performance data developed from testing in accordance with AMCA Standard 500 and shall illustrate pressure drops for all sizes of dampers required at all anticipated airflow rates. Fire dampers shall be equipped for vertical or horizontal installation as required by the location shown. Fire dampers required by the location shown. Fire dampers shall be installed in wall and floor openings utilizing steel sleeves, angles, other materials and practices required to provide an installation equivalent to that utilized by the manufacturer when dampers were tested at UL. Installation shall be in accordance with the damper manufacturer's instructions. Fire dampers shall be style "A", "B" or "C" as required.

2.6 ACCESS DOORS:

a. Ventifabrics, Krueger or Duro-Dyne, (Min. 12" x 10" - use 16" x 12" where size permits) insulated doors shall be provided for fire dampers, control dampers, smoke dampers, smoke detectors, and other locations where shown. Door shall be minimum 24 gauge galvanized, double construction with 1" insulation complete collar mounting frame, steel butt hinges, felt gaskets, fasteners and handles.

2.7 INSTRUMENT TEST HOLES:

a. Ventlock No. 699 with gasket. Provide a minimum of one in each zone supply duct.

2.8 TURNING VANES:

a. Turning vanes and Deflector Controls, Barber-Colman, Carnes Corporation, Kruger or Titus in length up to 18"; Aero-Dyne Duro-Dyne, or Airsan double thickness about 24" in length, installed in rails.

2.9 FLEXIBLE CONNECTIONS:

a. Flexible duct connections shall be provided where ductwork connects to equipment; ventifabrics or Duro-Dyne 28 ounce minimum waterproof and fire retardant woven glass fabric double coated with neoprene, approved by UL. Maximum length of flexible connections shall be 10 inches.

2.10 MANUAL AND MOTOR OPERATED DAMPERS:

a. American Warming and Ventilating Company Type DAA-P-50, opposed blade, constructed with 15 gauge steel blades. Manual dampers shall be provided with Ventlock No. 637 hand operated locking quadrants located outside of ducts. Locking quadrants shall be elevated 1-1/2" for insulation. Manual dampers 18" x 10" or smaller may be single blade type construction of 16 gauge galvanized sheet metal. Dampers of Ruskin, Krueger, Louvers and Dampers, or Advanced Air, Inc. will be acceptable.

2.11 SPLITTER DAMPERS:

a. Install where shown and at duct splits; provide with Ventlock No. 690 self-locking device; constructed of 16 gauge galvanized steel with hemmed leading edge and reinforced at hinged side.

2.12 GRILLES, REGISTERS AND DIFFUSERS:

a. Grilles, registers and diffusers shall be of the type, size and design as shown on the drawings and/or as specified below. Grilles within the same room or areas shall be of the same type and style to provide architectural uniformity.

b. Each supply, return and exhaust device shall be of the proper design as indicated to handle quantities of air within the space with maximum diffusion and without objectionable air movement or noise level.

c. Each supply outlet and register shall have a volume damper control operable from the front of the device with removable key. Where indicated on the drawings, all side wall registers shall be equipped with deflectors.

PART 3: EXECUTION

3.1 DUCTWORK:

a. All ductwork shall be provided in a neat workmanlike manner. The

ducts shall be properly braced and reinforced. All slip joints shall be made in the direction of flow. All ducts shall be true to the dimension indicated and shall be straight and smooth on the inside with neatly finished airtight joints. The ducts shall be securely anchored into the building construction in an approved manner and shall be completely free from vibration under all conditions of operation. All supply, return fresh-air and exhaust systems shall be completely balanced.

b. No duct transformation shall be of a ratio less than four to one and where possible, shall be of a ratio of six to one. No less than three vertical splitters shall be provided where these ratios cannot be met. No elbow shall have a throat center line radius of less than one and one-half times the duct width at the turn. All turns of less than this amount in rectangular duct shall be provided with duct turning vanes of standard design. Splitters or multi-blade volume dampers, where indicated, shall be provided in all branch.

c. Turning vanes shall be provided at all tees and square elbows. Turning vanes shall be factory fabricated and designed in accordance with the SMACNA or ASHRAE Guide for formed vanes. The first set of turning vanes on the leaving side of fans shall be of the acoustical type to aid in the elimination of unit noise with the exception of room fan coil units.

d. Splitter dampers and volume extractors shall be provided in all low velocity ductwork for proper air distribution. Each damper shall be provided, lubricated bearings at both ends of the shafts, adjustments quadrant, and locking devices and shall be constructed of galvanized iron or steel sheet one gauge heavier than the duct in which they are installed. Access doors shall be located at all splitter dampers.

e. Handholes of not less than 6" x 6" shall be provided at all points where access is required. Manholes of not less than 18" x 24" shall be provided at all points where it is necessary to clean or remove parts of equipment. All access doors and handholes shall be rubber gasketed insulated type with frame and latches.

f. Install access doors at each fire damper, and smoke detector.

g. All ductwork must be sealed in accordance with Seal Class C as defined in SMACNA HVAC Duct Construction Standards - Metal and Flexible, 1985.

h. All joints and seams in ductwork exposed to weather shall be sealed watertight with a suitable non-aging sealer.

3.2 DUCT HANGERS AND SUPPORTS:

a. Duct hangers and supports shall conform to those shown in Tables 4-1 and 4-2 of SMACNA HVAC Ductwork 1985, 1st Edition.

3.3 WALL PENETRATIONS:

a. Where ducts pass through non-rated walls and is exposed to view the duct shall be finished with suitable metal collar.

b. Where fire dampers are shown or required, dampers shall be installed

per manufacturer's UL listing.

3.4 CLEANING DUCT SYSTEMS:

a. Before fan systems are put in operation, vacuum clean inside of air units, plenums and apparatus housing. Filters are to be installed before moving air through duct systems.

SECTION 15900

AUTOMATIC TEMPERATURE CONTROLS

PART 1: GENERAL

1.1 SCOPE:

- a. The provisions of section 15010 apply to all work in this section.
- b. A complete system of automatic temperature controls shall be furnished by the temperature control manufacturer in conjunction with controls furnished by unit manufacturers. It shall be an electric system and shall be complete in every respect as hereinafter specified and as shown on the control diagrams. The control equipment shall adapt readily to all equipment furnished in the mechanical system so as to provide the sequence necessary for proper operation of all equipment herein specified. The control system shall be installed, checked out, and guaranteed by the control manufacturer.
- c. The control manufacturer shall guarantee the control system to be free defects in workmanship and material under normal use and provide service for a period of one year after acceptance by the Engineer or beneficial occupancy of the building. Any defects in workmanship or material during this time shall be corrected by the control manufacturer at no charge to the Owner.
- d. The control system shall consist of all thermostats, temperature transmitters, controllers, automatic dampers, damper operators, control panels, and accessory control equipment to fill the intent of the specifications and provide for a complete and operable system.
- e. All wiring associated with the temperature control system (line voltage or low voltage) shall be installed by the Temperature Control Contractor or by an Electrical Subcontractor whose principal business is control and interlock wiring. If the wiring is performed by an Electrical Subcontractor, the Temperature Contractor will supervise the wiring installation and be responsible for the performance of the system. Wiring shall be in accordance with the electrical specifications.
- f. Upon completion of the work and acceptance by the Owner, provide a 4 hour period of instruction to the Owner's operating personnel who have responsibility for the mechanical system. An additional 4 hour instruction period shall be given at the beginning of the next heating and cooling season.

1.2 SUBMITTALS:

- a. The Temperature Control Manufacturer shall submit copies of complete temperature control diagrams with written "sequence of control" and factory printed specification data sheets, covering each control device proposed to the used, for the Engineer's approval, prior to installation of any equipment.
- b. After approval and installation provide sets of complete operating and maintenance instructions with "as-built" drawings, typewritten instructions and operating sequences, and descriptive data sheets. Assemble each set in a hard cover binder with "temperature control" title placed on front cover and binding. Frame an auto-positive copy of the control drawings and mount in the

equipment room.

PART 2: PRODUCTS

2.1 SENSORS:

a. Outside Air Temperature Sensor

1. Sensor shall be mounted in the outdoors where natural air flow occurs, away from any artificial affect from mechanical sources - Example: Windows, doors, exhaust fans, etc. The temperature range shall be -40 to 220 degrees F. Provide a sun shield and weatherproof assembly for mounting ½ inch rigid conduit.

2.2 THERMOSTATS/CONTROLLERS:

a. Programmable Room Thermostats (provided by equipment manufacturer).

1. 1H/1C, 2H/1C or 3H/2C stage heatpump thermostat.
2. Seven-day with copy or 24 hour programmable.
3. Outdoor temperature display (field selectable - on/off).
4. Adaptive Intelligent or Conventional Recovery. Assure that desired temperature is achieved at programmed time & maintained regardless of weather conditions; optimizes energy savings, field activated.
5. Minimum compressor run time (Factory set to 10 minutes, field adjustable).
6. Comfort enhancing droop.
7. Backlight display.
8. Filter clean/replacement key (field adjustable).
9. No Batteries required. Continue clock for 15 minutes.
10. Programming and other functions stored in permanent "E-Prom" memory.
11. Manual or auto change over (field selectable).
12. 3-10 degree F dead band between heating and cooling setpoints in the "auto" changeover mode (field adjustable).
13. Conventional or adaptive intelligent recovery.
14. Adjustable heating range (55 - 85 degree setpoint range) (highest heating setpoint field adjustable downward).
15. Adjustable cooling range (65 - 99 degree setpoint range) (lowest cooling setpoint field adjustable upward from 65 degree F).

16. Daylight savings time key.
17. Fan can be programmed in the "on" or "auto" mode for each period.
18. Vacation/Leave program, will hold vacation/Leave temperature for up to 256 days.

19. Field temperature re-calibration offset (field adjustable). Allows installer to set thermostat to customer's wall mounted thermostat setting.

20. Finish: White

b. Programmable time clock (Paragon 7000 series or equal) with the following functions:

1. Each day shall be subdivided into light (day) and dark (night) portions with 30 minute increments.
2. Scheduling for up to 28 events for the week.
3. Scheduling for up to 4 on/off operation per day.
4. Any day may be omitted.
5. On event marker shall be light color, off events shall be dark color.
6. Three Hour Minimum time between events
7. Independent four pole switching that shall allow for SPST, DPST, SPDT switching.
8. Manual ON/OFF lever transfer switch operation.

2.3 AUTOMATIC CONTROL DAMPERS:

a. The Control Subcontractor will provide control dampers as specified and as shown on the plans of the types indicated on the plans. Frames shall not be less than 16 gauge galvanized steel. Blades must not be over 8 inches wide nor less than 16 gauge galvanized steel roll formed. Bearings shall be iolite, ball bearing or nylon with 1/2" shafts.

b. All two position control dampers shall be parallel blade type; all modulating dampers shall be opposed blade.

c. Dampers shall be minimum leakage type to conserve energy and the manufacturer shall submit leakage and flow characteristic data for all control dampers with the temperature control submittal. Maximum leakage shall be less than 1% at static pressure of 5 inches W.C. approach velocity of 2000 FPM.

d. Where low leakage dampers are required, the blade edges shall be fitted with replaceable, snap-on, inflatable seals to limit damper leakage to 1/2 percent at applied static pressure. Airfoil blades required. Low leak dampers are required on all outside air applications.

PART 3: EXECUTION

3.1 SEQUENCE OF OPERATION:

a. Split system heat pumps.

1. Programmable thermostat by unit manufacturer shall index unit to cooling or heating mode as dictated by space temperature.

2. When the unit control is in the occupied mode the indoor fans shall operate continuously to provide ventilation.

3. Outside air dampers shall open/close in response to time clock. Dampers shall be closed whenever the outside air temperature is above 90 deg. F or below 35 deg. F.

b. Fans

1. See plans for control.

c. Time Clock Zones

1. Outside air dampers.