GULF COAST STATE COLLEGE
SOFTBALL COMPLEX PROJECT
Panama City, Florida

ITB#6-2016/2017
PROJECT MANUAL

100% CONSTRUCTION DOCUMENTS
FLA Project No. 4228

Architect:
Florida Architects, Inc.
648 Florida Avenue
Panama City, FL 32401

Civil Engineer & Owner's Representative:
Dewberry|Preble-Rish Inc.
203 Aberdeen Parkway
Panama City, FL 32405

Landscape Architect:
Lawnscapes, Inc.
3209 Hwy. 231
Panama City, FL 32404

Structural Engineer:
Anderson Engineers, P.A.
78 Ricker Avenue
Santa Rosa Beach, FL 32459

M/E/P Engineer:
Premier Engineering Group, LLC
410 W. Nine Mile Road, Suite A
Pensacola, FL 32534

05/04/17

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END OF SECTION 000200

SECTION 000700 – INVITATION TO BID

PART 1 - GENERAL

1.1 INVITATION TO BID

A. Notice is hereby given that signed, sealed, and delivered bids shall be received from pre-qualified Contractors by the Owner no later than June 8, 2017 until 2:00 pm (CST) local time, for the work described in the construction of:

ITB#6-2016/2017
Gulf Coast State College (GCSC) Softball Complex Project

B. In order for bids to be considered, they must be in the possession of the Owner's Agent on or before the date and time noted above.
C. Mail or hand deliver all bid proposals as noted below:
D.

The District Board of Trustees of
GULF COAST STATE COLLEGE
5230 West U.S. Highway 98
Panama City, Florida 32401

Attention: Mr. Fred Brown, Director of Procurement

***Oral, telegraphic or electronic proposals will not be considered.

E. All bid proposals must be submitted in one (1) fully executed original form (marked Original) and one printed copy, and one (1) electronic copy (USB jump drive or readable CD) and must be signed, sealed (corporate seal), and securely sealed in an envelope or suitable conveyance, and clearly marked on the outside to show the date and time, and must be designated as "SEALED BID FOR ITB#6-2016/2017 - GCSC SOFTBALL COMPLEX PROJECT" and indicating the respondent's name, address, date and time of opening.
F. Bid proposals will be read aloud publicly at the bid opening on June 8, 2017 at 2:00 pm (CST) The bid results will be posted on the College's procurement website.
G. Bids and supporting documents will be evaluated by the Architect and the Owner's Agent.
H. Oral, telegraphic or electronic proposals will not be considered.
I. Further, the District Board of Trustees reserves the right to accept or reject any or all bids, or parts thereof, or to waive informalities therein, or to accept other than the lowest bid when considered to be in the best interest of the Owner, or to waive informalities in the solicitation documents, and to obtain new bids. Each Bid shall be valid and binding for a period of ninety (90) days after opening.
J. Proposals received after the published time or date, or incomplete proposals, will not be accepted.
K. Inquiries regarding this ITB should be directed to Mr. Fred Brown, Procurement Director, via emailto:fbrown3@gulfcoast.edu or Faxed to (850) 767-8043.
L. A Non-Mandatory Pre-Bid Conference will be held on May 30, 2017 at 10:00 AM (CST) at the Maintenance & Operations Building at the GCSC Panama City Campus.

1.2 DOCUMENTS

A. Documents will be available as follows:
B.

1. Bid Documents may be obtained on the College's procurement website: http://www.gulfcoast.edu/procurement

2. Addenda will be posted to the College's procurement website. Be sure to periodically check this website for any Addenda and/or additional information. Checking the website is the Bidders responsibility.

C. Documents may be viewed at no cost at the office of the Architect and Owner's Representative (Dewberry|Preble-Rish) when a time is prearranged by telephone.

END OF SECTION 000700

SECTION 01000 – INSTRUCTION TO BIDDERS

PART 1 - GENERAL

1.1 INSTRUCTIONS AND INFORMATION TO BIDDERS

A. Bid proposals shall be on forms included in this bid package (Bid Form Section 003100, Exhibit "A").
B. The Bidder will provide bid security in the form of a Bid Bond or Cashier's Check.
C. Bidders shall agree not to withdraw their bid proposal for a period of ninety (90) days after the date for opening of bids.
D. Certificates of Insurance will be required of the successful Bidder in the amounts specified in the General Conditions of the Contract as well as Performance Bond and Payment Bond in the amount of 100% of the Contract Price.
E. Each Bidder shall include in his bid amount the cost of the Bond and insurance.
F. The above listed document will be assembled and submitted in an appropriately sized envelope for submission with the name of the project appearing legibly on the outside of the envelope – refer to Section 000700, Invitation to Bid for additional information.

The Bid opening will take place at the following address:

The District Board of Trustees of
GULF COAST STATE COLLEGE
5230 West U.S. Highway 98
Panama City, Florida 32401

Maintenance & Operations Building Conference Room
Attention: Mr. Fred Brown, Director of Procurement

G. The Bid date will be:

June 8, 2017 at 2:00 pm (CST)

1.2 The District Board of Trustees reserves the right to accept or reject any or all bids, or parts thereof, or to waive informalities therein, or to accept other than the lowest bid when considered to be in the best interest of the Owner, or to waive informalities in the solicitation documents, to obtain new bids. Each Bid shall be valid and binding for a period of ninety (90) days after opening.

1.3 BID SUBMITTAL REQUIREMENTS

A. Attached bid proposal form is to be used, Section 003100, Exhibit "A"
B. Bid Bond, AIA Document A310 – 1970, (Exhibit "B" - Refer to Section 004400, Bid Bond)
C. List of Subcontractors, AIA Document G805 – 2001, Exhibit "C"
D. Drug Free Workplace, Exhibit "D"
E. E-Verify Background Check, Exhibit "E"
F. Sworn Statement Pursuant to Section 287.133(3)(a), Florida Statutes, PUBLIC ENTITY CRIMES Exhibit "F"
G. Anti-Collusion Clause, Exhibit "G"
H. Conflict of Interest Disclosure Form, Exhibit "H"
I. Addendum Acknowledgement Form, Exhibit "I"
J. Labor and Material Payment Bond, Exhibit "J"
K. Performance Bond, Exhibit "K"
L. Trench Safety Act Form, Exhibit "Section 009100"

1.4 AIA FORMS TO BE USED WITH THIS CONTRACT:

A.	A101	Owner's Agent-Contractor Agreement Form – Stipulated Sum
B.	A201	General Conditions of the Contract for Construction
C.	G701	Change Order
D.	G702	Application and Certificate for Payment
E.	G703	Continuation Sheet for G702
F.	G704	Certification of Substantial Completion
G.	G705	List of Subcontractors
H.	G706A	Contractor's Affidavit – Release of Liens
I.	G707	Consent of Surety to Final Payment
J.	G709	Proposal Request
K.	G710	Architect's Supplemental Instructions
L.	G714	Construction Change Directive
M.	G810	Transmittal Letter

1.5 DEFINITIONS:

A. The Bidding Documents include the Bid Scope Documents, the Conditions of the Contract (General, Supplementary General, and Special Conditions), and the Construction Drawings and Specifications (Project Manual), including any Addenda issued prior to the receipt of bids.

B. The Bid Scope Documents include the Invitation to Bid, Information to Bidders, Description of the Work, Schedule of Drawings, Bid Form, and sample bidding and contract forms.

C. The Contract Documents consist of the Agreement, the Conditions of the Contract (General, Supplementary General, and Special Conditions), the Construction Drawings, the Specifications (Project Manual), all Addenda, and all modifications thereto, and the Contract between the Owner and the Contractor.

D. Addenda are written and graphic instruments issued by the Architect and forwarded by the General Contractor prior to the time of receipt of Bids which modify or interpret the Bidding Documents by additions, deletions, clarifications, or corrections.

E. A Bid is complete and properly signed, sealed, and notarized proposal to do the work for the sums stipulated, supported by data called for by the Bidding Documents.

F. Base Bid is the sum for which the Bidder offers to perform the work described in the Bidding Documents as the Base.

G. An Alternate Bid (or Alternate) is an amount stated in the Bid to be added to, or deducted from, the amount of the Base Bid if the corresponding change in the project scope or materials or methods of construction is described in the Bidding Documents.

H. A Unit Price is an amount stated in the Bid as a price per unit of measurement for materials or services as described in the Bidding Documents or the Contract Documents.

I. Where reference is made to the Architect, it shall mean the designated representative of the Architect/Engineer.

J. Wherever in the Specifications (or on the Drawings) there is a reference to the "Contractor" (or "G.C."), or "Construction Manager" (or CM), such reference shall be interpreted to mean the "General Contractor".

1.6 QUALIFICATION OF CONTRACTORS AND SUBCONTRACTORS:

A. In order to be qualified, a Bidder must be able to present evidence that he (they) are currently registered with or hold an unexpired certificate as a Contractor, issued by the Florida Construction Industry Licensing Board in accordance with Chapter 489, Part I Licensing of Construction Industry, Florida Statutes. In order to be qualified, if the Bidder is a Corporation, he must be properly registered with the State of Florida, Department of State, Division of Corporations, and must hold a current State Corporate Charter Number in accordance with Chapter 607, Florida Statutes.

B. Furthermore, the Agreement will only be entered into with responsible Contractors, found to be satisfactory to the Architect and the Owner's Agent, qualified by experience and in a financial position to do the work specified.

C. The Contractor will be required to engage a qualified independent testing and inspection consultant, acceptable to the Owner's Agent and the Architect, with capabilities to act as a testing and inspecting agency to perform tests and inspections and to prepare reports during the entire term of the project.

1.7 METHOD OF BIDDING:

The work described in these documents is the sole responsibility of the Contractor known herein as "Contractor." The work of each Subcontractor is described in the Description of Work of each Specification Section and as noted on the drawings and shall be identified in the contract with each Subcontractor.

1.8 EXAMINE BIDDING DOCUMENTS AND SITE VISIT:

A. The Bidder shall be held to have examined the premises and site so as to compare the existing conditions with the Drawings and Specifications, and to have satisfied himself as to the condition of the premises, any obstructions, the actual levels, and all other work necessary for carrying out the project, before delivery of his proposal. The Bidder shall also acquaint himself with the character and extent of the Owner's Agent's and other Contractor's operations in the area of the work, so that he may make his construction plans accordingly. No allowances or extra payment will be made to a Contractor for, or on account of, costs or expenses occasioned by his failure to comply with the provisions of this paragraph, or by reason of error or oversight on the part of the Contractor, or on account of interferences by the Owner's Agent or a Subcontractor's activities.

B. Complete sets of Bidding Documents shall be used in preparing bids. Neither the Owner's Agent, nor the Architect assumes any responsibility for errors, omissions, or misinterpretations resulting from the use of incomplete sets of Bidding Documents (available at (http://www.gulfcoast.edu/procurement)

C. The Owner's Agent or Architect in making, or having made, copies of the Bidding documents and Contract Documents available, does so only for the purpose of obtaining bids on, or construction of, the Work and does not confer a license or grant for any other use.

1.9 NON-MANDATORY PRE-BID CONFERENCE:

A. For the dissemination of information and clarification of intent of the Bidding Documents, a Pre-Bid Meeting will be held on May 30, 2017. The time will be at 10:00 am (CST) at the Maintenance and Operations Building at the GCSC Panama City Campus.

B. This meeting is non-mandatory.

C. Bidders shall submit to the Architect a written list of questions and requests for clarification.

D. The last day to submit written questions shall be June 1, 2017, 4:00 pm (CST).

1.10 DISCREPANCIES, OMISSIONS OR INTERPRETATIONS

A. Bidders shall promptly notify the Architect of any ambiguity, inconsistency, or error which they may discover upon examination of the Bidding Documents or Contract Documents or of site and local conditions. Bidders requiring clarification or interpretation of the Bidding Documents or Contract Documents shall make a written request to the Architect by June 1, 2017, 4:00 pm (CST). Interpretations will not be made orally.

B. Any interpretations, corrections, or change of the Architect's Bidding Documents will be made by Addendum by the Architect and issued to registered plan holders by the Architect. Interpretations, corrections, or changes of Documents made in any other manner will not be binding, and bidders shall not rely upon such interpretations, corrections, and changes.

C. Addenda will be posted to the College's Procurement Website for all potential bidders (http://www.gulfcoast.edu/procurement)

D. All telephone calls, emails or Faxes on clarification or interpretation of the documents will be accepted by the Owner's Agent, Mr. Fred Brown, Director of Procurement (refer to Section 000700, Invitation to Bid for additional information). This routing of calls is only to ensure orderly dissemination of

information. The Architect is the preparer of the Bidding Documents and Construction Documents and, as such will be the interpreter of the Documents, and will be the only party responsible for issuance of clarification or interpretation information regarding this project.

1.11 BID PROPOSAL FORM:

A. The Bidder by submitting his Bid represents that he has read and understands the Bidding Documents and his Bid is made in accordance therewith.
B. Each bid shall be submitted on the bidder's letterhead following (matching) the bid proposal form bound in the Bid Scope Documents with all blank spaces filled in. All blanks on the bid form shall be filled in by typewriter or manually in ink. Each bid shall be submitted in duplicate (one marked "Original" and one (1) electronic copy on a jump drive or readable CD) (refer to Section 000700, Invitation to Bid for additional information).
C. All interlineations, alterations, or erasures shall be initiated by the signer of the bid.
D. Fill in all spaces for bid prices in both words and figures. In case of discrepancies, the amount shown in words will govern. Submit the Bid, the bid security, and any other documents required to be submitted with the Bid, in a sealed opaque envelope (refer to Section 000700, Invitation to Bid for additional information).
E. All requested Alternates shall be bid. If alternates do not make a change in the Base Bid, enter "No Change". Failure to comply with this requirement may result in rejection of the Bid.
F. Make the Bid in the name of the principal, and if a co-partnership, give the names of the parties. Give the complete address. If bids are submitted by an agency, provide satisfactory evidence of the agency authority.
G. The Bid shall include the legal name of the Bidder and a statement that the Bidder is a sole proprietor, a partnership, a corporation, or some other legal entity. The Bid Proposal shall be signed, sealed and notarized by the person or persons authorized to bind the Bidder to the contract.
H. The Bidder, by submitting his Bid, represents that he has read and acknowledges that the construction time frame is acceptable. The Bidder further acknowledges that his Bid is based upon the materials, system, and equipment required by the Bidding Documents without exception.
I. Bids must be received at the designated location prior to the time and date for receipt of bids indicated in the Invitation to Bid, or any extension thereof made by the Addendum.
J. Oral, telephone, or telegraph bids are invalid and will not receive consideration. No Bids received after the time fixed for receiving them will be considered. Late Bids will be returned to the sender unopened.

1.12 ADDENDA:

A. All addenda issued during the time of bidding shall become part of the Bidding Documents, and receipt thereof shall be acknowledged on the bid proposal (refer to Section 000700, Invitation to Bid for additional information).
B. Each Bidder shall ascertain prior to submitting his bid that he has obtained all Addenda issued.
C. Addenda will be posted to the College's Procurement Website as soon as prepared by the Architect.

1.13 ALTERNATES:

A. Each Bidder shall bid on all Alternates listed in each part of the Bid Proposal. They will be fully considered in awarding the Contract.
B. Bids will be considered irregular, and may be rejected, if Alternates contained in the Bid Proposal are obviously unbalanced in excess of, or below, reasonable cost analysis values.

1.14 SALES TAX:

A. The Bidder shall include in his Bid Proposal all sales and use taxes on materials and equipment included in his Proposal which may be required by law.

1.15 INSURANCE:

A. Refer to "Supplementary General Conditions", Article 11.

1.16 SUBSTITUTIONS:

A. Bidders wishing to obtain approval of an article, device, product, material, fixture, form, or type of construction other than that specified or shown by name, make, or catalog number, shall make written request to the Architect, through the General Contractor, timed so as to reach the Architect at least seven (7) working days prior to the date of receipt of bids. Such request shall be accompanied by data supporting the claim to equality or equivalence and as indicated in Sections 008000, 008200 and 016000.
B. Approval by the Architect, if given, will be made by Addendum. Said approval will indicate that the additional article, device, product material, fixture, form, or type of construction is approved for use insofar as the requirements of this Project are concerned.
C. The Bidder shall submit drawings and other descriptive data of any modification, or items of assemblies, necessary to provide approved compliance with requirements and compatibility with adjacent components.
D. Bids shall not be based on assumed acceptance of any item which has not been approved by Addendum or specified herein.
E. Under no circumstance will the Architect be required to prove that a product proposed for substitution is, or is not, equal or equivalent quality to the product specified. It is mandatory that the Bidder submit a complete description of the proposed substitute, the name of the material or equipment for which it is to be substituted, drawings, cuts, performance and test data, locations of other installations in the State of Florida with contacts names at those locations and any other data, samples or information necessary for a complete evaluation. Insufficient data will not be considered.

1.17 WITHDRAWAL OR REVISION OF BID PROPOSALS:

A. Any bid proposal may be withdrawn or revised in writing prior to the scheduled time for opening of bid proposals.
B. A bid may not be modified, withdrawn, or canceled by the Bidder during the stipulated time period following the time and date designated for the receipt of bids, and the Bidder so agrees in submitting his bid.
C. Prior to the time and date designated for receipt of bids, bids submitted early may be modified or withdrawn only by notice to the party receiving bids at the place, and prior to the time, designated for receipt of bids. Such notice shall be in writing over the signature of the Bidder or be by telegram; if by telegram, written confirmation over the signature of the Bidder must have been mailed and post-marked on or before the date and time set for receipt of bids. It shall be so worded as not to reveal the amount of the original bid.
D. Withdrawn bids may be resubmitted up to the time designated for the receipt of bids provided that they are then fully in conformance with this Section, Information to Bidders and other Bid Document requirements.
E. Bid security shall be in an amount sufficient for the bid as modified or resubmitted.

1.18 ACCEPTANCE OF BID PROPOSALS:

A. Bids will be received on or before **June 8, 2017 until 2:00 pm (CST).**
B. Bids will be read aloud on **June 8, 2017 at 2:00 pm (CST).**
C. Bids shall be good for ninety (90) calendar days after the bid opening.
D. It is the intent of the Owner’s Agent to award a Contractor to the lowest responsible Bidder provided the Bid has been submitted in accordance with the requirements of the Bidding Documents and does not exceed the funds available.
E. Further, the District Board of Trustees reserves the right to accept or reject any or all bids, or parts thereof, or to waive informalities therein, or to accept other than the lowest bid when considered to be in

the best interest of the Owner, or to waive informalities in the solicitation documents, and to obtain new bids.

1.19 CONSTRUCTION BONDS:

A. The Owner's Agent will, prior to the execution of the Contract, require the General Contractor to furnish a Performance Bond (Exhibit "K") and Labor and Material Payment Bond (Exhibit "J") equal to one hundred percent (100%) of the total amount payable by the terms of the Contract.
B. The General Contractor shall deliver the required Bonds to the Owner's Agent at the date of execution of the Contract.
C. The Bonds shall be written and executed on the forms which are included in the Bid Scope Documents. Any bonding company submitting a Bid Bond or Construction Bonds to the Owner's Agent must be licensed to transact a fidelity and surety business in the State of Florida.
D. The General Contractor shall be responsible for notifying the Owner's Agent immediately upon notification from the Bonding Company that they can no longer provide the Bonding requirements for this project, and/or if the company is not able to conduct business, or if the company goes out of business. The General Contractor shall also be responsible for immediately obtaining new Bonds as required for this project and forwarding them to the Owner's Agent, if the original Bonding Company cannot provide the bonds or goes out of business.

1.20 CONTRACT AGREEMENT FORM:

A. The form that will be used for this contract agreement shall be the "Standard Form of Agreement between the Owner's Agent and Contractor where the basis of payment is a STIPULATED SUM" (A.I.A. Document A101-1997) as modified/prepared by the Owner's Agent. The General Contractor will provide all bonds and insurance certificates within seven (7) calendar days of the Notice of Award by the District Board of Trustees of Gulf Coast State College.

1.21 POST-BID INFORMATION:

A. After the bids are received, tabulated and evaluated by the Owner's Agent and the Architect, the apparent low bidder shall meet for the purpose of determining any contract concerns. Contractor to provide the following information to the Owner at the meeting:

Designation of Work to be performed by the Bidder with his own forces.

Complete detailed unit cost breakdown. This breakdown shall include separate line items for all mechanical work, and all electrical work, and further a line item cost for each Section of the Specifications.

Provide a Schedule of Values with unit costs for each major item.

A final list of names of the Subcontractors or other entities (including those who are to furnish materials or equipment fabricated to a special design) proposed for the principal portions of the Work.

The proprietary names and the suppliers of principal items or systems of materials and equipment proposed for the Work. This information shall not be allowed to change during the course of the Work unless approved by the Architect/Engineer.

Within seven (7) calendar days after Notice of Award, Contractor to submit to the Architect a complete list of all items, products, and layouts for which shop drawings, brochures, or samples are required, names of each subcontractor or supplier, and date of planned submission.

1. The Bidder will be required to establish to the satisfaction of the Architect and Owner's Agent the reliability and responsibility of the persons or entities proposed to furnish and perform the Work described in the Bidding Documents.

    a. Prior to the award of the Contract, the Architect will notify the Bidder in writing if either the Owner's Agent or the Architect, after due investigations, has reasonable objection to any such proposed person or entity.
    b. If the Owner's Agent or Architect has reasonable objection to any such proposed person or entity, the Bidder shall submit an acceptable substitute person or entity with an adjustment in his bid price, if any, to cover the difference in cost occasioned by such substitution.
    c. The Owner's Agent may, at his discretion, accept the adjusted bid price or he may disqualify the Bidder. In the event of either withdrawal or disqualification of the Bidder pursuant to this paragraph, bid security will not be forfeited.

1.22 SCHEDULING AND COMPLETION:

A. Work shall be commenced by the date established in the Notice to Proceed, but in no case more than five (5) consecutive calendar days after such date, and shall proceed in accordance with a schedule to be developed by the Contractor and presented to the Architect and the Owner's Agent. **The work shall be Substantially Complete (as approved by the Architect and Owner) within one-hundred-eighty-nine (189) consecutive calendar days from Notice To Proceed; and the playing field irrigation and grass to be installed by October 1, 2017 (eighty-three days)**.

B. Due to the required operation schedule, the need to complete this work in order to occupy the facility at full capacity, time is of the essence for this Contract.

C. LIQUIDATED DAMAGES:

If the Contractor fails to achieve Substantial Completion of the Work within the Contract Time or as otherwise required by the Contract Documents, the Owner's Agent shall be entitled to retain or recover from the Contractor and/or its Surety, and liquidated damages and not as a penalty, the following per diem amounts commencing upon the first day following expiration of the Contract Time and continuing until the actual date of Substantial Completion. Such liquidated damages are hereby agreed to be a reasonable pre-estimate of damages the Owner's Agent would incur as a result of delayed completion of the Work.

Substantial Completion Liquidated Damages Per Day: $3,000.00

The Liquidated Damages amount per calendar day are fixed and agreed upon by and between the Contractor and the Owner's Agent because of the impracticality and difficulty of ascertaining actual damages the Owner's Agent will sustain. The Owner's Agent will suffer financial damage if the Project is not substantially completed on the dates set forth in the Contract Documents. Therefore, it is agreed that the liquidated damages amount per calendar day is adequate to cover damages which the Owner's Agent will sustain by reason of the inconvenience, loss of use, loss of monies, additional costs of contract administration by the Architect and Owner's Agent.

Permitting the contractor to continue and finish the Work or any part of the Work after time fixed for its completion or after date to which time for completion may have been extended shall in no way constitute a wavier on the part of the Owner's Agent of any of his rights under the Contract.

Liquidated Damages shall also be assigned to the Contractor if punch list items have not been completed within twenty-one (21) consecutive calendar days after Substantial Completion. Liquidated Damages for punch list items shall commence on the (22nd) day after Substantial Completion and accrue until the final Application for Payment has been approved by the Architect. The Contractor, and its Surety, shall pay to the Owner's Agent the sums hereinafter stipulated as fixed, agreed and liquidated damages for each calendar day of delay until the punch list items are complete:

Final Completion Liquidated Damages Per Day: $1,500.00

1.23 REQUIREMENTS FOR LICENSED SUBCONTRACTORS:

A. The Contractor must complete a form provided by the College for every sub contractor. The information required will be their license # and the expiration date.

END OF SECTION 001000

EXHIBIT "C"

SUB-CONTRACTORS FORM

As the Bidder, I submit a listing of the Sub-Contractors which I shall use to accomplish the Work. Sub-Contractors are listed by name, address, amount of work and item of work. If none, please state so.

Subcontractor Name, Address, & License #: _____

_____

Work to be performed and amount: _____

_____

Subcontractor Name, Address, & License #: _____

_____

Work to be performed and amount: _____

_____

Subcontractor Name, Address, & License #: _____

_____

Work to be performed and amount: _____

_____

Subcontractor Name, Address, & License #: _____

_____

Work to be performed and amount: _____

_____

Subcontractor Name, Address, & License #: _____

_____

Work to be performed and amount: _____

_____

Subcontractor Name, Address, & License #: _____

_____

Work to be performed and amount: _____

_____

Name of Firm: _____

Authorized Signature: _____

Printed Name: _____

Title: _____

Date: _____

EXHIBIT "D"

DRUG FREE WORKPLACE
Section 287.087 Florida Statutes

Preference shall be given to businesses with drug-free workplace programs. Whenever two or more proposals, which are equal with respect to price, quality, and service, are received by the GCSC for the procurement of commodities or contractual services, a proposal received from a business that certifies that it has implemented a drug-free workplace program shall be given preference in the award process. Established procedures for processing tie bids will be followed if none of the tied vendors have a drug-free workplace program. To have a drug-free workplace program, a business shall:

1. Publish a statement notifying employees that the unlawful manufacture, distribution, dispensing, possession, or use of a controlled substance is prohibited in the workplace and specifying the actions that will be taken against employees for violations of such prohibition.

2. Inform employees about the dangers of drug abuse in the workplace, the business's policy of maintaining a drug-free workplace, any available drug counseling, rehabilitation, and employee assistance programs, and the penalties that may be imposed upon employees for drug abuse violations.

3. Give each employee engaged in providing the commodities or contractual services that are under Bid a copy of the statement specified in subsection (1).

4. In the statement specified in subsection (1), notify the employees that, as a condition of working on the commodities or contractual services that are under Bid, the employees will abide by the terms of the statement and will notify the employer of any conviction of, or plea of guilty or nolo contendere to, any violation of Chapter 893 or of any controlled substance law of the United States or any state, for a violation occurring in the workplace no later than five (5) days after such conviction.

5. Impose a sanction on, or require the satisfactory participation in a drug abuse assistance or rehabilitation program if such is available in the employee's community, by an employee who is so convicted.

6. Make a good faith effort to continue to maintain a drug-free workplace through implementation of this section.

As the person authorized to sign the statement, I certify that this firm complies fully with the above requirements.

Name of Firm: _____

Authorized Signature: _____

Printed Name: _____

Title: _____

Date: _____

EXHIBIT E

E-VERIFY

Vendor/Consultant acknowledges and agrees to the following: Vendor/Consultant shall utilize the U.S. Department of Homeland Security's E-Verify system, in accordance with the terms governing use of the system, to confirm the employment eligibility of:

1. All persons employed by the Vendor/Consultant during the term of the Contract to perform employment duties within Florida; and
2. All persons, including subcontractors, assigned by the Vendor/Consultant to perform work pursuant to the contract with GCSC.

Name of Firm: _____

Authorized Signature: _____

Printed Name: _____

Title: _____

Date: _____

EXHIBIT "F"

SWORN STATEMENT PURSUANT TO SECTION 287.133(3)(a),
FLORIDA STATUTES,
PUBLIC ENTITY CRIMES

THIS FORM MUST BE SIGNED AND SWORN TO IN THE PRESENCE OF A NOTARY PUBLIC OR OTHER OFFICIAL AUTHORIZED TO ADMINISTER OATHS.

1. This sworn statement is submitted to _____

   by _____

   for _____

   whose business address is

   _____

   _____

   and (if applicable) its Federal Employer Identification Number (FEIN) is _____

   (If the entity has no FEIN, include the Social Security Number of the individual signing this sworn statement:

   _____

2. I understand that a "public entity crime" as defined in Paragraph 287.133 (1)(g), Florida Statutes, means a violation of any state or federal law by a person with respect to and directly related to the transaction of business with any public entity or with an agency or political subdivision of any other state or of the United States, including, but not limited to, any bid or contract for goods or services to be provided to any public entity or an agency or political subdivision of any other state or of the United States and involving antitrust, fraud, theft, bribery, collusion, racketeering, conspiracy, or material misrepresentation.

3. I understand that "convicted" or "conviction" as defined in Paragraph 287.133 (1)(b), Florida Statutes, means a finding of guilt or a conviction of a public entity crime, with or without an adjudication of guilt, in any federal or state trial court of record relating to charges brought by indictment or information after July 1, 1989, as a result of a jury verdict, non jury trial, or entry of a plea of guilty or nolo contendere.

4. I understand that an "affiliate" as defined in Paragraph 287.133(1)(a), Florida Statutes, means:

   a. A predecessor or successor of a person convicted of a public entity crime; or
   b. An entity under the control of any natural person who is active in the management of the entity and who has been convicted of a public entity crime. The term "affiliate" includes officers, directors, executives, partners, shareholders, employees, members, and agents who are active in the management of an affiliate. The ownership by one person of shares constituting a controlling interest in another person, or a pooling of equipment or income among persons when not for fair market value under an arm's length agreement, shall be a prima facie case that one person controls another person. A person who knowingly enters into a joint venture with a person who has been convicted of a public entity crime in Florida during the preceding 36 months shall be considered an affiliate.

5. I understand that a "person" as defined in Paragraph 287.133(1)I, Florida Statutes, means any natural person or entity organized under the laws of any state or of the United States with the legal power to enter in to a binding contract and which bids or applied to bid on contracts for the provision of goods or services let by a public entity, or which otherwise transacts or applies to transact business with a public entity. The term "person" includes those officers, directors, executives, partners, shareholders, employees, members, and agents who are active in management of an entity.

6. Based on information and belief, the statement which I have marked below is true in relation to the entity submitting this sworn statement. [indicate which statement applies.]

   _____Neither the entity submitting this sworn statement, nor any of its officers, directors, executives, partners, shareholders, employees, members, or agents who are active in the management of the entity, nor any affiliate of the entity has been charged with and convicted of a public entity crime subsequent to July 1, 1989.

   _____The entity submitting this sworn statement, or one or more of its officers, directors, executives, partners, share holders, employees, members, or agents who are active in the management of the entity, or an affiliate of the entity has been charged with and convicted of a public entity crime subsequent to July 1, 1989.

   _____The entity submitting this sworn statement, or one or more of its officers, directors, executives, partners, shareholders, employees, members, or agents who are active in the management of the entity, or an affiliate of the entity has been charged with and convicted of a public entity crime subsequent to July 1, 1989. However, there has been a subsequent proceeding before a Hearing Office of the State of Florida, Division of Administrative Hearings and the Final Order entered by the Hearing Officer determined that it was not in the public interest to place the entity submitting this sworn statement on the convicted vender list. [attach a copy of the final order]

I UNDERSTAND THAT THE SUBMISSION OF THIS FORM TO THE CONTRACTING OFFICER FOR THE PUBLIC ENTITY IDENTIFIED IN PARAGRAPH 1 (ONE) ABOVE IS FOR THE PUBLIC ENTITY ONLY AND, THAT THIS FORM IS VALID THROUGH DECEMBER 31 OF THE CALENDAR YEAR IN WHICH IT IS FILED. I ALSO UNDERSTAND THAT I AM REQUIRED TO INFORM THE PUBLIC ENTITY PRIOR TO ENTERING INTO A CONTRACT IN EXCESS OF THE THRESHOLD AMOUNT PROVIDED IN SECTION 287.017, FLORIDA STATUTES FOR CATEGORY TWO OF ANY CHANGE IN THE INFORMATION CONTAINED IN THIS FORM.

_____
Signature

Sworn to and subscribed before me on this _____ day of _____, 20___.

Personally known _____ OR Produced identification _____

Notary Public- State of _____

My commission expires: _____
[printed, typed or stamped commissioned name of notary public]

EXHIBIT "G"

ANTI-COLLUSION CLAUSE

Firm certifies that their response is made without prior understanding, agreement or connection with any Corporation, Firm or person submitting a response for the same services and is in all respects fair and without collusion or fraud.

Name of Firm: _____

Authorized Signature: _____

Printed Name: _____

Title: _____

Date: _____

EXHIBIT H

CONFLICT OF INTEREST DISCLOSURE FORM

For purposes of determining any possible conflict of interest, all firms, must disclose if any District Board of Trustees of Gulf Coast State College(s), employee(s), elected officials(s), of if any of its agencies is also an owner, corporate officer, agency, employee, etc., of their firm.

Indicate either “yes” (a GCSC employee, elected official, or agency is also associated with your firm), or “no”. If yes, give person(s) name(s) and position(s) with your firm.

YES_____ NO_____

NAME(S)	**POSITION(S)**

Name of Firm: _____

Authorized Signature: _____

Printed Name: _____

Title: _____

Date: _____

EXHIBIT "I"

ADDENDUM ACKNOWLEDGEMENT

I acknowledge receipt of the following addenda:

ADDENDUM NO._____ DATED_____

ADDENDUM NO._____ DATED_____

ADDENDUM NO._____ DATED_____

ADDENDUM NO._____ DATED_____

ADDENDUM NO._____ DATED_____

Name of Firm: _____

Authorized Signature: _____

Printed Name: _____

Title: _____

Date: _____

It is the responsibility of the firm to ensure that they have received addendums if issued. Call (850) 872-3843 or email fbrown3@gulfcoast.edu prior to submitting your proposal to ensure that you have received addendums.

EXHIBIT "J"

LABOR AND MATERIAL PAYMENT BOND

BY THIS BOND, We, _____ as Principal and _____, a corporation, as Surety, are bound to the DISTRICT BOARD OF TRUSTEES OF GULF COAST STATE COLLEGE, as College, in the sum of $_____ for the payment of which we bind ourselves, our heirs, personal representatives, successors, and assigns, jointly and severally.

Principal and GCSC entered into a contract dated _____, 2012 for _____, which is incorporated by reference.

THE CONDITIONS of this bond is such that

1. 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 insurance premiums on said work, and for all labor, performed in such work whether by subcontractor or otherwise, then this obligation shall be void. Otherwise, it shall remain in full force and effect.

2. If 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.

Further, no final settlement between GCSC College and the Contractor shall abridge the right of any beneficiary hereunder, whose claim may be unsatisfied.

Now, therefore, if the Contractor shall promptly make payment to all claimants, defined below, for all labor and material used or required for use in performing the obligations of this Contract, then this obligation shall be null and void; otherwise it shall remain in full force and effect.

Signed and Sealed this _____ day of _____, 2012.

CORPORATE PRINCIPAL Attest:

By: _____ Seal:

Its: _____

Acknowledged and subscribed on _____, 2012, before the undersigned authority by _____, as the _____ of the Corporation named as Principal and with due authorization of the Corporation.

_____
Notary Public

SURETY Attest:

By:_____ Seal:

Countersigned:
By: _____
Attorney-in-Fact, State of Florida

EXHIBIT K

PERFORMANCE BOND

BY THIS BOND, We, _____ as Principal and _____, a corporation, as Surety, are bound to the DISTRICT BOARD OF TRUSTEES OF GULF COAST STATE COLLEGE, as College, in the sum of $_____for the payment of which we bind ourselves, our heirs, personal representatives, successors, and assigns, jointly and severally. THE CONDITIONS of this bond are that if Principal:

1. Performs the contract dated _____, 2012, between Principal and the GCSC College for construction of _____ _____, the contract being made a part of this bond by reference, at the times and in the manner prescribed in the contract; and
2. Promptly makes payments to all claimants, as defined in section 255.05(1), Florida Statutes, supplying Principal with labor materials or supplies, used directly or indirectly by Principal in the prosecution of the work provided for in the contract; and
3. Pays County all losses, damages, expenses, costs, and attorney's fees, including appellate proceedings, that GCSC sustains because of a default by Principal under the contract; and
4. Performs the guarantee and warranty of all work and materials furnished under the contract for the time specified in the contract, then this bond is void; otherwise it remains in full force.
5. Any action instituted by a claimant under this bond for payment must be in accordance with the notice and time limitation provisions in Section 255.05(2), Florida Statutes. Any changes in or under the contract documents and compliance or noncompliance with any formalities connected with the contract or the changes does not affect Surety's obligation under this bond.

The Surety and the Contractor consent and yield to the jurisdiction of the Civil Courts in and for Bay County, Florida.

CORPORATE PRINCIPAL

Attest:

By: _____

Seal:

Its: _____

Acknowledged and subscribed on _____, 2012, before the undersigned authority by _____, as the _____ of the Corporation named as Principal and with due authorization of the Corporation.

_____
Notary Public

SURETY

Attest:

By:_____

Seal:

Countersigned:
By: _____

SECTION 003100 – BID PROPOSAL FORM

(EXHIBIT "A")

PART 1 - GENERAL

1.1 BID FOR CONSTRUCTION CONTRACT FOR: ITB#6-2016/2017 GULF COAST STATE COLLEGE SOFTBALL COMPLEX PROJECT:

A. **BID FROM:** _____

_____

_____

(herein after called "Bidder") a Corporate organized and existing under the laws of the State of Florida, a Partnership, or an individual.

B. **TO:** The DISTRICT BOARD OF TRUSTEES OF GULF COAST STATE COLLEGE

The undersigned, as Bidder, hereby declares that the only person or persons interested in the Bid as Principal or Principals is, or are, named herein and that no other person and herein mentioned has any interest in this proposal or in the contract to be entered into; that this Bid is made without connection with any other person, company, or parties making a bid; and that it is in all respects fair and in good faith, without collusion or fraud.

C. The Bidder further declares that he has examined the site of the work and informed himself fully in regard to all conditions pertaining to the places where the work is to be done; that he has examined the drawings and specifications for the work and the contractual documents relative thereto (available at (http://www.gulfcoast.edu/procurement), and has read all the special provisions furnished prior to the opening of bids, and that he has satisfied himself relative to the work to be performed.

D. The Bidder proposes and agrees, if this Bid is accepted, to contract with The District Board of Trustees of Gulf Coast State College in the form of Contract specified, to furnish all necessary materials, equipment, machinery, tools, apparatus, means of transportation, and labor necessary to complete the scope-of-work identified in full and complete accordance with the shown, noted, described, and intended requirements of the Contract Documents to the full and entire satisfaction of Florida Architects, Inc. with a definite understanding that no money will be allowed for extra work except as set for in the Contract Documents, the Bidder makes the following proposal.

E. The Bidder further proposes and agrees to commence work under this Contract no later than FIVE (5) consecutive days from the date established in the Notice to Proceed issued by the Architect, and be Substantially Complete WITHIN ONE-HUNDRED-EIGHTY-NINE (189) CONSECUTIVE CALENDAR DAYS AND THAT ON-SITE PLAYING FIELD IRRIGATION AND GRASS INSTALLED BY OCTOBER 12, 2017 (83 DAYS). Liquidated Damages apply for failure to perform as specified in the Project Manual.

1. It is planned that the Intent To Award will be issued on or about June 15, 2017 on the College's Procurement Website.
2. The Proposed Construction Contract is intended to be on the District Board of Trustees Meeting Agenda July 20, 2017.
3. It is the intent that the Notice to Proceed will be issued on July 21, 2017.

F. After the date of Substantial Completion, an additional twenty-one (21) calendar days will be allowed for the following:

1. Completion of all punch-list items.
2. Removal of equipment, excess materials, and debris from the site.

3. Completion of all Contract close-out items including as-built drawings and maintenance manuals.

G. The Bidder further proposes and agrees to execute and deliver the said Contract and the required Certificates of Insurance and Bonds, all within THREE (3) consecutive calendar days after written notice being given of the Notice of Award of the contract.

1.2 CONSIDERATION OF BIDS:

A. The Bidder agrees that this bid may not be withdrawn for a period of Ninety (90) calendar days from the opening thereof.
B. This Bid Form shall become a part of the Contract for Construction.

1.3 ADDENDA RECEIPT:

A. Complete and attach the Addenda to the Bidding Documents Acknowledgement Form Exhibit "I".

1.4 BUILDING BID AMOUNTS:

A. **Base-Bid Amount:** For all work associated and described on the Drawings and the Specifications

1. Base-Bid Amount (In Words):
2. _____Dollars

($_____)

3. Show in both words and figure. In case of discrepancy, amount shown in words shall govern.
4. Contractor shall include the following Unit Prices in the Base Bid:

1.5 UNIT PRICE AMOUNTS (None)

1.6 SIGNATURES

A. The undersigned Bidder holds Florida Construction Industry Licensing Board Certification Number: _____

1. Respectfully submitted,

2. (FIRM NAME) _____

3. Address: _____

4. By: _____
(Signature of Authorized Officer)

5. Print Name &Title: _____

6. Witness: _____

7. (Seal if bid is by a Corporation) (SEAL)

1.7 DISCLAIMER

A. The District Board of Trustees reserves the right to accept or reject any or all bids, or parts thereof, or to waive informalities therein, or to accept other than the lowest bid when considered to be in the best interest of the Owner, or to waive informalities in the solicitation documents, and to obtain new bids.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 003100

SECTION 004400 – BID BOND (AIA DOCUMENT A310)

(EXHIBIT "B")

See Attached AIA Document

END OF SECTION 004400

AIA® Document A310™ – 2010

Bid Bond

CONTRACTOR:
(Name, legal status and address)

SURETY:
(Name, legal status and principal place of business)

OWNER:
(Name, legal status and address)
Gulf Coast State College
5230 W. Hwy. 98
Panama City, Florida 32401

BOND AMOUNT: $

PROJECT:
(Name, location or address, and Project number, if any)
GCSC Softball Complex Bid No. ITB#6-2016/2017
FLA Project No. 4166-4228
GCSC Panama City, Florida

ADDITIONS AND DELETIONS:
The author of this document has added information needed for its completion. The author may also have revised the text of the original AIA standard form. An *Additions and Deletions Report* that notes added information as well as revisions to the standard form text is available from the author and should be reviewed. A vertical line in the left margin of this document indicates where the author has added necessary information and where the author has added to or deleted from the original AIA text.

This document has important legal consequences. Consultation with an attorney is encouraged with respect to its completion or modification.

Any singular reference to Contractor, Surety, Owner or other party shall be considered plural where applicable.

The Contractor and Surety are bound to the Owner in the amount set forth above, for the payment of which the Contractor and Surety bind themselves, their heirs, executors, administrators, successors and assigns, jointly and severally, as provided herein. The conditions of this Bond are such that if the Owner accepts the bid of the Contractor within the time specified in the bid documents, or within such time period as may be agreed to by the Owner and Contractor, and the Contractor either (1) enters into a contract with the Owner in accordance with the terms of such bid, and gives such bond or bonds as may be specified in the bidding or Contract Documents, with a surety admitted in the jurisdiction of the Project and otherwise acceptable to the Owner, for the faithful performance of such Contract and for the prompt payment of labor and material furnished in the prosecution thereof; or (2) pays to the Owner the difference, not to exceed the amount of this Bond, between the amount specified in said bid and such larger amount for which the Owner may in good faith contract with another party to perform the work covered by said bid, then this obligation shall be null and void, otherwise to remain in full force and effect. The Surety hereby waives any notice of an agreement between the Owner and Contractor to extend the time in which the Owner may accept the bid. Waiver of notice by the Surety shall not apply to any extension exceeding sixty (60) days in the aggregate beyond the time for acceptance of bids specified in the bid documents, and the Owner and Contractor shall obtain the Surety's consent for an extension beyond sixty (60) days.

If this Bond is issued in connection with a subcontractor's bid to a Contractor, the term Contractor in this Bond shall be deemed to be Subcontractor and the term Owner shall be deemed to be Contractor.

When this Bond has been furnished to comply with a statutory or other legal requirement in the location of the Project, any provision in this Bond conflicting with said statutory or legal requirement shall be deemed deleted herefrom and provisions conforming to such statutory or other legal requirement shall be deemed incorporated herein. When so

furnished, the intent is that this Bond shall be construed as a statutory bond and not as a common law bond.

Signed and sealed this day of ,

	(Contractor as Principal) *(Seal)*
(Witness)	*(Title)*
	(Surety) *(Seal)*
(Witness)	*(Title)*

Additions and Deletions Report for

AIA® Document A310™ – 2010

This Additions and Deletions Report, as defined on page 1 of the associated document, reproduces below all text the author has added to the standard form AIA document in order to complete it, as well as any text the author may have added to or deleted from the original AIA text. Added text is shown underlined. Deleted text is indicated with a horizontal line through the original AIA text.

Note: This Additions and Deletions Report is provided for information purposes only and is not incorporated into or constitute any part of the associated AIA document. This Additions and Deletions Report and its associated document were generated simultaneously by AIA software at 16:46:58 on 05/04/2017.

PAGE 1

Gulf Coast State College
5230 W. Hwy. 98
Panama City, Florida 32401

...

(Name, location or address, and Project number, if any)
GCSC Softball Complex Bid No. ITB#6-2016/2017
FLA Project No. 4166-4228
GCSC Panama City, Florida

Certification of Document's Authenticity

AIA® Document D401™ – 2003

I, Joseph J. Sorci, hereby certify, to the best of my knowledge, information and belief, that I created the attached final document simultaneously with its associated Additions and Deletions Report and this certification at 16:46:58 on 05/04/2017 under Order No. 4874519908_1 from AIA Contract Documents software and that in preparing the attached final document I made no changes to the original text of AIA® Document A310™ – 2010, Bid Bond, as published by the AIA in its software, other than those additions and deletions shown in the associated Additions and Deletions Report.

_____

(Signed)

_____

(Title)

_____

(Dated)

SECTION 007000 – GENERAL CONDITIONS (AIA DOCUMENT A201)

See Attached AIA Document as modified by the Owner's Agent.

END OF SECTION 007000

AIA® Document A201™ – 2007

General Conditions of the Contract for Construction

for the following PROJECT:
(Name and location or address)
GCSC Softball Complex Bid No. ITB#6-2016/2017
FLA Project No. 4228
GCSC Panama City, Florida

THE OWNER:
(Name, legal status and address)
Gulf Coast State College
5230 W. Hwy. 98
Panama City, Florida 32401

THE ARCHITECT:
(Name, legal status and address)
Florida Architects, Inc.
648 Florida Avenue
Panama City, Florida 32401

ADDITIONS AND DELETIONS:
The author of this document has added information needed for its completion. The author may also have revised the text of the original AIA standard form. An *Additions and Deletions Report* that notes added information as well as revisions to the standard form text is available from the author and should be reviewed. A vertical line in the left margin of this document indicates where the author has added necessary information and where the author has added to or deleted from the original AIA text.

This document has important legal consequences. Consultation with an attorney is encouraged with respect to its completion or modification.

TABLE OF ARTICLES

Init.
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INDEX
(Topics and numbers in bold are section headings.)

ARTICLE 1 GENERAL PROVISIONS

§ 1.1 BASIC DEFINITIONS

§ 1.1.1 THE CONTRACT DOCUMENTS

The Contract Documents are enumerated in the Agreement between the Owner and Contractor (hereinafter the Agreement) and consist of the Agreement, Conditions of the Contract (General, Supplementary and other Conditions), Drawings, Specifications, Addenda issued prior to execution of the Contract, other documents listed in the Agreement and Modifications issued after execution of the Contract. A Modification is (1) a written amendment to the Contract signed by both parties, (2) a Change Order, (3) a Construction Change Directive or (4) a written order for a minor change in the Work issued by the Architect. Unless specifically enumerated in the Agreement, the Contract Documents do not include the advertisement or invitation to bid, Instructions to Bidders, sample forms, other information furnished by the Owner in anticipation of receiving bids or proposals, the Contractor's bid or proposal, or portions of Addenda relating to bidding requirements.

§ 1.1.2 THE CONTRACT

The Contract Documents form the Contract for Construction. The Contract represents the entire and integrated agreement between the parties hereto and supersedes prior negotiations, representations or agreements, either written or oral. The Contract may be amended or modified only by a Modification. The Contract Documents shall not be construed to create a contractual relationship of any kind (1) between the Contractor and the Architect or the Architect's consultants, (2) between the Owner and a Subcontractor or a Sub-subcontractor, (3) between the Owner and the Architect or the Architect's consultants or (4) between any persons or entities other than the Owner and the Contractor. The Architect shall, however, be entitled to performance and enforcement of obligations under the Contract intended to facilitate performance of the Architect's duties.

§ 1.1.3 THE WORK

The term "Work" means the construction and services required by the Contract Documents, whether completed or partially completed, and includes all other labor, materials, equipment and services provided or to be provided by the Contractor to fulfill the Contractor's obligations. The Work may constitute the whole or a part of the Project.

§ 1.1.4 THE PROJECT

The Project is the total construction of which the Work performed under the Contract Documents may be the whole or a part and which may include construction by the Owner and by separate contractors.

§ 1.1.5 THE DRAWINGS

The Drawings are the graphic and pictorial portions of the Contract Documents showing the design, location and dimensions of the Work, generally including plans, elevations, sections, details, schedules and diagrams.

§ 1.1.6 THE SPECIFICATIONS

The Specifications are that portion of the Contract Documents consisting of the written requirements for materials, equipment, systems, standards and workmanship for the Work, and performance of related services.

§ 1.1.7 INSTRUMENTS OF SERVICE

Instruments of Service are representations, in any medium of expression now known or later developed, of the tangible and intangible creative work performed by the Architect and the Architect's consultants under their respective professional services agreements. Instruments of Service may include, without limitation, studies, surveys, models, sketches, drawings, specifications, and other similar materials.

§ 1.1.8 INITIAL DECISION MAKER

The Initial Decision Maker is the person identified in the Agreement to render initial decisions on Claims in accordance with Section 15.2 and certify termination of the Agreement under Section 14.2.2.

§ 1.2 CORRELATION AND INTENT OF THE CONTRACT DOCUMENTS

§ 1.2.1 The intent of the Contract Documents is to include all items necessary for the proper execution and completion of the Work by the Contractor. The Contract Documents are complementary, and what is required by one shall be as binding as if required by all; performance by the Contractor shall be required only to the extent consistent with the Contract Documents and reasonably inferable from them as being necessary to produce the indicated results.

§ 1.2.2 Organization of the Specifications into divisions, sections and articles, and arrangement of Drawings shall not control the Contractor in dividing the Work among Subcontractors or in establishing the extent of Work to be performed by any trade.

§ 1.2.3 Unless otherwise stated in the Contract Documents, words that have well-known technical or construction industry meanings are used in the Contract Documents in accordance with such recognized meanings.

§ 1.3 CAPITALIZATION

Terms capitalized in these General Conditions include those that are (1) specifically defined, (2) the titles of numbered articles or (3) the titles of other documents published by the American Institute of Architects.

§ 1.4 INTERPRETATION

In the interest of brevity the Contract Documents frequently omit modifying words such as "all" and "any" and articles such as "the" and "an," but the fact that a modifier or an article is absent from one statement and appears in another is not intended to affect the interpretation of either statement.

§ 1.5 OWNERSHIP AND USE OF DRAWINGS, SPECIFICATIONS AND OTHER INSTRUMENTS OF SERVICE

§ 1.5.1 The Architect and the Architect's consultants shall be deemed the authors and owners of their respective Instruments of Service, including the Drawings and Specifications, and will retain all common law, statutory and other reserved rights, including copyrights. The Contractor, Subcontractors, Sub-subcontractors, and material or equipment suppliers shall not own or claim a copyright in the Instruments of Service. Submittal or distribution to meet official regulatory requirements or for other purposes in connection with this Project is not to be construed as publication in derogation of the Architect's or Architect's consultants' reserved rights.

§ 1.5.2 The Contractor, Subcontractors, Sub-subcontractors and material or equipment suppliers are authorized to use and reproduce the Instruments of Service provided to them solely and exclusively for execution of the Work. All copies made under this authorization shall bear the copyright notice, if any, shown on the Instruments of Service. The Contractor, Subcontractors, Sub-subcontractors, and material or equipment suppliers may not use the Instruments of Service on other projects or for additions to this Project outside the scope of the Work without the specific written consent of the Owner, Architect and the Architect's consultants.

§ 1.6 TRANSMISSION OF DATA IN DIGITAL FORM

If the parties intend to transmit Instruments of Service or any other information or documentation in digital form, they shall endeavor to establish necessary protocols governing such transmissions, unless otherwise already provided in the Agreement or the Contract Documents.

ARTICLE 2 OWNER

§ 2.1 GENERAL

§ 2.1.1 The Owner is the person or entity identified as such in the Agreement and is referred to throughout the Contract Documents as if singular in number. The Owner shall designate in writing a representative who shall have express authority to bind the Owner with respect to all matters requiring the Owner's approval or authorization. Except as otherwise provided in Section 4.2.1, the Architect does not have such authority. The term "Owner" means the Owner or the Owner's authorized representative.

§ 2.1.2 The Owner shall furnish to the Contractor within fifteen days after receipt of a written request, information necessary and relevant for the Contractor to evaluate, give notice of or enforce mechanic's lien rights. Such information shall include a correct statement of the record legal title to the property on which the Project is located, usually referred to as the site, and the Owner's interest therein.

§ 2.2 INFORMATION AND SERVICES REQUIRED OF THE OWNER

§ 2.2.1 Prior to commencement of the Work, the Contractor may request in writing that the Owner provide reasonable evidence that the Owner has made financial arrangements to fulfill the Owner's obligations under the Contract. Thereafter, the Contractor may only request such evidence if (1) the Owner fails to make payments to the Contractor as the Contract Documents require; (2) a change in the Work materially changes the Contract Sum; or (3) the Contractor identifies in writing a reasonable concern regarding the Owner's ability to make payment when due. The Owner shall furnish such evidence as a condition precedent to commencement or continuation of the Work or

the portion of the Work affected by a material change. After the Owner furnishes the evidence, the Owner shall not materially vary such financial arrangements without prior notice to the Contractor.

§ 2.2.2 Except for permits and fees that are the responsibility of the Contractor under the Contract Documents, including those required under Section 3.7.1, the Owner shall secure and pay for necessary approvals, easements, assessments and charges required for construction, use or occupancy of permanent structures or for permanent changes in existing facilities.

§ 2.2.3 The Owner shall furnish surveys describing physical characteristics, legal limitations and utility locations for the site of the Project, and a legal description of the site. The Contractor shall be entitled to rely on the accuracy of information furnished by the Owner but shall exercise proper precautions relating to the safe performance of the Work.

§ 2.2.4 The Owner shall furnish information or services required of the Owner by the Contract Documents with reasonable promptness. The Owner shall also furnish any other information or services under the Owner's control and relevant to the Contractor's performance of the Work with reasonable promptness after receiving the Contractor's written request for such information or services.

§ 2.2.5 Unless otherwise provided in the Contract Documents, the Owner shall furnish to the Contractor one copy of the Contract Documents for purposes of making reproductions pursuant to Section 1.5.2.

§ 2.3 OWNER'S RIGHT TO STOP THE WORK

If the Contractor fails to correct Work that is not in accordance with the requirements of the Contract Documents as required by Section 12.2 or repeatedly fails to carry out Work in accordance with the Contract Documents, the Owner may issue a written order to the Contractor to stop the Work, or any portion thereof, until the cause for such order has been eliminated; however, the right of the Owner to stop the Work shall not give rise to a duty on the part of the Owner to exercise this right for the benefit of the Contractor or any other person or entity, except to the extent required by Section 6.1.3.

§ 2.4 OWNER'S RIGHT TO CARRY OUT THE WORK

If the Contractor defaults or neglects to carry out the Work in accordance with the Contract Documents and fails within a ten-day period after receipt of written notice from the Owner to commence and continue correction of such default or neglect with diligence and promptness, the Owner may, without prejudice to other remedies the Owner may have, correct such deficiencies. In such case an appropriate Change Order shall be issued deducting from payments then or thereafter due the Contractor the reasonable cost of correcting such deficiencies, including Owner's expenses and compensation for the Architect's additional services made necessary by such default, neglect or failure. Such action by the Owner and amounts charged to the Contractor are both subject to prior approval of the Architect. If payments then or thereafter due the Contractor are not sufficient to cover such amounts, the Contractor shall pay the difference to the Owner.

ARTICLE 3 CONTRACTOR

§ 3.1 GENERAL

§ 3.1.1 The Contractor is the person or entity identified as such in the Agreement and is referred to throughout the Contract Documents as if singular in number. The Contractor shall be lawfully licensed, if required in the jurisdiction where the Project is located. The Contractor shall designate in writing a representative who shall have express authority to bind the Contractor with respect to all matters under this Contract. The term "Contractor" means the Contractor or the Contractor's authorized representative.

§ 3.1.2 The Contractor shall perform the Work in accordance with the Contract Documents.

§ 3.1.3 The Contractor shall not be relieved of obligations to perform the Work in accordance with the Contract Documents either by activities or duties of the Architect in the Architect's administration of the Contract, or by tests, inspections or approvals required or performed by persons or entities other than the Contractor.

§ 3.2 REVIEW OF CONTRACT DOCUMENTS AND FIELD CONDITIONS BY CONTRACTOR

§ 3.2.1 Execution of the Contract by the Contractor is a representation that the Contractor has visited the site, become generally familiar with local conditions under which the Work is to be performed and correlated personal observations with requirements of the Contract Documents.

§ 3.2.2 Because the Contract Documents are complementary, the Contractor shall, before starting each portion of the Work, carefully study and compare the various Contract Documents relative to that portion of the Work, as well as the information furnished by the Owner pursuant to Section 2.2.3, shall take field measurements of any existing conditions related to that portion of the Work, and shall observe any conditions at the site affecting it. These obligations are for the purpose of facilitating coordination and construction by the Contractor and are not for the purpose of discovering errors, omissions, or inconsistencies in the Contract Documents; however, the Contractor shall promptly report to the Architect any errors, inconsistencies or omissions discovered by or made known to the Contractor as a request for information in such form as the Architect may require. It is recognized that the Contractor's review is made in the Contractor's capacity as a contractor and not as a licensed design professional, unless otherwise specifically provided in the Contract Documents.

§ 3.2.3 The Contractor is not required to ascertain that the Contract Documents are in accordance with applicable laws, statutes, ordinances, codes, rules and regulations, or lawful orders of public authorities, but the Contractor shall promptly report to the Architect any nonconformity discovered by or made known to the Contractor as a request for information in such form as the Architect may require.

§ 3.2.4 If the Contractor believes that additional cost or time is involved because of clarifications or instructions the Architect issues in response to the Contractor's notices or requests for information pursuant to Sections 3.2.2 or 3.2.3, the Contractor shall make Claims as provided in Article 15. If the Contractor fails to perform the obligations of Sections 3.2.2 or 3.2.3, the Contractor shall pay such costs and damages to the Owner as would have been avoided if the Contractor had performed such obligations. If the Contractor performs those obligations, the Contractor shall not be liable to the Owner or Architect for damages resulting from errors, inconsistencies or omissions in the Contract Documents, for differences between field measurements or conditions and the Contract Documents, or for nonconformities of the Contract Documents to applicable laws, statutes, ordinances, codes, rules and regulations, and lawful orders of public authorities.

§ 3.3 SUPERVISION AND CONSTRUCTION PROCEDURES

§ 3.3.1 The Contractor shall supervise and direct the Work, using the Contractor's best skill and attention. The Contractor shall be solely responsible for, and have control over, construction means, methods, techniques, sequences and procedures and for coordinating all portions of the Work under the Contract, unless the Contract Documents give other specific instructions concerning these matters. If the Contract Documents give specific instructions concerning construction means, methods, techniques, sequences or procedures, the Contractor shall evaluate the jobsite safety thereof and, except as stated below, shall be fully and solely responsible for the jobsite safety of such means, methods, techniques, sequences or procedures. If the Contractor determines that such means, methods, techniques, sequences or procedures may not be safe, the Contractor shall give timely written notice to the Owner and Architect and shall not proceed with that portion of the Work without further written instructions from the Architect. If the Contractor is then instructed to proceed with the required means, methods, techniques, sequences or procedures without acceptance of changes proposed by the Contractor, the Owner shall be solely responsible for any loss or damage arising solely from those Owner-required means, methods, techniques, sequences or procedures.

§ 3.3.2 The Contractor shall be responsible to the Owner for acts and omissions of the Contractor's employees, Subcontractors and their agents and employees, and other persons or entities performing portions of the Work for, or on behalf of, the Contractor or any of its Subcontractors.

§ 3.3.3 The Contractor shall be responsible for inspection of portions of Work already performed to determine that such portions are in proper condition to receive subsequent Work.

§ 3.4 LABOR AND MATERIALS

§ 3.4.1 Unless otherwise provided in the Contract Documents, the Contractor shall provide and pay for labor, materials, equipment, tools, construction equipment and machinery, water, heat, utilities, transportation, and other

facilities and services necessary for proper execution and completion of the Work, whether temporary or permanent and whether or not incorporated or to be incorporated in the Work.

§ 3.4.2 Except in the case of minor changes in the Work authorized by the Architect in accordance with Sections 3.12.8 or 7.4, the Contractor may make substitutions only with the consent of the Owner, after evaluation by the Architect and in accordance with a Change Order or Construction Change Directive.

§ 3.4.3 The Contractor shall enforce strict discipline and good order among the Contractor's employees and other persons carrying out the Work. The Contractor shall not permit employment of unfit persons or persons not properly skilled in tasks assigned to them.

§ 3.5 WARRANTY

The Contractor warrants to the Owner and Architect that materials and equipment furnished under the Contract will be of good quality and new unless the Contract Documents require or permit otherwise. The Contractor further warrants that the Work will conform to the requirements of the Contract Documents and will be free from defects, except for those inherent in the quality of the Work the Contract Documents require or permit. Work, materials, or equipment not conforming to these requirements may be considered defective. The Contractor's warranty excludes remedy for damage or defect caused by abuse, alterations to the Work not executed by the Contractor, improper or insufficient maintenance, improper operation, or normal wear and tear and normal usage. If required by the Architect, the Contractor shall furnish satisfactory evidence as to the kind and quality of materials and equipment.

§ 3.6 TAXES

The Contractor shall pay sales, consumer, use and similar taxes for the Work provided by the Contractor that are legally enacted when bids are received or negotiations concluded, whether or not yet effective or merely scheduled to go into effect.

§ 3.7 PERMITS, FEES, NOTICES AND COMPLIANCE WITH LAWS

§ 3.7.1 Unless otherwise provided in the Contract Documents, the Contractor shall secure and pay for the building permit as well as for other permits, fees, licenses, and inspections by government agencies necessary for proper execution and completion of the Work that are customarily secured after execution of the Contract and legally required at the time bids are received or negotiations concluded.

§ 3.7.2 The Contractor shall comply with and give notices required by applicable laws, statutes, ordinances, codes, rules and regulations, and lawful orders of public authorities applicable to performance of the Work.

§ 3.7.3 If the Contractor performs Work knowing it to be contrary to applicable laws, statutes, ordinances, codes, rules and regulations, or lawful orders of public authorities, the Contractor shall assume appropriate responsibility for such Work and shall bear the costs attributable to correction.

§ 3.7.4 Concealed or Unknown Conditions. If the Contractor encounters conditions at the site that are (1) subsurface or otherwise concealed physical conditions that differ materially from those indicated in the Contract Documents or (2) unknown physical conditions of an unusual nature, that differ materially from those ordinarily found to exist and generally recognized as inherent in construction activities of the character provided for in the Contract Documents, the Contractor shall promptly provide notice to the Owner and the Architect before conditions are disturbed and in no event later than 21 days after first observance of the conditions. The Architect will promptly investigate such conditions and, if the Architect determines that they differ materially and cause an increase or decrease in the Contractor's cost of, or time required for, performance of any part of the Work, will recommend an equitable adjustment in the Contract Sum or Contract Time, or both. If the Architect determines that the conditions at the site are not materially different from those indicated in the Contract Documents and that no change in the terms of the Contract is justified, the Architect shall promptly notify the Owner and Contractor in writing, stating the reasons. If either party disputes the Architect's determination or recommendation, that party may proceed as provided in Article 15.

§ 3.7.5 If, in the course of the Work, the Contractor encounters human remains or recognizes the existence of burial markers, archaeological sites or wetlands not indicated in the Contract Documents, the Contractor shall immediately suspend any operations that would affect them and shall notify the Owner and Architect. Upon receipt of such notice, the Owner shall promptly take any action necessary to obtain governmental authorization required to resume

the operations. The Contractor shall continue to suspend such operations until otherwise instructed by the Owner but shall continue with all other operations that do not affect those remains or features. Requests for adjustments in the Contract Sum and Contract Time arising from the existence of such remains or features may be made as provided in Article 15.

§ 3.8 ALLOWANCES

§ 3.8.1 The Contractor shall include in the Contract Sum all allowances stated in the Contract Documents. Items covered by allowances shall be supplied for such amounts and by such persons or entities as the Owner may direct, but the Contractor shall not be required to employ persons or entities to whom the Contractor has reasonable objection.

§ 3.8.2 Unless otherwise provided in the Contract Documents,

.1 Allowances shall cover the cost to the Contractor of materials and equipment delivered at the site and all required taxes, less applicable trade discounts;

.2 Contractor's costs for unloading and handling at the site, labor, installation costs, overhead, profit and other expenses contemplated for stated allowance amounts shall be included in the Contract Sum but not in the allowances; and

.3 Whenever costs are more than or less than allowances, the Contract Sum shall be adjusted accordingly by Change Order. The amount of the Change Order shall reflect (1) the difference between actual costs and the allowances under Section 3.8.2.1 and (2) changes in Contractor's costs under Section 3.8.2.2.

§ 3.8.3 Materials and equipment under an allowance shall be selected by the Owner with reasonable promptness.

§ 3.9 SUPERINTENDENT

§ 3.9.1 The Contractor shall employ a competent superintendent and necessary assistants who shall be in attendance at the Project site during performance of the Work. The superintendent shall represent the Contractor, and communications given to the superintendent shall be as binding as if given to the Contractor.

§ 3.9.2 The Contractor, as soon as practicable after award of the Contract, shall furnish in writing to the Owner through the Architect the name and qualifications of a proposed superintendent. The Architect may reply within 14 days to the Contractor in writing stating (1) whether the Owner or the Architect has reasonable objection to the proposed superintendent or (2) that the Architect requires additional time to review. Failure of the Architect to reply within the 14 day period shall constitute notice of no reasonable objection.

§ 3.9.3 The Contractor shall not employ a proposed superintendent to whom the Owner or Architect has made reasonable and timely objection. The Contractor shall not change the superintendent without the Owner's consent, which shall not unreasonably be withheld or delayed.

§ 3.10 CONTRACTOR'S CONSTRUCTION SCHEDULES

§ 3.10.1 The Contractor, promptly after being awarded the Contract, shall prepare and submit for the Owner's and Architect's information a Contractor's construction schedule for the Work. The schedule shall not exceed time limits current under the Contract Documents, shall be revised at appropriate intervals as required by the conditions of the Work and Project, shall be related to the entire Project to the extent required by the Contract Documents, and shall provide for expeditious and practicable execution of the Work.

§ 3.10.2 The Contractor shall prepare a submittal schedule, promptly after being awarded the Contract and thereafter as necessary to maintain a current submittal schedule, and shall submit the schedule(s) for the Architect's approval. The Architect's approval shall not unreasonably be delayed or withheld. The submittal schedule shall (1) be coordinated with the Contractor's construction schedule, and (2) allow the Architect reasonable time to review submittals. If the Contractor fails to submit a submittal schedule, the Contractor shall not be entitled to any increase in Contract Sum or extension of Contract Time based on the time required for review of submittals.

§ 3.10.3 The Contractor shall perform the Work in general accordance with the most recent schedules submitted to the Owner and Architect.

§ 3.11 DOCUMENTS AND SAMPLES AT THE SITE

The Contractor shall maintain at the site for the Owner one copy of the Drawings, Specifications, Addenda, Change Orders and other Modifications, in good order and marked currently to indicate field changes and selections made during construction, and one copy of approved Shop Drawings, Product Data, Samples and similar required submittals. These shall be available to the Architect and shall be delivered to the Architect for submittal to the Owner upon completion of the Work as a record of the Work as constructed.

§ 3.12 SHOP DRAWINGS, PRODUCT DATA AND SAMPLES

§ 3.12.1 Shop Drawings are drawings, diagrams, schedules and other data specially prepared for the Work by the Contractor or a Subcontractor, Sub-subcontractor, manufacturer, supplier or distributor to illustrate some portion of the Work.

§ 3.12.2 Product Data are illustrations, standard schedules, performance charts, instructions, brochures, diagrams and other information furnished by the Contractor to illustrate materials or equipment for some portion of the Work.

§ 3.12.3 Samples are physical examples that illustrate materials, equipment or workmanship and establish standards by which the Work will be judged.

§ 3.12.4 Shop Drawings, Product Data, Samples and similar submittals are not Contract Documents. Their purpose is to demonstrate the way by which the Contractor proposes to conform to the information given and the design concept expressed in the Contract Documents for those portions of the Work for which the Contract Documents require submittals. Review by the Architect is subject to the limitations of Section 4.2.7. Informational submittals upon which the Architect is not expected to take responsive action may be so identified in the Contract Documents. Submittals that are not required by the Contract Documents may be returned by the Architect without action.

§ 3.12.5 The Contractor shall review for compliance with the Contract Documents, approve and submit to the Architect Shop Drawings, Product Data, Samples and similar submittals required by the Contract Documents in accordance with the submittal schedule approved by the Architect or, in the absence of an approved submittal schedule, with reasonable promptness and in such sequence as to cause no delay in the Work or in the activities of the Owner or of separate contractors.

§ 3.12.6 By submitting Shop Drawings, Product Data, Samples and similar submittals, the Contractor represents to the Owner and Architect that the Contractor has (1) reviewed and approved them, (2) determined and verified materials, field measurements and field construction criteria related thereto, or will do so and (3) checked and coordinated the information contained within such submittals with the requirements of the Work and of the Contract Documents.

§ 3.12.7 The Contractor shall perform no portion of the Work for which the Contract Documents require submittal and review of Shop Drawings, Product Data, Samples or similar submittals until the respective submittal has been approved by the Architect.

§ 3.12.8 The Work shall be in accordance with approved submittals except that the Contractor shall not be relieved of responsibility for deviations from requirements of the Contract Documents by the Architect's approval of Shop Drawings, Product Data, Samples or similar submittals unless the Contractor has specifically informed the Architect in writing of such deviation at the time of submittal and (1) the Architect has given written approval to the specific deviation as a minor change in the Work, or (2) a Change Order or Construction Change Directive has been issued authorizing the deviation. The Contractor shall not be relieved of responsibility for errors or omissions in Shop Drawings, Product Data, Samples or similar submittals by the Architect's approval thereof.

§ 3.12.9 The Contractor shall direct specific attention, in writing or on resubmitted Shop Drawings, Product Data, Samples or similar submittals, to revisions other than those requested by the Architect on previous submittals. In the absence of such written notice, the Architect's approval of a resubmission shall not apply to such revisions.

§ 3.12.10 The Contractor shall not be required to provide professional services that constitute the practice of architecture or engineering unless such services are specifically required by the Contract Documents for a portion of the Work or unless the Contractor needs to provide such services in order to carry out the Contractor's responsibilities for construction means, methods, techniques, sequences and procedures. The Contractor shall not be

required to provide professional services in violation of applicable law. If professional design services or certifications by a design professional related to systems, materials or equipment are specifically required of the Contractor by the Contract Documents, the Owner and the Architect will specify all performance and design criteria that such services must satisfy. The Contractor shall cause such services or certifications to be provided by a properly licensed design professional, whose signature and seal shall appear on all drawings, calculations, specifications, certifications, Shop Drawings and other submittals prepared by such professional. Shop Drawings and other submittals related to the Work designed or certified by such professional, if prepared by others, shall bear such professional's written approval when submitted to the Architect. The Owner and the Architect shall be entitled to rely upon the adequacy, accuracy and completeness of the services, certifications and approvals performed or provided by such design professionals, provided the Owner and Architect have specified to the Contractor all performance and design criteria that such services must satisfy. Pursuant to this Section 3.12.10, the Architect will review, approve or take other appropriate action on submittals only for the limited purpose of checking for conformance with information given and the design concept expressed in the Contract Documents. The Contractor shall not be responsible for the adequacy of the performance and design criteria specified in the Contract Documents.

§ 3.13 USE OF SITE

The Contractor shall confine operations at the site to areas permitted by applicable laws, statutes, ordinances, codes, rules and regulations, and lawful orders of public authorities and the Contract Documents and shall not unreasonably encumber the site with materials or equipment.

§ 3.14 CUTTING AND PATCHING

§ 3.14.1 The Contractor shall be responsible for cutting, fitting or patching required to complete the Work or to make its parts fit together properly. All areas requiring cutting, fitting and patching shall be restored to the condition existing prior to the cutting, fitting and patching, unless otherwise required by the Contract Documents.

§ 3.14.2 The Contractor shall not damage or endanger a portion of the Work or fully or partially completed construction of the Owner or separate contractors by cutting, patching or otherwise altering such construction, or by excavation. The Contractor shall not cut or otherwise alter such construction by the Owner or a separate contractor except with written consent of the Owner and of such separate contractor; such consent shall not be unreasonably withheld. The Contractor shall not unreasonably withhold from the Owner or a separate contractor the Contractor's consent to cutting or otherwise altering the Work.

§ 3.15 CLEANING UP

§ 3.15.1 The Contractor shall keep the premises and surrounding area free from accumulation of waste materials or rubbish caused by operations under the Contract. At completion of the Work, the Contractor shall remove waste materials, rubbish, the Contractor's tools, construction equipment, machinery and surplus materials from and about the Project.

§ 3.15.2 If the Contractor fails to clean up as provided in the Contract Documents, the Owner may do so and Owner shall be entitled to reimbursement from the Contractor.

§ 3.16 ACCESS TO WORK

The Contractor shall provide the Owner and Architect access to the Work in preparation and progress wherever located.

§ 3.17 ROYALTIES, PATENTS AND COPYRIGHTS

The Contractor shall pay all royalties and license fees. The Contractor shall defend suits or claims for infringement of copyrights and patent rights and shall hold the Owner and Architect harmless from loss on account thereof, but shall not be responsible for such defense or loss when a particular design, process or product of a particular manufacturer or manufacturers is required by the Contract Documents, or where the copyright violations are contained in Drawings, Specifications or other documents prepared by the Owner or Architect. However, if the Contractor has reason to believe that the required design, process or product is an infringement of a copyright or a patent, the Contractor shall be responsible for such loss unless such information is promptly furnished to the Architect.

§ 3.18 INDEMNIFICATION

§ 3.18.1 To the fullest extent permitted by law the Contractor shall indemnify and hold harmless the Owner, Architect, Architect's consultants, and agents and employees of any of them from and against claims, damages, losses and expenses, including but not limited to attorneys' fees, arising out of or resulting from performance of the Work, provided that such claim, damage, loss or expense is attributable to bodily injury, sickness, disease or death, or to injury to or destruction of tangible property (other than the Work itself), but only to the extent caused by the negligent acts or omissions of the Contractor, a Subcontractor, anyone directly or indirectly employed by them or anyone for whose acts they may be liable, regardless of whether or not such claim, damage, loss or expense is caused in part by a party indemnified hereunder. Such obligation shall not be construed to negate, abridge, or reduce other rights or obligations of indemnity that would otherwise exist as to a party or person described in this Section 3.18.

§ 3.18.2 In claims against any person or entity indemnified under this Section 3.18 by an employee of the Contractor, a Subcontractor, anyone directly or indirectly employed by them or anyone for whose acts they may be liable, the indemnification obligation under Section 3.18.1 shall not be limited by a limitation on amount or type of damages, compensation or benefits payable by or for the Contractor or a Subcontractor under workers' compensation acts, disability benefit acts or other employee benefit acts.

ARTICLE 4 ARCHITECT

§ 4.1 GENERAL

§ 4.1.1 The Owner shall retain an architect lawfully licensed to practice architecture or an entity lawfully practicing architecture in the jurisdiction where the Project is located. That person or entity is identified as the Architect in the Agreement and is referred to throughout the Contract Documents as if singular in number.

§ 4.1.2 Duties, responsibilities and limitations of authority of the Architect as set forth in the Contract Documents shall not be restricted, modified or extended without written consent of the Owner, Contractor and Architect. Consent shall not be unreasonably withheld.

§ 4.1.3 If the employment of the Architect is terminated, the Owner shall employ a successor architect as to whom the Contractor has no reasonable objection and whose status under the Contract Documents shall be that of the Architect.

§ 4.2 ADMINISTRATION OF THE CONTRACT

§ 4.2.1 The Architect will provide administration of the Contract as described in the Contract Documents and will be an Owner's representative during construction until the date the Architect issues the final Certificate for Payment. The Architect will have authority to act on behalf of the Owner only to the extent provided in the Contract Documents.

§ 4.2.2 The Architect will visit the site at intervals appropriate to the stage of construction, or as otherwise agreed with the Owner, to become generally familiar with the progress and quality of the portion of the Work completed, and to determine in general if the Work observed is being performed in a manner indicating that the Work, when fully completed, will be in accordance with the Contract Documents. However, the Architect will not be required to make exhaustive or continuous on-site inspections to check the quality or quantity of the Work. The Architect will not have control over, charge of, or responsibility for, the construction means, methods, techniques, sequences or procedures, or for the safety precautions and programs in connection with the Work, since these are solely the Contractor's rights and responsibilities under the Contract Documents, except as provided in Section 3.3.1.

§ 4.2.3 On the basis of the site visits, the Architect will keep the Owner reasonably informed about the progress and quality of the portion of the Work completed, and report to the Owner (1) known deviations from the Contract Documents and from the most recent construction schedule submitted by the Contractor, and (2) defects and deficiencies observed in the Work. The Architect will not be responsible for the Contractor's failure to perform the Work in accordance with the requirements of the Contract Documents. The Architect will not have control over or charge of and will not be responsible for acts or omissions of the Contractor, Subcontractors, or their agents or employees, or any other persons or entities performing portions of the Work.

§ 4.2.4 COMMUNICATIONS FACILITATING CONTRACT ADMINISTRATION
Except as otherwise provided in the Contract Documents or when direct communications have been specially authorized, the Owner and Contractor shall endeavor to communicate with each other through the Architect about matters arising out of or relating to the Contract. Communications by and with the Architect's consultants shall be through the Architect. Communications by and with Subcontractors and material suppliers shall be through the Contractor. Communications by and with separate contractors shall be through the Owner.

§ 4.2.5 Based on the Architect's evaluations of the Contractor's Applications for Payment, the Architect will review and certify the amounts due the Contractor and will issue Certificates for Payment in such amounts.

§ 4.2.6 The Architect has authority to reject Work that does not conform to the Contract Documents. Whenever the Architect considers it necessary or advisable, the Architect will have authority to require inspection or testing of the Work in accordance with Sections 13.5.2 and 13.5.3, whether or not such Work is fabricated, installed or completed. However, neither this authority of the Architect nor a decision made in good faith either to exercise or not to exercise such authority shall give rise to a duty or responsibility of the Architect to the Contractor, Subcontractors, material and equipment suppliers, their agents or employees, or other persons or entities performing portions of the Work.

§ 4.2.7 The Architect will review and approve, or take other appropriate action upon, the Contractor's submittals such as Shop Drawings, Product Data and Samples, but only for the limited purpose of checking for conformance with information given and the design concept expressed in the Contract Documents. The Architect's action will be taken in accordance with the submittal schedule approved by the Architect or, in the absence of an approved submittal schedule, with reasonable promptness while allowing sufficient time in the Architect's professional judgment to permit adequate review. Review of such submittals is not conducted for the purpose of determining the accuracy and completeness of other details such as dimensions and quantities, or for substantiating instructions for installation or performance of equipment or systems, all of which remain the responsibility of the Contractor as required by the Contract Documents. The Architect's review of the Contractor's submittals shall not relieve the Contractor of the obligations under Sections 3.3, 3.5 and 3.12. The Architect's review shall not constitute approval of safety precautions or, unless otherwise specifically stated by the Architect, of any construction means, methods, techniques, sequences or procedures. The Architect's approval of a specific item shall not indicate approval of an assembly of which the item is a component.

§ 4.2.8 The Architect will prepare Change Orders and Construction Change Directives, and may authorize minor changes in the Work as provided in Section 7.4. The Architect will investigate and make determinations and recommendations regarding concealed and unknown conditions as provided in Section 3.7.4.

§ 4.2.9 The Architect will conduct inspections to determine the date or dates of Substantial Completion and the date of final completion; issue Certificates of Substantial Completion pursuant to Section 9.8; receive and forward to the Owner, for the Owner's review and records, written warranties and related documents required by the Contract and assembled by the Contractor pursuant to Section 9.10; and issue a final Certificate for Payment pursuant to Section 9.10.

§ 4.2.10 If the Owner and Architect agree, the Architect will provide one or more project representatives to assist in carrying out the Architect's responsibilities at the site. The duties, responsibilities and limitations of authority of such project representatives shall be as set forth in an exhibit to be incorporated in the Contract Documents.

§ 4.2.11 The Architect will interpret and decide matters concerning performance under, and requirements of, the Contract Documents on written request of either the Owner or Contractor. The Architect's response to such requests will be made in writing within any time limits agreed upon or otherwise with reasonable promptness.

§ 4.2.12 Interpretations and decisions of the Architect will be consistent with the intent of, and reasonably inferable from, the Contract Documents and will be in writing or in the form of drawings. When making such interpretations and decisions, the Architect will endeavor to secure faithful performance by both Owner and Contractor, will not show partiality to either and will not be liable for results of interpretations or decisions rendered in good faith.

§ 4.2.13 The Architect's decisions on matters relating to aesthetic effect will be final if consistent with the intent expressed in the Contract Documents.

§ 4.2.14 The Architect will review and respond to requests for information about the Contract Documents. The Architect's response to such requests will be made in writing within any time limits agreed upon or otherwise with reasonable promptness. If appropriate, the Architect will prepare and issue supplemental Drawings and Specifications in response to the requests for information.

ARTICLE 5 SUBCONTRACTORS

§ 5.1 DEFINITIONS

§ 5.1.1 A Subcontractor is a person or entity who has a direct contract with the Contractor to perform a portion of the Work at the site. The term "Subcontractor" is referred to throughout the Contract Documents as if singular in number and means a Subcontractor or an authorized representative of the Subcontractor. The term "Subcontractor" does not include a separate contractor or subcontractors of a separate contractor.

§ 5.1.2 A Sub-subcontractor is a person or entity who has a direct or indirect contract with a Subcontractor to perform a portion of the Work at the site. The term "Sub-subcontractor" is referred to throughout the Contract Documents as if singular in number and means a Sub-subcontractor or an authorized representative of the Sub-subcontractor.

§ 5.2 AWARD OF SUBCONTRACTS AND OTHER CONTRACTS FOR PORTIONS OF THE WORK

§ 5.2.1 Unless otherwise stated in the Contract Documents or the bidding requirements, the Contractor, as soon as practicable after award of the Contract, shall furnish in writing to the Owner through the Architect the names of persons or entities (including those who are to furnish materials or equipment fabricated to a special design) proposed for each principal portion of the Work. The Architect may reply within 14 days to the Contractor in writing stating (1) whether the Owner or the Architect has reasonable objection to any such proposed person or entity or (2) that the Architect requires additional time for review. Failure of the Owner or Architect to reply within the 14-day period shall constitute notice of no reasonable objection.

§ 5.2.2 The Contractor shall not contract with a proposed person or entity to whom the Owner or Architect has made reasonable and timely objection. The Contractor shall not be required to contract with anyone to whom the Contractor has made reasonable objection.

§ 5.2.3 If the Owner or Architect has reasonable objection to a person or entity proposed by the Contractor, the Contractor shall propose another to whom the Owner or Architect has no reasonable objection. If the proposed but rejected Subcontractor was reasonably capable of performing the Work, the Contract Sum and Contract Time shall be increased or decreased by the difference, if any, occasioned by such change, and an appropriate Change Order shall be issued before commencement of the substitute Subcontractor's Work. However, no increase in the Contract Sum or Contract Time shall be allowed for such change unless the Contractor has acted promptly and responsively in submitting names as required.

§ 5.2.4 The Contractor shall not substitute a Subcontractor, person or entity previously selected if the Owner or Architect makes reasonable objection to such substitution.

§ 5.3 SUBCONTRACTUAL RELATIONS

By appropriate agreement, written where legally required for validity, the Contractor shall require each Subcontractor, to the extent of the Work to be performed by the Subcontractor, to be bound to the Contractor by terms of the Contract Documents, and to assume toward the Contractor all the obligations and responsibilities, including the responsibility for safety of the Subcontractor's Work, which the Contractor, by these Documents, assumes toward the Owner and Architect. Each subcontract agreement shall preserve and protect the rights of the Owner and Architect under the Contract Documents with respect to the Work to be performed by the Subcontractor so that subcontracting thereof will not prejudice such rights, and shall allow to the Subcontractor, unless specifically provided otherwise in the subcontract agreement, the benefit of all rights, remedies and redress against the Contractor that the Contractor, by the Contract Documents, has against the Owner. Where appropriate, the Contractor shall require each Subcontractor to enter into similar agreements with Sub-subcontractors. The Contractor shall make available to each proposed Subcontractor, prior to the execution of the subcontract agreement, copies of the Contract Documents to which the Subcontractor will be bound, and, upon written request of the Subcontractor, identify to the Subcontractor terms and conditions of the proposed subcontract agreement that may

be at variance with the Contract Documents. Subcontractors will similarly make copies of applicable portions of such documents available to their respective proposed Sub-subcontractors.

§ 5.4 CONTINGENT ASSIGNMENT OF SUBCONTRACTS

§ 5.4.1 Each subcontract agreement for a portion of the Work is assigned by the Contractor to the Owner, provided that

.1 assignment is effective only after termination of the Contract by the Owner for cause pursuant to Section 14.2 and only for those subcontract agreements that the Owner accepts by notifying the Subcontractor and Contractor in writing; and

.2 assignment is subject to the prior rights of the surety, if any, obligated under bond relating to the Contract.

When the Owner accepts the assignment of a subcontract agreement, the Owner assumes the Contractor's rights and obligations under the subcontract.

§ 5.4.2 Upon such assignment, if the Work has been suspended for more than 30 days, the Subcontractor's compensation shall be equitably adjusted for increases in cost resulting from the suspension.

§ 5.4.3 Upon such assignment to the Owner under this Section 5.4, the Owner may further assign the subcontract to a successor contractor or other entity. If the Owner assigns the subcontract to a successor contractor or other entity, the Owner shall nevertheless remain legally responsible for all of the successor contractor's obligations under the subcontract.

ARTICLE 6 CONSTRUCTION BY OWNER OR BY SEPARATE CONTRACTORS

§ 6.1 OWNER'S RIGHT TO PERFORM CONSTRUCTION AND TO AWARD SEPARATE CONTRACTS

§ 6.1.1 The Owner reserves the right to perform construction or operations related to the Project with the Owner's own forces, and to award separate contracts in connection with other portions of the Project or other construction or operations on the site under Conditions of the Contract identical or substantially similar to these including those portions related to insurance and waiver of subrogation. If the Contractor claims that delay or additional cost is involved because of such action by the Owner, the Contractor shall make such Claim as provided in Article 15.

§ 6.1.2 When separate contracts are awarded for different portions of the Project or other construction or operations on the site, the term "Contractor" in the Contract Documents in each case shall mean the Contractor who executes each separate Owner-Contractor Agreement.

§ 6.1.3 The Owner shall provide for coordination of the activities of the Owner's own forces and of each separate contractor with the Work of the Contractor, who shall cooperate with them. The Contractor shall participate with other separate contractors and the Owner in reviewing their construction schedules. The Contractor shall make any revisions to the construction schedule deemed necessary after a joint review and mutual agreement. The construction schedules shall then constitute the schedules to be used by the Contractor, separate contractors and the Owner until subsequently revised.

§ 6.1.4 Unless otherwise provided in the Contract Documents, when the Owner performs construction or operations related to the Project with the Owner's own forces, the Owner shall be deemed to be subject to the same obligations and to have the same rights that apply to the Contractor under the Conditions of the Contract, including, without excluding others, those stated in Article 3, this Article 6 and Articles 10, 11 and 12.

§ 6.2 MUTUAL RESPONSIBILITY

§ 6.2.1 The Contractor shall afford the Owner and separate contractors reasonable opportunity for introduction and storage of their materials and equipment and performance of their activities, and shall connect and coordinate the Contractor's construction and operations with theirs as required by the Contract Documents.

§ 6.2.2 If part of the Contractor's Work depends for proper execution or results upon construction or operations by the Owner or a separate contractor, the Contractor shall, prior to proceeding with that portion of the Work, promptly report to the Architect apparent discrepancies or defects in such other construction that would render it unsuitable for such proper execution and results. Failure of the Contractor so to report shall constitute an acknowledgment that

the Owner's or separate contractor's completed or partially completed construction is fit and proper to receive the Contractor's Work, except as to defects not then reasonably discoverable.

§ 6.2.3 The Contractor shall reimburse the Owner for costs the Owner incurs that are payable to a separate contractor because of the Contractor's delays, improperly timed activities or defective construction. The Owner shall be responsible to the Contractor for costs the Contractor incurs because of a separate contractor's delays, improperly timed activities, damage to the Work or defective construction.

§ 6.2.4 The Contractor shall promptly remedy damage the Contractor wrongfully causes to completed or partially completed construction or to property of the Owner or separate contractors as provided in Section 10.2.5.

§ 6.2.5 The Owner and each separate contractor shall have the same responsibilities for cutting and patching as are described for the Contractor in Section 3.14.

§ 6.3 OWNER'S RIGHT TO CLEAN UP

If a dispute arises among the Contractor, separate contractors and the Owner as to the responsibility under their respective contracts for maintaining the premises and surrounding area free from waste materials and rubbish, the Owner may clean up and the Architect will allocate the cost among those responsible.

ARTICLE 7 CHANGES IN THE WORK

§ 7.1 GENERAL

§ 7.1.1 Changes in the Work may be accomplished after execution of the Contract, and without invalidating the Contract, by Change Order, Construction Change Directive or order for a minor change in the Work, subject to the limitations stated in this Article 7 and elsewhere in the Contract Documents.

§ 7.1.2 A Change Order shall be based upon agreement among the Owner, Contractor and Architect; a Construction Change Directive requires agreement by the Owner and Architect and may or may not be agreed to by the Contractor; an order for a minor change in the Work may be issued by the Architect alone.

§ 7.1.3 Changes in the Work shall be performed under applicable provisions of the Contract Documents, and the Contractor shall proceed promptly, unless otherwise provided in the Change Order, Construction Change Directive or order for a minor change in the Work.

§ 7.2 CHANGE ORDERS

§ 7.2.1 A Change Order is a written instrument prepared by the Architect and signed by the Owner, Contractor and Architect stating their agreement upon all of the following:

.1 The change in the Work;
.2 The amount of the adjustment, if any, in the Contract Sum; and
.3 The extent of the adjustment, if any, in the Contract Time.

§ 7.3 CONSTRUCTION CHANGE DIRECTIVES

§ 7.3.1 A Construction Change Directive is a written order prepared by the Architect and signed by the Owner and Architect, directing a change in the Work prior to agreement on adjustment, if any, in the Contract Sum or Contract Time, or both. The Owner may by Construction Change Directive, without invalidating the Contract, order changes in the Work within the general scope of the Contract consisting of additions, deletions or other revisions, the Contract Sum and Contract Time being adjusted accordingly.

§ 7.3.2 A Construction Change Directive shall be used in the absence of total agreement on the terms of a Change Order.

§ 7.3.3 If the Construction Change Directive provides for an adjustment to the Contract Sum, the adjustment shall be based on one of the following methods:

.1 Mutual acceptance of a lump sum properly itemized and supported by sufficient substantiating data to permit evaluation;
.2 Unit prices stated in the Contract Documents or subsequently agreed upon;
.3 Cost to be determined in a manner agreed upon by the parties and a mutually acceptable fixed or percentage fee; or

.4 As provided in Section 7.3.7.

§ 7.3.4 If unit prices are stated in the Contract Documents or subsequently agreed upon, and if quantities originally contemplated are materially changed in a proposed Change Order or Construction Change Directive so that application of such unit prices to quantities of Work proposed will cause substantial inequity to the Owner or Contractor, the applicable unit prices shall be equitably adjusted.

§ 7.3.5 Upon receipt of a Construction Change Directive, the Contractor shall promptly proceed with the change in the Work involved and advise the Architect of the Contractor's agreement or disagreement with the method, if any, provided in the Construction Change Directive for determining the proposed adjustment in the Contract Sum or Contract Time.

§ 7.3.6 A Construction Change Directive signed by the Contractor indicates the Contractor's agreement therewith, including adjustment in Contract Sum and Contract Time or the method for determining them. Such agreement shall be effective immediately and shall be recorded as a Change Order.

§ 7.3.7 If the Contractor does not respond promptly or disagrees with the method for adjustment in the Contract Sum, the Architect shall determine the method and the adjustment on the basis of reasonable expenditures and savings of those performing the Work attributable to the change, including, in case of an increase in the Contract Sum, an amount for overhead and profit as set forth in the Agreement, or if no such amount is set forth in the Agreement, a reasonable amount. In such case, and also under Section 7.3.3.3, the Contractor shall keep and present, in such form as the Architect may prescribe, an itemized accounting together with appropriate supporting data. Unless otherwise provided in the Contract Documents, costs for the purposes of this Section 7.3.7 shall be limited to the following:

.1 Costs of labor, including social security, old age and unemployment insurance, fringe benefits required by agreement or custom, and workers' compensation insurance;

.2 Costs of materials, supplies and equipment, including cost of transportation, whether incorporated or consumed;

.3 Rental costs of machinery and equipment, exclusive of hand tools, whether rented from the Contractor or others;

.4 Costs of premiums for all bonds and insurance, permit fees, and sales, use or similar taxes related to the Work; and

.5 Additional costs of supervision and field office personnel directly attributable to the change.

§ 7.3.8 The amount of credit to be allowed by the Contractor to the Owner for a deletion or change that results in a net decrease in the Contract Sum shall be actual net cost as confirmed by the Architect. When both additions and credits covering related Work or substitutions are involved in a change, the allowance for overhead and profit shall be figured on the basis of net increase, if any, with respect to that change.

§ 7.3.9 Pending final determination of the total cost of a Construction Change Directive to the Owner, the Contractor may request payment for Work completed under the Construction Change Directive in Applications for Payment. The Architect will make an interim determination for purposes of monthly certification for payment for those costs and certify for payment the amount that the Architect determines, in the Architect's professional judgment, to be reasonably justified. The Architect's interim determination of cost shall adjust the Contract Sum on the same basis as a Change Order, subject to the right of either party to disagree and assert a Claim in accordance with Article 15.

§ 7.3.10 When the Owner and Contractor agree with a determination made by the Architect concerning the adjustments in the Contract Sum and Contract Time, or otherwise reach agreement upon the adjustments, such agreement shall be effective immediately and the Architect will prepare a Change Order. Change Orders may be issued for all or any part of a Construction Change Directive.

§ 7.4 MINOR CHANGES IN THE WORK

The Architect has authority to order minor changes in the Work not involving adjustment in the Contract Sum or extension of the Contract Time and not inconsistent with the intent of the Contract Documents. Such changes will be effected by written order signed by the Architect and shall be binding on the Owner and Contractor.

ARTICLE 8 TIME

§ 8.1 DEFINITIONS

§ 8.1.1 Unless otherwise provided, Contract Time is the period of time, including authorized adjustments, allotted in the Contract Documents for Substantial Completion of the Work.

§ 8.1.2 The date of commencement of the Work is the date established in the Agreement.

§ 8.1.3 The date of Substantial Completion is the date certified by the Architect in accordance with Section 9.8.

§ 8.1.4 The term "day" as used in the Contract Documents shall mean calendar day unless otherwise specifically defined.

§ 8.2 PROGRESS AND COMPLETION

§ 8.2.1 Time limits stated in the Contract Documents are of the essence of the Contract. By executing the Agreement the Contractor confirms that the Contract Time is a reasonable period for performing the Work.

§ 8.2.2 The Contractor shall not knowingly, except by agreement or instruction of the Owner in writing, prematurely commence operations on the site or elsewhere prior to the effective date of insurance required by Article 11 to be furnished by the Contractor and Owner. The date of commencement of the Work shall not be changed by the effective date of such insurance.

§ 8.2.3 The Contractor shall proceed expeditiously with adequate forces and shall achieve Substantial Completion within the Contract Time.

§ 8.3 DELAYS AND EXTENSIONS OF TIME

§ 8.3.1 If the Contractor is delayed at any time in the commencement or progress of the Work by an act or neglect of the Owner or Architect, or of an employee of either, or of a separate contractor employed by the Owner; or by changes ordered in the Work; or by labor disputes, fire, unusual delay in deliveries, unavoidable casualties or other causes beyond the Contractor's control; or by delay authorized by the Owner pending mediation and arbitration; or by other causes that the Architect determines may justify delay, then the Contract Time shall be extended by Change Order for such reasonable time as the Architect may determine.

§ 8.3.2 Claims relating to time shall be made in accordance with applicable provisions of Article 15.

§ 8.3.3 This Section 8.3 does not preclude recovery of damages for delay by either party under other provisions of the Contract Documents.

ARTICLE 9 PAYMENTS AND COMPLETION

§ 9.1 CONTRACT SUM

The Contract Sum is stated in the Agreement and, including authorized adjustments, is the total amount payable by the Owner to the Contractor for performance of the Work under the Contract Documents.

§ 9.2 SCHEDULE OF VALUES

Where the Contract is based on a stipulated sum or Guaranteed Maximum Price, the Contractor shall submit to the Architect, before the first Application for Payment, a schedule of values allocating the entire Contract Sum to the various portions of the Work and prepared in such form and supported by such data to substantiate its accuracy as the Architect may require. This schedule, unless objected to by the Architect, shall be used as a basis for reviewing the Contractor's Applications for Payment.

§ 9.3 APPLICATIONS FOR PAYMENT

§ 9.3.1 At least ten days before the date established for each progress payment, the Contractor shall submit to the Architect an itemized Application for Payment prepared in accordance with the schedule of values, if required under Section 9.2, for completed portions of the Work. Such application shall be notarized, if required, and supported by such data substantiating the Contractor's right to payment as the Owner or Architect may require, such as copies of requisitions from Subcontractors and material suppliers, and shall reflect retainage if provided for in the Contract Documents.

§ 9.3.1.1 As provided in Section 7.3.9, such applications may include requests for payment on account of changes in the Work that have been properly authorized by Construction Change Directives, or by interim determinations of the Architect, but not yet included in Change Orders.

§ 9.3.1.2 Applications for Payment shall not include requests for payment for portions of the Work for which the Contractor does not intend to pay a Subcontractor or material supplier, unless such Work has been performed by others whom the Contractor intends to pay.

§ 9.3.2 Unless otherwise provided in the Contract Documents, payments shall be made on account of materials and equipment delivered and suitably stored at the site for subsequent incorporation in the Work. If approved in advance by the Owner, payment may similarly be made for materials and equipment suitably stored off the site at a location agreed upon in writing. Payment for materials and equipment stored on or off the site shall be conditioned upon compliance by the Contractor with procedures satisfactory to the Owner to establish the Owner's title to such materials and equipment or otherwise protect the Owner's interest, and shall include the costs of applicable insurance, storage and transportation to the site for such materials and equipment stored off the site.

§ 9.3.3 The Contractor warrants that title to all Work covered by an Application for Payment will pass to the Owner no later than the time of payment. The Contractor further warrants that upon submittal of an Application for Payment all Work for which Certificates for Payment have been previously issued and payments received from the Owner shall, to the best of the Contractor's knowledge, information and belief, be free and clear of liens, claims, security interests or encumbrances in favor of the Contractor, Subcontractors, material suppliers, or other persons or entities making a claim by reason of having provided labor, materials and equipment relating to the Work.

§ 9.4 CERTIFICATES FOR PAYMENT

§ 9.4.1 The Architect will, within seven days after receipt of the Contractor's Application for Payment, either issue to the Owner a Certificate for Payment, with a copy to the Contractor, for such amount as the Architect determines is properly due, or notify the Contractor and Owner in writing of the Architect's reasons for withholding certification in whole or in part as provided in Section 9.5.1.

§ 9.4.2 The issuance of a Certificate for Payment will constitute a representation by the Architect to the Owner, based on the Architect's evaluation of the Work and the data comprising the Application for Payment, that, to the best of the Architect's knowledge, information and belief, the Work has progressed to the point indicated and that the quality of the Work is in accordance with the Contract Documents. The foregoing representations are subject to an evaluation of the Work for conformance with the Contract Documents upon Substantial Completion, to results of subsequent tests and inspections, to correction of minor deviations from the Contract Documents prior to completion and to specific qualifications expressed by the Architect. The issuance of a Certificate for Payment will further constitute a representation that the Contractor is entitled to payment in the amount certified. However, the issuance of a Certificate for Payment will not be a representation that the Architect has (1) made exhaustive or continuous on-site inspections to check the quality or quantity of the Work, (2) reviewed construction means, methods, techniques, sequences or procedures, (3) reviewed copies of requisitions received from Subcontractors and material suppliers and other data requested by the Owner to substantiate the Contractor's right to payment, or (4) made examination to ascertain how or for what purpose the Contractor has used money previously paid on account of the Contract Sum.

§ 9.5 DECISIONS TO WITHHOLD CERTIFICATION

§ 9.5.1 The Architect may withhold a Certificate for Payment in whole or in part, to the extent reasonably necessary to protect the Owner, if in the Architect's opinion the representations to the Owner required by Section 9.4.2 cannot be made. If the Architect is unable to certify payment in the amount of the Application, the Architect will notify the Contractor and Owner as provided in Section 9.4.1. If the Contractor and Architect cannot agree on a revised amount, the Architect will promptly issue a Certificate for Payment for the amount for which the Architect is able to make such representations to the Owner. The Architect may also withhold a Certificate for Payment or, because of subsequently discovered evidence, may nullify the whole or a part of a Certificate for Payment previously issued, to such extent as may be necessary in the Architect's opinion to protect the Owner from loss for which the Contractor is responsible, including loss resulting from acts and omissions described in Section 3.3.2, because of

.1 defective Work not remedied;

.2 third party claims filed or reasonable evidence indicating probable filing of such claims unless security acceptable to the Owner is provided by the Contractor;

.3 failure of the Contractor to make payments properly to Subcontractors or for labor, materials or equipment;

.4 reasonable evidence that the Work cannot be completed for the unpaid balance of the Contract Sum;

.5 damage to the Owner or a separate contractor;

.6 reasonable evidence that the Work will not be completed within the Contract Time, and that the unpaid balance would not be adequate to cover actual or liquidated damages for the anticipated delay; or

.7 repeated failure to carry out the Work in accordance with the Contract Documents.

§ 9.5.2 When the above reasons for withholding certification are removed, certification will be made for amounts previously withheld.

§ 9.5.3 If the Architect withholds certification for payment under Section 9.5.1.3, the Owner may, at its sole option, issue joint checks to the Contractor and to any Subcontractor or material or equipment suppliers to whom the Contractor failed to make payment for Work properly performed or material or equipment suitably delivered. If the Owner makes payments by joint check, the Owner shall notify the Architect and the Architect will reflect such payment on the next Certificate for Payment.

§ 9.6 PROGRESS PAYMENTS

§ 9.6.1 After the Architect has issued a Certificate for Payment, the Owner shall make payment in the manner and within the time provided in the Contract Documents, and shall so notify the Architect.

§ 9.6.2 The Contractor shall pay each Subcontractor no later than seven days after receipt of payment from the Owner the amount to which the Subcontractor is entitled, reflecting percentages actually retained from payments to the Contractor on account of the Subcontractor's portion of the Work. The Contractor shall, by appropriate agreement with each Subcontractor, require each Subcontractor to make payments to Sub-subcontractors in a similar manner.

§ 9.6.3 The Architect will, on request, furnish to a Subcontractor, if practicable, information regarding percentages of completion or amounts applied for by the Contractor and action taken thereon by the Architect and Owner on account of portions of the Work done by such Subcontractor.

§ 9.6.4 The Owner has the right to request written evidence from the Contractor that the Contractor has properly paid Subcontractors and material and equipment suppliers amounts paid by the Owner to the Contractor for subcontracted Work. If the Contractor fails to furnish such evidence within seven days, the Owner shall have the right to contact Subcontractors to ascertain whether they have been properly paid. Neither the Owner nor Architect shall have an obligation to pay or to see to the payment of money to a Subcontractor, except as may otherwise be required by law.

§ 9.6.5 Contractor payments to material and equipment suppliers shall be treated in a manner similar to that provided in Sections 9.6.2, 9.6.3 and 9.6.4.

§ 9.6.6 A Certificate for Payment, a progress payment, or partial or entire use or occupancy of the Project by the Owner shall not constitute acceptance of Work not in accordance with the Contract Documents.

§ 9.6.7 Unless the Contractor provides the Owner with a payment bond in the full penal sum of the Contract Sum, payments received by the Contractor for Work properly performed by Subcontractors and suppliers shall be held by the Contractor for those Subcontractors or suppliers who performed Work or furnished materials, or both, under contract with the Contractor for which payment was made by the Owner. Nothing contained herein shall require money to be placed in a separate account and not commingled with money of the Contractor, shall create any fiduciary liability or tort liability on the part of the Contractor for breach of trust or shall entitle any person or entity to an award of punitive damages against the Contractor for breach of the requirements of this provision.

§ 9.7 FAILURE OF PAYMENT

If the Architect does not issue a Certificate for Payment, through no fault of the Contractor, within seven days after receipt of the Contractor's Application for Payment, or if the Owner does not pay the Contractor within seven days after the date established in the Contract Documents the amount certified by the Architect or awarded by binding

dispute resolution, then the Contractor may, upon seven additional days' written notice to the Owner and Architect, stop the Work until payment of the amount owing has been received. The Contract Time shall be extended appropriately and the Contract Sum shall be increased by the amount of the Contractor's reasonable costs of shut-down, delay and start-up, plus interest as provided for in the Contract Documents.

§ 9.8 SUBSTANTIAL COMPLETION

§ 9.8.1 Substantial Completion is the stage in the progress of the Work when the Work or designated portion thereof is sufficiently complete in accordance with the Contract Documents so that the Owner can occupy or utilize the Work for its intended use.

§ 9.8.2 When the Contractor considers that the Work, or a portion thereof which the Owner agrees to accept separately, is substantially complete, the Contractor shall prepare and submit to the Architect a comprehensive list of items to be completed or corrected prior to final payment. Failure to include an item on such list does not alter the responsibility of the Contractor to complete all Work in accordance with the Contract Documents.

§ 9.8.3 Upon receipt of the Contractor's list, the Architect will make an inspection to determine whether the Work or designated portion thereof is substantially complete. If the Architect's inspection discloses any item, whether or not included on the Contractor's list, which is not sufficiently complete in accordance with the Contract Documents so that the Owner can occupy or utilize the Work or designated portion thereof for its intended use, the Contractor shall, before issuance of the Certificate of Substantial Completion, complete or correct such item upon notification by the Architect. In such case, the Contractor shall then submit a request for another inspection by the Architect to determine Substantial Completion.

§ 9.8.4 When the Work or designated portion thereof is substantially complete, the Architect will prepare a Certificate of Substantial Completion that shall establish the date of Substantial Completion, shall establish responsibilities of the Owner and Contractor for security, maintenance, heat, utilities, damage to the Work and insurance, and shall fix the time within which the Contractor shall finish all items on the list accompanying the Certificate. Warranties required by the Contract Documents shall commence on the date of Substantial Completion of the Work or designated portion thereof unless otherwise provided in the Certificate of Substantial Completion.

§ 9.8.5 The Certificate of Substantial Completion shall be submitted to the Owner and Contractor for their written acceptance of responsibilities assigned to them in such Certificate. Upon such acceptance and consent of surety, if any, the Owner shall make payment of retainage applying to such Work or designated portion thereof. Such payment shall be adjusted for Work that is incomplete or not in accordance with the requirements of the Contract Documents.

§ 9.9 PARTIAL OCCUPANCY OR USE

§ 9.9.1 The Owner may occupy or use any completed or partially completed portion of the Work at any stage when such portion is designated by separate agreement with the Contractor, provided such occupancy or use is consented to by the insurer as required under Section 11.3.1.5 and authorized by public authorities having jurisdiction over the Project. Such partial occupancy or use may commence whether or not the portion is substantially complete, provided the Owner and Contractor have accepted in writing the responsibilities assigned to each of them for payments, retainage, if any, security, maintenance, heat, utilities, damage to the Work and insurance, and have agreed in writing concerning the period for correction of the Work and commencement of warranties required by the Contract Documents. When the Contractor considers a portion substantially complete, the Contractor shall prepare and submit a list to the Architect as provided under Section 9.8.2. Consent of the Contractor to partial occupancy or use shall not be unreasonably withheld. The stage of the progress of the Work shall be determined by written agreement between the Owner and Contractor or, if no agreement is reached, by decision of the Architect.

§ 9.9.2 Immediately prior to such partial occupancy or use, the Owner, Contractor and Architect shall jointly inspect the area to be occupied or portion of the Work to be used in order to determine and record the condition of the Work.

§ 9.9.3 Unless otherwise agreed upon, partial occupancy or use of a portion or portions of the Work shall not constitute acceptance of Work not complying with the requirements of the Contract Documents.

§ 9.10 FINAL COMPLETION AND FINAL PAYMENT

§ 9.10.1 Upon receipt of the Contractor's written notice that the Work is ready for final inspection and acceptance and upon receipt of a final Application for Payment, the Architect will promptly make such inspection and, when the Architect finds the Work acceptable under the Contract Documents and the Contract fully performed, the Architect will promptly issue a final Certificate for Payment stating that to the best of the Architect's knowledge, information and belief, and on the basis of the Architect's on-site visits and inspections, the Work has been completed in accordance with terms and conditions of the Contract Documents and that the entire balance found to be due the Contractor and noted in the final Certificate is due and payable. The Architect's final Certificate for Payment will constitute a further representation that conditions listed in Section 9.10.2 as precedent to the Contractor's being entitled to final payment have been fulfilled.

§ 9.10.2 Neither final payment nor any remaining retained percentage shall become due until the Contractor submits to the Architect (1) an affidavit that payrolls, bills for materials and equipment, and other indebtedness connected with the Work for which the Owner or the Owner's property might be responsible or encumbered (less amounts withheld by Owner) have been paid or otherwise satisfied, (2) a certificate evidencing that insurance required by the Contract Documents to remain in force after final payment is currently in effect and will not be canceled or allowed to expire until at least 30 days' prior written notice has been given to the Owner, (3) a written statement that the Contractor knows of no substantial reason that the insurance will not be renewable to cover the period required by the Contract Documents, (4) consent of surety, if any, to final payment and (5), if required by the Owner, other data establishing payment or satisfaction of obligations, such as receipts, releases and waivers of liens, claims, security interests or encumbrances arising out of the Contract, to the extent and in such form as may be designated by the Owner. If a Subcontractor refuses to furnish a release or waiver required by the Owner, the Contractor may furnish a bond satisfactory to the Owner to indemnify the Owner against such lien. If such lien remains unsatisfied after payments are made, the Contractor shall refund to the Owner all money that the Owner may be compelled to pay in discharging such lien, including all costs and reasonable attorneys' fees.

§ 9.10.3 If, after Substantial Completion of the Work, final completion thereof is materially delayed through no fault of the Contractor or by issuance of Change Orders affecting final completion, and the Architect so confirms, the Owner shall, upon application by the Contractor and certification by the Architect, and without terminating the Contract, make payment of the balance due for that portion of the Work fully completed and accepted. If the remaining balance for Work not fully completed or corrected is less than retainage stipulated in the Contract Documents, and if bonds have been furnished, the written consent of surety to payment of the balance due for that portion of the Work fully completed and accepted shall be submitted by the Contractor to the Architect prior to certification of such payment. Such payment shall be made under terms and conditions governing final payment, except that it shall not constitute a waiver of claims.

§ 9.10.4 The making of final payment shall constitute a waiver of Claims by the Owner except those arising from

- .1 liens, Claims, security interests or encumbrances arising out of the Contract and unsettled;
- .2 failure of the Work to comply with the requirements of the Contract Documents; or
- .3 terms of special warranties required by the Contract Documents.

§ 9.10.5 Acceptance of final payment by the Contractor, a Subcontractor or material supplier shall constitute a waiver of claims by that payee except those previously made in writing and identified by that payee as unsettled at the time of final Application for Payment.

ARTICLE 10 PROTECTION OF PERSONS AND PROPERTY

§ 10.1 SAFETY PRECAUTIONS AND PROGRAMS

The Contractor shall be responsible for initiating, maintaining and supervising all safety precautions and programs in connection with the performance of the Contract.

§ 10.2 SAFETY OF PERSONS AND PROPERTY

§ 10.2.1 The Contractor shall take reasonable precautions for safety of, and shall provide reasonable protection to prevent damage, injury or loss to

- .1 employees on the Work and other persons who may be affected thereby;
- .2 the Work and materials and equipment to be incorporated therein, whether in storage on or off the site, under care, custody or control of the Contractor or the Contractor's Subcontractors or Sub-subcontractors; and

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

§ 10.2.2 The Contractor shall comply with and give notices required by applicable laws, statutes, ordinances, codes, rules and regulations, and lawful orders of public authorities bearing on safety of persons or property or their protection from damage, injury or loss.

§ 10.2.3 The Contractor shall erect and maintain, as required by existing conditions and performance of the Contract, reasonable safeguards for safety and protection, including posting danger signs and other warnings against hazards, promulgating safety regulations and notifying owners and users of adjacent sites and utilities.

§ 10.2.4 When use or storage of explosives or other hazardous materials or equipment or unusual methods are necessary for execution of the Work, the Contractor shall exercise utmost care and carry on such activities under supervision of properly qualified personnel.

§ 10.2.5 The Contractor shall promptly remedy damage and loss (other than damage or loss insured under property insurance required by the Contract Documents) to property referred to in Sections 10.2.1.2 and 10.2.1.3 caused in whole or in part by the Contractor, a Subcontractor, a Sub-subcontractor, or anyone directly or indirectly employed by any of them, or by anyone for whose acts they may be liable and for which the Contractor is responsible under Sections 10.2.1.2 and 10.2.1.3, except damage or loss attributable to acts or omissions of the Owner or Architect or anyone directly or indirectly employed by either of them, or by anyone for whose acts either of them may be liable, and not attributable to the fault or negligence of the Contractor. The foregoing obligations of the Contractor are in addition to the Contractor's obligations under Section 3.18.

§ 10.2.6 The Contractor shall designate a responsible member of the Contractor's organization at the site whose duty shall be the prevention of accidents. This person shall be the Contractor's superintendent unless otherwise designated by the Contractor in writing to the Owner and Architect.

§ 10.2.7 The Contractor shall not permit any part of the construction or site to be loaded so as to cause damage or create an unsafe condition.

§ 10.2.8 INJURY OR DAMAGE TO PERSON OR PROPERTY
If either party suffers injury or damage to person or property because of an act or omission of the other party, or of others for whose acts such party is legally responsible, written notice of such injury or damage, whether or not insured, shall be given to the other party within a reasonable time not exceeding 21 days after discovery. The notice shall provide sufficient detail to enable the other party to investigate the matter.

§ 10.3 HAZARDOUS MATERIALS
§ 10.3.1 The Contractor is responsible for compliance with any requirements included in the Contract Documents regarding hazardous materials. If the Contractor encounters a hazardous material or substance not addressed in the Contract Documents and if reasonable precautions will be inadequate to prevent foreseeable bodily injury or death to persons resulting from a material or substance, including but not limited to asbestos or polychlorinated biphenyl (PCB), encountered on the site by the Contractor, the Contractor shall, upon recognizing the condition, immediately stop Work in the affected area and report the condition to the Owner and Architect in writing.

§ 10.3.2 Upon receipt of the Contractor's written notice, the Owner shall obtain the services of a licensed laboratory to verify the presence or absence of the material or substance reported by the Contractor and, in the event such material or substance is found to be present, to cause it to be rendered harmless. Unless otherwise required by the Contract Documents, the Owner shall furnish in writing to the Contractor and Architect the names and qualifications of persons or entities who are to perform tests verifying the presence or absence of such material or substance or who are to perform the task of removal or safe containment of such material or substance. The Contractor and the Architect will promptly reply to the Owner in writing stating whether or not either has reasonable objection to the persons or entities proposed by the Owner. If either the Contractor or Architect has an objection to a person or entity proposed by the Owner, the Owner shall propose another to whom the Contractor and the Architect have no reasonable objection. When the material or substance has been rendered harmless, Work in the affected area shall resume upon written agreement of the Owner and Contractor. By Change Order, the Contract Time shall be

extended appropriately and the Contract Sum shall be increased in the amount of the Contractor's reasonable additional costs of shut-down, delay and start-up.

§ 10.3.3 To the fullest extent permitted by law, the Owner shall indemnify and hold harmless the Contractor, Subcontractors, Architect, Architect's consultants and agents and employees of any of them from and against claims, damages, losses and expenses, including but not limited to attorneys' fees, arising out of or resulting from performance of the Work in the affected area if in fact the material or substance presents the risk of bodily injury or death as described in Section 10.3.1 and has not been rendered harmless, provided that such claim, damage, loss or expense is attributable to bodily injury, sickness, disease or death, or to injury to or destruction of tangible property (other than the Work itself), except to the extent that such damage, loss or expense is due to the fault or negligence of the party seeking indemnity.

§ 10.3.4 The Owner shall not be responsible under this Section 10.3 for materials or substances the Contractor brings to the site unless such materials or substances are required by the Contract Documents. The Owner shall be responsible for materials or substances required by the Contract Documents, except to the extent of the Contractor's fault or negligence in the use and handling of such materials or substances.

§ 10.3.5 The Contractor shall indemnify the Owner for the cost and expense the Owner incurs (1) for remediation of a material or substance the Contractor brings to the site and negligently handles, or (2) where the Contractor fails to perform its obligations under Section 10.3.1, except to the extent that the cost and expense are due to the Owner's fault or negligence.

§ 10.3.6 If, without negligence on the part of the Contractor, the Contractor is held liable by a government agency for the cost of remediation of a hazardous material or substance solely by reason of performing Work as required by the Contract Documents, the Owner shall indemnify the Contractor for all cost and expense thereby incurred.

§ 10.4 EMERGENCIES

In an emergency affecting safety of persons or property, the Contractor shall act, at the Contractor's discretion, to prevent threatened damage, injury or loss. Additional compensation or extension of time claimed by the Contractor on account of an emergency shall be determined as provided in Article 15 and Article 7.

ARTICLE 11 INSURANCE AND BONDS

§ 11.1 CONTRACTOR'S LIABILITY INSURANCE

§ 11.1.1 The Contractor shall purchase from and maintain in a company or companies lawfully authorized to do business in the jurisdiction in which the Project is located such insurance as will protect the Contractor from claims set forth below which may arise out of or result from the Contractor's operations and completed operations under the Contract and for which the Contractor may be legally liable, whether such operations be by the Contractor or by a Subcontractor or by anyone directly or indirectly employed by any of them, or by anyone for whose acts any of them may be liable:

.1 Claims under workers' compensation, disability benefit and other similar employee benefit acts that are applicable to the Work to be performed;

.2 Claims for damages because of bodily injury, occupational sickness or disease, or death of the Contractor's employees;

.3 Claims for damages because of bodily injury, sickness or disease, or death of any person other than the Contractor's employees;

.4 Claims for damages insured by usual personal injury liability coverage;

.5 Claims for damages, other than to the Work itself, because of injury to or destruction of tangible property, including loss of use resulting therefrom;

.6 Claims for damages because of bodily injury, death of a person or property damage arising out of ownership, maintenance or use of a motor vehicle;

.7 Claims for bodily injury or property damage arising out of completed operations; and

.8 Claims involving contractual liability insurance applicable to the Contractor's obligations under Section 3.18.

§ 11.1.2 The insurance required by Section 11.1.1 shall be written for not less than limits of liability specified in the Contract Documents or required by law, whichever coverage is greater. Coverages, whether written on an occurrence or claims-made basis, shall be maintained without interruption from the date of commencement of the

Work until the date of final payment and termination of any coverage required to be maintained after final payment, and, with respect to the Contractor's completed operations coverage, until the expiration of the period for correction of Work or for such other period for maintenance of completed operations coverage as specified in the Contract Documents.

§ 11.1.3 Certificates of insurance acceptable to the Owner shall be filed with the Owner prior to commencement of the Work and thereafter upon renewal or replacement of each required policy of insurance. These certificates and the insurance policies required by this Section 11.1 shall contain a provision that coverages afforded under the policies will not be canceled or allowed to expire until at least 30 days' prior written notice has been given to the Owner. An additional certificate evidencing continuation of liability coverage, including coverage for completed operations, shall be submitted with the final Application for Payment as required by Section 9.10.2 and thereafter upon renewal or replacement of such coverage until the expiration of the time required by Section 11.1.2. Information concerning reduction of coverage on account of revised limits or claims paid under the General Aggregate, or both, shall be furnished by the Contractor with reasonable promptness.

§ 11.1.4 The Contractor shall cause the commercial liability coverage required by the Contract Documents to include (1) the Owner, the Architect and the Architect's consultants as additional insureds for claims caused in whole or in part by the Contractor's negligent acts or omissions during the Contractor's operations; and (2) the Owner as an additional insured for claims caused in whole or in part by the Contractor's negligent acts or omissions during the Contractor's completed operations.

§ 11.2 OWNER'S LIABILITY INSURANCE

The Owner shall be responsible for purchasing and maintaining the Owner's usual liability insurance.

§ 11.3 PROPERTY INSURANCE

§ 11.3.1 Unless otherwise provided, the Owner shall purchase and maintain, in a company or companies lawfully authorized to do business in the jurisdiction in which the Project is located, property insurance written on a builder's risk "all-risk" or equivalent policy form in the amount of the initial Contract Sum, plus value of subsequent Contract Modifications and cost of materials supplied or installed by others, comprising total value for the entire Project at the site on a replacement cost basis without optional deductibles. Such property insurance shall be maintained, unless otherwise provided in the Contract Documents or otherwise agreed in writing by all persons and entities who are beneficiaries of such insurance, until final payment has been made as provided in Section 9.10 or until no person or entity other than the Owner has an insurable interest in the property required by this Section 11.3 to be covered, whichever is later. This insurance shall include interests of the Owner, the Contractor, Subcontractors and Sub-subcontractors in the Project.

§ 11.3.1.1 Property insurance shall be on an "all-risk" or equivalent policy form and shall include, without limitation, insurance against the perils of fire (with extended coverage) and physical loss or damage including, without duplication of coverage, theft, vandalism, malicious mischief, collapse, earthquake, flood, windstorm, falsework, testing and startup, temporary buildings and debris removal including demolition occasioned by enforcement of any applicable legal requirements, and shall cover reasonable compensation for Architect's and Contractor's services and expenses required as a result of such insured loss.

§ 11.3.1.2 If the Owner does not intend to purchase such property insurance required by the Contract and with all of the coverages in the amount described above, the Owner shall so inform the Contractor in writing prior to commencement of the Work. The Contractor may then effect insurance that will protect the interests of the Contractor, Subcontractors and Sub-subcontractors in the Work, and by appropriate Change Order the cost thereof shall be charged to the Owner. If the Contractor is damaged by the failure or neglect of the Owner to purchase or maintain insurance as described above, without so notifying the Contractor in writing, then the Owner shall bear all reasonable costs properly attributable thereto.

§ 11.3.1.3 If the property insurance requires deductibles, the Owner shall pay costs not covered because of such deductibles.

§ 11.3.1.4 This property insurance shall cover portions of the Work stored off the site, and also portions of the Work in transit.

§ 11.3.1.5 Partial occupancy or use in accordance with Section 9.9 shall not commence until the insurance company or companies providing property insurance have consented to such partial occupancy or use by endorsement or otherwise. The Owner and the Contractor shall take reasonable steps to obtain consent of the insurance company or companies and shall, without mutual written consent, take no action with respect to partial occupancy or use that would cause cancellation, lapse or reduction of insurance.

§ 11.3.2 BOILER AND MACHINERY INSURANCE

The Owner shall purchase and maintain boiler and machinery insurance required by the Contract Documents or by law, which shall specifically cover such insured objects during installation and until final acceptance by the Owner; this insurance shall include interests of the Owner, Contractor, Subcontractors and Sub-subcontractors in the Work, and the Owner and Contractor shall be named insureds.

§ 11.3.3 LOSS OF USE INSURANCE

The Owner, at the Owner's option, may purchase and maintain such insurance as will insure the Owner against loss of use of the Owner's property due to fire or other hazards, however caused. The Owner waives all rights of action against the Contractor for loss of use of the Owner's property, including consequential losses due to fire or other hazards however caused.

§ 11.3.4 If the Contractor requests in writing that insurance for risks other than those described herein or other special causes of loss be included in the property insurance policy, the Owner shall, if possible, include such insurance, and the cost thereof shall be charged to the Contractor by appropriate Change Order.

§ 11.3.5 If during the Project construction period the Owner insures properties, real or personal or both, at or adjacent to the site by property insurance under policies separate from those insuring the Project, or if after final payment property insurance is to be provided on the completed Project through a policy or policies other than those insuring the Project during the construction period, the Owner shall waive all rights in accordance with the terms of Section 11.3.7 for damages caused by fire or other causes of loss covered by this separate property insurance. All separate policies shall provide this waiver of subrogation by endorsement or otherwise.

§ 11.3.6 Before an exposure to loss may occur, the Owner shall file with the Contractor a copy of each policy that includes insurance coverages required by this Section 11.3. Each policy shall contain all generally applicable conditions, definitions, exclusions and endorsements related to this Project. Each policy shall contain a provision that the policy will not be canceled or allowed to expire, and that its limits will not be reduced, until at least 30 days' prior written notice has been given to the Contractor.

§ 11.3.7 WAIVERS OF SUBROGATION

The Owner and Contractor waive all rights against (1) each other and any of their subcontractors, sub-subcontractors, agents and employees, each of the other, and (2) the Architect, Architect's consultants, separate contractors described in Article 6, if any, and any of their subcontractors, sub-subcontractors, agents and employees, for damages caused by fire or other causes of loss to the extent covered by property insurance obtained pursuant to this Section 11.3 or other property insurance applicable to the Work, except such rights as they have to proceeds of such insurance held by the Owner as fiduciary. The Owner or Contractor, as appropriate, shall require of the Architect, Architect's consultants, separate contractors described in Article 6, if any, and the subcontractors, sub-subcontractors, agents and employees of any of them, by appropriate agreements, written where legally required for validity, similar waivers each in favor of other parties enumerated herein. The policies shall provide such waivers of subrogation by endorsement or otherwise. A waiver of subrogation shall be effective as to a person or entity even though that person or entity would otherwise have a duty of indemnification, contractual or otherwise, did not pay the insurance premium directly or indirectly, and whether or not the person or entity had an insurable interest in the property damaged.

§ 11.3.8 A loss insured under the Owner's property insurance shall be adjusted by the Owner as fiduciary and made payable to the Owner as fiduciary for the insureds, as their interests may appear, subject to requirements of any applicable mortgagee clause and of Section 11.3.10. The Contractor shall pay Subcontractors their just shares of insurance proceeds received by the Contractor, and by appropriate agreements, written where legally required for validity, shall require Subcontractors to make payments to their Sub-subcontractors in similar manner.

§ 11.3.9 If required in writing by a party in interest, the Owner as fiduciary shall, upon occurrence of an insured loss, give bond for proper performance of the Owner's duties. The cost of required bonds shall be charged against proceeds received as fiduciary. The Owner shall deposit in a separate account proceeds so received, which the Owner shall distribute in accordance with such agreement as the parties in interest may reach, or as determined in accordance with the method of binding dispute resolution selected in the Agreement between the Owner and Contractor. If after such loss no other special agreement is made and unless the Owner terminates the Contract for convenience, replacement of damaged property shall be performed by the Contractor after notification of a Change in the Work in accordance with Article 7.

§ 11.3.10 The Owner as fiduciary shall have power to adjust and settle a loss with insurers unless one of the parties in interest shall object in writing within five days after occurrence of loss to the Owner's exercise of this power; if such objection is made, the dispute shall be resolved in the manner selected by the Owner and Contractor as the method of binding dispute resolution in the Agreement. If the Owner and Contractor have selected arbitration as the method of binding dispute resolution, the Owner as fiduciary shall make settlement with insurers or, in the case of a dispute over distribution of insurance proceeds, in accordance with the directions of the arbitrators.

§ 11.4 PERFORMANCE BOND AND PAYMENT BOND

§ 11.4.1 The Owner shall have the right to require the Contractor to furnish bonds covering faithful performance of the Contract and payment of obligations arising thereunder as stipulated in bidding requirements or specifically required in the Contract Documents on the date of execution of the Contract.

§ 11.4.2 Upon the request of any person or entity appearing to be a potential beneficiary of bonds covering payment of obligations arising under the Contract, the Contractor shall promptly furnish a copy of the bonds or shall authorize a copy to be furnished.

ARTICLE 12 UNCOVERING AND CORRECTION OF WORK

§ 12.1 UNCOVERING OF WORK

§ 12.1.1 If a portion of the Work is covered contrary to the Architect's request or to requirements specifically expressed in the Contract Documents, it must, if requested in writing by the Architect, be uncovered for the Architect's examination and be replaced at the Contractor's expense without change in the Contract Time.

§ 12.1.2 If a portion of the Work has been covered that the Architect has not specifically requested to examine prior to its being covered, the Architect may request to see such Work and it shall be uncovered by the Contractor. If such Work is in accordance with the Contract Documents, costs of uncovering and replacement shall, by appropriate Change Order, be at the Owner's expense. If such Work is not in accordance with the Contract Documents, such costs and the cost of correction shall be at the Contractor's expense unless the condition was caused by the Owner or a separate contractor in which event the Owner shall be responsible for payment of such costs.

§ 12.2 CORRECTION OF WORK

§ 12.2.1 BEFORE OR AFTER SUBSTANTIAL COMPLETION

The Contractor shall promptly correct Work rejected by the Architect or failing to conform to the requirements of the Contract Documents, whether discovered before or after Substantial Completion and whether or not fabricated, installed or completed. Costs of correcting such rejected Work, including additional testing and inspections, the cost of uncovering and replacement, and compensation for the Architect's services and expenses made necessary thereby, shall be at the Contractor's expense.

§ 12.2.2 AFTER SUBSTANTIAL COMPLETION

§ 12.2.2.1 In addition to the Contractor's obligations under Section 3.5, if, within one year after the date of Substantial Completion of the Work or designated portion thereof or after the date for commencement of warranties established under Section 9.9.1, or by terms of an applicable special warranty required by the Contract Documents, any of the Work is found to be not in accordance with the requirements of the Contract Documents, the Contractor shall correct it promptly after receipt of written notice from the Owner to do so unless the Owner has previously given the Contractor a written acceptance of such condition. The Owner shall give such notice promptly after discovery of the condition. During the one-year period for correction of Work, if the Owner fails to notify the Contractor and give the Contractor an opportunity to make the correction, the Owner waives the rights to require correction by the Contractor and to make a claim for breach of warranty. If the Contractor fails to correct

nonconforming Work within a reasonable time during that period after receipt of notice from the Owner or Architect, the Owner may correct it in accordance with Section 2.4.

§ 12.2.2.2 The one-year period for correction of Work shall be extended with respect to portions of Work first performed after Substantial Completion by the period of time between Substantial Completion and the actual completion of that portion of the Work.

§ 12.2.2.3 The one-year period for correction of Work shall not be extended by corrective Work performed by the Contractor pursuant to this Section 12.2.

§ 12.2.3 The Contractor shall remove from the site portions of the Work that are not in accordance with the requirements of the Contract Documents and are neither corrected by the Contractor nor accepted by the Owner.

§ 12.2.4 The Contractor shall bear the cost of correcting destroyed or damaged construction, whether completed or partially completed, of the Owner or separate contractors caused by the Contractor's correction or removal of Work that is not in accordance with the requirements of the Contract Documents.

§ 12.2.5 Nothing contained in this Section 12.2 shall be construed to establish a period of limitation with respect to other obligations the Contractor has under the Contract Documents. Establishment of the one-year period for correction of Work as described in Section 12.2.2 relates only to the specific obligation of the Contractor to correct the Work, and has no relationship to the time within which the obligation to comply with the Contract Documents may be sought to be enforced, nor to the time within which proceedings may be commenced to establish the Contractor's liability with respect to the Contractor's obligations other than specifically to correct the Work.

§ 12.3 ACCEPTANCE OF NONCONFORMING WORK

If the Owner prefers to accept Work that is not in accordance with the requirements of the Contract Documents, the Owner may do so instead of requiring its removal and correction, in which case the Contract Sum will be reduced as appropriate and equitable. Such adjustment shall be effected whether or not final payment has been made.

ARTICLE 13 MISCELLANEOUS PROVISIONS

§ 13.1 GOVERNING LAW

The Contract shall be governed by the law of the place where the Project is located except that, if the parties have selected arbitration as the method of binding dispute resolution, the Federal Arbitration Act shall govern Section 15.4.

§ 13.2 SUCCESSORS AND ASSIGNS

§ 13.2.1 The Owner and Contractor respectively bind themselves, their partners, successors, assigns and legal representatives to covenants, agreements and obligations contained in the Contract Documents. Except as provided in Section 13.2.2, neither party to the Contract shall assign the Contract as a whole without written consent of the other. If either party attempts to make such an assignment without such consent, that party shall nevertheless remain legally responsible for all obligations under the Contract.

§ 13.2.2 The Owner may, without consent of the Contractor, assign the Contract to a lender providing construction financing for the Project, if the lender assumes the Owner's rights and obligations under the Contract Documents. The Contractor shall execute all consents reasonably required to facilitate such assignment.

§ 13.3 WRITTEN NOTICE

Written notice shall be deemed to have been duly served if delivered in person to the individual, to a member of the firm or entity, or to an officer of the corporation for which it was intended; or if delivered at, or sent by registered or certified mail or by courier service providing proof of delivery to, the last business address known to the party giving notice.

§ 13.4 RIGHTS AND REMEDIES

§ 13.4.1 Duties and obligations imposed by the Contract Documents and rights and remedies available thereunder shall be in addition to and not a limitation of duties, obligations, rights and remedies otherwise imposed or available by law.

§ 13.4.2 No action or failure to act by the Owner, Architect or Contractor shall constitute a waiver of a right or duty afforded them under the Contract, nor shall such action or failure to act constitute approval of or acquiescence in a breach there under, except as may be specifically agreed in writing.

§ 13.5 TESTS AND INSPECTIONS

§ 13.5.1 Tests, inspections and approvals of portions of the Work shall be made as required by the Contract Documents and by applicable laws, statutes, ordinances, codes, rules and regulations or lawful orders of public authorities. Unless otherwise provided, the Contractor shall make arrangements for such tests, inspections and approvals with an independent testing laboratory or entity acceptable to the Owner, or with the appropriate public authority, and shall bear all related costs of tests, inspections and approvals. The Contractor shall give the Architect timely notice of when and where tests and inspections are to be made so that the Architect may be present for such procedures. The Owner shall bear costs of (1) tests, inspections or approvals that do not become requirements until after bids are received or negotiations concluded, and (2) tests, inspections or approvals where building codes or applicable laws or regulations prohibit the Owner from delegating their cost to the Contractor.

§ 13.5.2 If the Architect, Owner or public authorities having jurisdiction determine that portions of the Work require additional testing, inspection or approval not included under Section 13.5.1, the Architect will, upon written authorization from the Owner, instruct the Contractor to make arrangements for such additional testing, inspection or approval by an entity acceptable to the Owner, and the Contractor shall give timely notice to the Architect of when and where tests and inspections are to be made so that the Architect may be present for such procedures. Such costs, except as provided in Section 13.5.3, shall be at the Owner's expense.

§ 13.5.3 If such procedures for testing, inspection or approval under Sections 13.5.1 and 13.5.2 reveal failure of the portions of the Work to comply with requirements established by the Contract Documents, all costs made necessary by such failure including those of repeated procedures and compensation for the Architect's services and expenses shall be at the Contractor's expense.

§ 13.5.4 Required certificates of testing, inspection or approval shall, unless otherwise required by the Contract Documents, be secured by the Contractor and promptly delivered to the Architect.

§ 13.5.5 If the Architect is to observe tests, inspections or approvals required by the Contract Documents, the Architect will do so promptly and, where practicable, at the normal place of testing.

§ 13.5.6 Tests or inspections conducted pursuant to the Contract Documents shall be made promptly to avoid unreasonable delay in the Work.

§ 13.6 INTEREST

Payments due and unpaid under the Contract Documents shall bear interest from the date payment is due at such rate as the parties may agree upon in writing or, in the absence thereof, at the legal rate prevailing from time to time at the place where the Project is located.

§ 13.7 TIME LIMITS ON CLAIMS

The Owner and Contractor shall commence all claims and causes of action, whether in contract, tort, breach of warranty or otherwise, against the other arising out of or related to the Contract in accordance with the requirements of the final dispute resolution method selected in the Agreement within the time period specified by applicable law, but in any case not more than 10 years after the date of Substantial Completion of the Work. The Owner and Contractor waive all claims and causes of action not commenced in accordance with this Section 13.7.

ARTICLE 14 TERMINATION OR SUSPENSION OF THE CONTRACT

§ 14.1 TERMINATION BY THE CONTRACTOR

§ 14.1.1 The Contractor may terminate the Contract if the Work is stopped for a period of 30 consecutive days through no act or fault of the Contractor or a Subcontractor, Sub-subcontractor or their agents or employees or any other persons or entities performing portions of the Work under direct or indirect contract with the Contractor, for any of the following reasons:

.1 Issuance of an order of a court or other public authority having jurisdiction that requires all Work to be stopped;

.2 An act of government, such as a declaration of national emergency that requires all Work to be stopped;

.3 Because the Architect has not issued a Certificate for Payment and has not notified the Contractor of the reason for withholding certification as provided in Section 9.4.1, or because the Owner has not made payment on a Certificate for Payment within the time stated in the Contract Documents; or

.4 The Owner has failed to furnish to the Contractor promptly, upon the Contractor's request, reasonable evidence as required by Section 2.2.1.

§ 14.1.2 The Contractor may terminate the Contract if, through no act or fault of the Contractor or a Subcontractor, Sub-subcontractor or their agents or employees or any other persons or entities performing portions of the Work under direct or indirect contract with the Contractor, repeated suspensions, delays or interruptions of the entire Work by the Owner as described in Section 14.3 constitute in the aggregate more than 100 percent of the total number of days scheduled for completion, or 120 days in any 365-day period, whichever is less.

§ 14.1.3 If one of the reasons described in Section 14.1.1 or 14.1.2 exists, the Contractor may, upon seven days' written notice to the Owner and Architect, terminate the Contract and recover from the Owner payment for Work executed, including reasonable overhead and profit, costs incurred by reason of such termination, and damages.

§ 14.1.4 If the Work is stopped for a period of 60 consecutive days through no act or fault of the Contractor or a Subcontractor or their agents or employees or any other persons performing portions of the Work under contract with the Contractor because the Owner has repeatedly failed to fulfill the Owner's obligations under the Contract Documents with respect to matters important to the progress of the Work, the Contractor may, upon seven additional days' written notice to the Owner and the Architect, terminate the Contract and recover from the Owner as provided in Section 14.1.3.

§ 14.2 TERMINATION BY THE OWNER FOR CAUSE

§ 14.2.1 The Owner may terminate the Contract if the Contractor

.1 repeatedly refuses or fails to supply enough properly skilled workers or proper materials;

.2 fails to make payment to Subcontractors for materials or labor in accordance with the respective agreements between the Contractor and the Subcontractors;

.3 repeatedly disregards applicable laws, statutes, ordinances, codes, rules and regulations, or lawful orders of a public authority; or

.4 otherwise is guilty of substantial breach of a provision of the Contract Documents.

§ 14.2.2 When any of the above reasons exist, the Owner, upon certification by the Initial Decision Maker that sufficient cause exists to justify such action, may without prejudice to any other rights or remedies of the Owner and after giving the Contractor and the Contractor's surety, if any, seven days' written notice, terminate employment of the Contractor and may, subject to any prior rights of the surety:

.1 Exclude the Contractor from the site and take possession of all materials, equipment, tools, and construction equipment and machinery thereon owned by the Contractor;

.2 Accept assignment of subcontracts pursuant to Section 5.4; and

.3 Finish the Work by whatever reasonable method the Owner may deem expedient. Upon written request of the Contractor, the Owner shall furnish to the Contractor a detailed accounting of the costs incurred by the Owner in finishing the Work.

§ 14.2.3 When the Owner terminates the Contract for one of the reasons stated in Section 14.2.1, the Contractor shall not be entitled to receive further payment until the Work is finished.

§ 14.2.4 If the unpaid balance of the Contract Sum exceeds costs of finishing the Work, including compensation for the Architect's services and expenses made necessary thereby, and other damages incurred by the Owner and not expressly waived, such excess shall be paid to the Contractor. If such costs and damages exceed the unpaid balance, the Contractor shall pay the difference to the Owner. The amount to be paid to the Contractor or Owner, as the case may be, shall be certified by the Initial Decision Maker, upon application, and this obligation for payment shall survive termination of the Contract.

§ 14.3 SUSPENSION BY THE OWNER FOR CONVENIENCE

§ 14.3.1 The Owner may, without cause, order the Contractor in writing to suspend, delay or interrupt the Work in whole or in part for such period of time as the Owner may determine.

§ 14.3.2 The Contract Sum and Contract Time shall be adjusted for increases in the cost and time caused by suspension, delay or interruption as described in Section 14.3.1. Adjustment of the Contract Sum shall include profit. No adjustment shall be made to the extent

.1 that performance is, was or would have been so suspended, delayed or interrupted by another cause for which the Contractor is responsible; or

.2 that an equitable adjustment is made or denied under another provision of the Contract.

§ 14.4 TERMINATION BY THE OWNER FOR CONVENIENCE

§ 14.4.1 The Owner may, at any time, terminate the Contract for the Owner's convenience and without cause.

§ 14.4.2 Upon receipt of written notice from the Owner of such termination for the Owner's convenience, the Contractor shall

.1 cease operations as directed by the Owner in the notice;

.2 take actions necessary, or that the Owner may direct, for the protection and preservation of the Work; and

.3 except for Work directed to be performed prior to the effective date of termination stated in the notice, terminate all existing subcontracts and purchase orders and enter into no further subcontracts and purchase orders.

§ 14.4.3 In case of such termination for the Owner's convenience, the Contractor shall be entitled to receive payment for Work executed, and costs incurred by reason of such termination, along with reasonable overhead and profit on the Work not executed.

ARTICLE 15 CLAIMS AND DISPUTES

§ 15.1 CLAIMS

§ 15.1.1 DEFINITION

A Claim is a demand or assertion by one of the parties seeking, as a matter of right, payment of money, or other relief with respect to the terms of the Contract. The term "Claim" also includes other disputes and matters in question between the Owner and Contractor arising out of or relating to the Contract. The responsibility to substantiate Claims shall rest with the party making the Claim.

§ 15.1.2 NOTICE OF CLAIMS

Claims by either the Owner or Contractor must be initiated by written notice to the other party and to the Initial Decision Maker with a copy sent to the Architect, if the Architect is not serving as the Initial Decision Maker. Claims by either party must be initiated within 21 days after occurrence of the event giving rise to such Claim or within 21 days after the claimant first recognizes the condition giving rise to the Claim, whichever is later.

§ 15.1.3 CONTINUING CONTRACT PERFORMANCE

Pending final resolution of a Claim, except as otherwise agreed in writing or as provided in Section 9.7 and Article 14, the Contractor shall proceed diligently with performance of the Contract and the Owner shall continue to make payments in accordance with the Contract Documents. The Architect will prepare Change Orders and issue Certificates for Payment in accordance with the decisions of the Initial Decision Maker.

§ 15.1.4 CLAIMS FOR ADDITIONAL COST

If the Contractor wishes to make a Claim for an increase in the Contract Sum, written notice as provided herein shall be given before proceeding to execute the Work. Prior notice is not required for Claims relating to an emergency endangering life or property arising under Section 10.4.

§ 15.1.5 CLAIMS FOR ADDITIONAL TIME

§ 15.1.5.1 If the Contractor wishes to make a Claim for an increase in the Contract Time, written notice as provided herein shall be given. The Contractor's Claim shall include an estimate of cost and of probable effect of delay on progress of the Work. In the case of a continuing delay, only one Claim is necessary.

§ 15.1.5.2 If adverse weather conditions are the basis for a Claim for additional time, such Claim shall be documented by data substantiating that weather conditions were abnormal for the period of time, could not have been reasonably anticipated and had an adverse effect on the scheduled construction.

§ 15.1.6 CLAIMS FOR CONSEQUENTIAL DAMAGES

The Contractor and Owner waive Claims against each other for consequential damages arising out of or relating to this Contract. This mutual waiver includes

.1 damages incurred by the Owner for rental expenses, for losses of use, income, profit, financing, business and reputation, and for loss of management or employee productivity or of the services of such persons; and

.2 damages incurred by the Contractor for principal office expenses including the compensation of personnel stationed there, for losses of financing, business and reputation, and for loss of profit except anticipated profit arising directly from the Work.

This mutual waiver is applicable, without limitation, to all consequential damages due to either party's termination in accordance with Article 14. Nothing contained in this Section 15.1.6 shall be deemed to preclude an award of liquidated damages, when applicable, in accordance with the requirements of the Contract Documents.

§ 15.2 INITIAL DECISION

§ 15.2.1 Claims, excluding those arising under Sections 10.3, 10.4, 11.3.9, and 11.3.10, shall be referred to the Initial Decision Maker for initial decision. The Architect will serve as the Initial Decision Maker, unless otherwise indicated in the Agreement. Except for those Claims excluded by this Section 15.2.1, an initial decision shall be required as a condition precedent to mediation of any Claim arising prior to the date final payment is due, unless 30 days have passed after the Claim has been referred to the Initial Decision Maker with no decision having been rendered. Unless the Initial Decision Maker and all affected parties agree, the Initial Decision Maker will not decide disputes between the Contractor and persons or entities other than the Owner.

§ 15.2.2 The Initial Decision Maker will review Claims and within ten days of the receipt of a Claim take one or more of the following actions: (1) request additional supporting data from the claimant or a response with supporting data from the other party, (2) reject the Claim in whole or in part, (3) approve the Claim, (4) suggest a compromise, or (5) advise the parties that the Initial Decision Maker is unable to resolve the Claim if the Initial Decision Maker lacks sufficient information to evaluate the merits of the Claim or if the Initial Decision Maker concludes that, in the Initial Decision Maker's sole discretion, it would be inappropriate for the Initial Decision Maker to resolve the Claim.

§ 15.2.3 In evaluating Claims, the Initial Decision Maker may, but shall not be obligated to, consult with or seek information from either party or from persons with special knowledge or expertise who may assist the Initial Decision Maker in rendering a decision. The Initial Decision Maker may request the Owner to authorize retention of such persons at the Owner's expense.

§ 15.2.4 If the Initial Decision Maker requests a party to provide a response to a Claim or to furnish additional supporting data, such party shall respond, within ten days after receipt of such request, and shall either (1) provide a response on the requested supporting data, (2) advise the Initial Decision Maker when the response or supporting data will be furnished or (3) advise the Initial Decision Maker that no supporting data will be furnished. Upon receipt of the response or supporting data, if any, the Initial Decision Maker will either reject or approve the Claim in whole or in part.

§ 15.2.5 The Initial Decision Maker will render an initial decision approving or rejecting the Claim, or indicating that the Initial Decision Maker is unable to resolve the Claim. This initial decision shall (1) be in writing; (2) state the reasons therefor; and (3) notify the parties and the Architect, if the Architect is not serving as the Initial Decision Maker, of any change in the Contract Sum or Contract Time or both. The initial decision shall be final and binding on the parties but subject to mediation and, if the parties fail to resolve their dispute through mediation, to binding dispute resolution.

§ 15.2.6 Either party may file for mediation of an initial decision at any time, subject to the terms of Section 15.2.6.1.

§ 15.2.6.1 Either party may, within 30 days from the date of an initial decision, demand in writing that the other party file for mediation within 60 days of the initial decision. If such a demand is made and the party receiving the demand fails to file for mediation within the time required, then both parties waive their rights to mediate or pursue binding dispute resolution proceedings with respect to the initial decision.

§ 15.2.7 In the event of a Claim against the Contractor, the Owner may, but is not obligated to, notify the surety, if any, of the nature and amount of the Claim. If the Claim relates to a possibility of a Contractor's default, the Owner may, but is not obligated to, notify the surety and request the surety's assistance in resolving the controversy.

§ 15.2.8 If a Claim relates to or is the subject of a mechanic's lien, the party asserting such Claim may proceed in accordance with applicable law to comply with the lien notice or filing deadlines.

§ 15.3 MEDIATION

§ 15.3.1 Claims, disputes, or other matters in controversy arising out of or related to the Contract except those waived as provided for in Sections 9.10.4, 9.10.5, and 15.1.6 shall be subject to mediation as a condition precedent to binding dispute resolution.

§ 15.3.2 The parties shall endeavor to resolve their Claims by mediation which, unless the parties mutually agree otherwise, shall be administered by the American Arbitration Association in accordance with its Construction Industry Mediation Procedures in effect on the date of the Agreement. A request for mediation shall be made in writing, delivered to the other party to the Contract, and filed with the person or entity administering the mediation. The request may be made concurrently with the filing of binding dispute resolution proceedings but, in such event, mediation shall proceed in advance of binding dispute resolution proceedings, which shall be stayed pending mediation for a period of 60 days from the date of filing, unless stayed for a longer period by agreement of the parties or court order. If an arbitration is stayed pursuant to this Section 15.3.2, the parties may nonetheless proceed to the selection of the arbitrator(s) and agree upon a schedule for later proceedings.

§ 15.3.3 The parties shall share the mediator's fee and any filing fees equally. The mediation shall be held in the place where the Project is located, unless another location is mutually agreed upon. Agreements reached in mediation shall be enforceable as settlement agreements in any court having jurisdiction thereof.

§ 15.4 ARBITRATION

§ 15.4.1 If the parties have selected arbitration as the method for binding dispute resolution in the Agreement, any Claim subject to, but not resolved by, mediation shall be subject to arbitration which, unless the parties mutually agree otherwise, shall be administered by the American Arbitration Association in accordance with its Construction Industry Arbitration Rules in effect on the date of the Agreement. A demand for arbitration shall be made in writing, delivered to the other party to the Contract, and filed with the person or entity administering the arbitration. The party filing a notice of demand for arbitration must assert in the demand all Claims then known to that party on which arbitration is permitted to be demanded.

§ 15.4.1.1 A demand for arbitration shall be made no earlier than concurrently with the filing of a request for mediation, but in no event shall it be made after the date when the institution of legal or equitable proceedings based on the Claim would be barred by the applicable statute of limitations. For statute of limitations purposes, receipt of a written demand for arbitration by the person or entity administering the arbitration shall constitute the institution of legal or equitable proceedings based on the Claim.

§ 15.4.2 The award rendered by the arbitrator or arbitrators shall be final, and judgment may be entered upon it in accordance with applicable law in any court having jurisdiction thereof.

§ 15.4.3 The foregoing agreement to arbitrate and other agreements to arbitrate with an additional person or entity duly consented to by parties to the Agreement shall be specifically enforceable under applicable law in any court having jurisdiction thereof.

§ 15.4.4 CONSOLIDATION OR JOINDER

§ 15.4.4.1 Either party, at its sole discretion, may consolidate an arbitration conducted under this Agreement with any other arbitration to which it is a party provided that (1) the arbitration agreement governing the other arbitration

permits consolidation, (2) the arbitrations to be consolidated substantially involve common questions of law or fact, and (3) the arbitrations employ materially similar procedural rules and methods for selecting arbitrator(s).

§ 15.4.4.2 Either party, at its sole discretion, may include by joinder persons or entities substantially involved in a common question of law or fact whose presence is required if complete relief is to be accorded in arbitration, provided that the party sought to be joined consents in writing to such joinder. Consent to arbitration involving an additional person or entity shall not constitute consent to arbitration of any claim, dispute or other matter in question not described in the written consent.

§ 15.4.4.3 The Owner and Contractor grant to any person or entity made a party to an arbitration conducted under this Section 15.4, whether by joinder or consolidation, the same rights of joinder and consolidation as the Owner and Contractor under this Agreement.

Additions and Deletions Report for
AIA® Document A201™ – 2007

This Additions and Deletions Report, as defined on page 1 of the associated document, reproduces below all text the author has added to the standard form AIA document in order to complete it, as well as any text the author may have added to or deleted from the original AIA text. Added text is shown underlined. Deleted text is indicated with a horizontal line through the original AIA text.

Note: This Additions and Deletions Report is provided for information purposes only and is not incorporated into or constitute any part of the associated AIA document. This Additions and Deletions Report and its associated document were generated simultaneously by AIA software at 16:50:00 on 05/04/2017.

PAGE 1

GCSC Phase 2 Bid No. ITB#7-2016/2017; FLA Project No. 4166-14
98 U. S. Hwy. 98
Panama City, Florida

...

Gulf Coast State College
5230 W. Hwy. 98
Panama City, Florida 32401

...

Florida Architects, Inc.
648 Florida Avenue
Panama City, Florida 32401

Certification of Document's Authenticity

AIA® Document D401™ – 2003

I, Joseph J. Sorci, hereby certify, to the best of my knowledge, information and belief, that I created the attached final document simultaneously with its associated Additions and Deletions Report and this certification at 16:50:00 on 05/04/2017 under Order No. 4874519908_1 from AIA Contract Documents software and that in preparing the attached final document I made no changes to the original text of AIA® Document A201™ – 2007, General Conditions of the Contract for Construction, as published by the AIA in its software, other than those additions and deletions shown in the associated Additions and Deletions Report.

_____

(Signed)

_____

(Title)

_____

(Dated)

SECTION 008000 – SUPPLEMENTARY GENERAL CONDITIONS

SUPPLEMENTS TO A.I.A. DOCUMENT A201, 2007 EDITION
GENERAL CONDITIONS FOR THE CONTRACT FOR CONSTRUCTION
TABLE OF CONTENTS:

GENERAL:
These Supplementary General Conditions modify, change, delete from, or add to the "General Conditions of the Contract for Construction," A.I.A. Document A201, 2007 Edition (Section 007000). The A.I.A Document A201, 2007 Edition as modified by the Owner's Agent is hereby made a part of every Section of these Specifications and shall be binding upon each Contractor, Subcontractor, and Material Supplier. Where any Article of the General Conditions is modified, or any Paragraph, Subparagraph, or Sub-Subparagraph thereof is modified or deleted by these Supplementary General Conditions, the unaltered provisions of the Article, Paragraph, Subparagraph, or Sub-Subparagraph shall remain in effect.

ARTICLE 1:
GENERAL PROVISIONS:

1.1 BASIC DEFINITIONS:
1.1 Supplement Paragraph 1.1 as follows:
1.1.1.1 The General Contractor's and Subcontractor's Proposal Forms as accepted by the Owner and Architect shall be a part of the Contract Documents.
1.1.9 "Provide", as used in the Contract Documents, includes furnishing all labor, supervision, tools, materials, supplies, equipment, shop drawings, product data and samples, together with all services, accessories and costs associated with performance of the work, or production or installation of an item or system usable in the complete project.
1.1.10 "Diagrammatic", as used in the Contract Documents, shall mean to outline in schematic form or an illustration to be used as a guide only.
1.1.11 "Product", as used in these Contract Documents, includes materials, systems and equipment.

1.2 CORRELATION AND INTENT OF THE CONTRACT DOCUMENTS:
1.2.1 Delete subsection entirely and substitute the following:
1.2.1 The intent of the Contract Documents is to include all items necessary for the execution and completion of the work by the Contractor. The Contract Documents are complementary, and what is required by any one shall be as binding as if required by all. Performance by the Contractor / Subcontractor shall be required to produce the intended results. In cases of discrepancies between the Contract Documents, the Agreement shall take precedence over the Drawings and Specifications, and the Specifications shall take precedence over the Drawings, except as listed under Item "4". Figure dimensions (if not in error) shall take precedence over scale. Large scale plans, sections, and details

take precedence over smaller scaled items. Plan schedules shall control over general plans. Addenda and Change Orders supersede only affected portions of the Documents.
1.2.1.1 The Contractor/Subcontractor, however, shall be held to providing completed work, according to the meaning and intent of the Drawings and Specifications whether all of the items involved under any trade are mentioned in one or several sections and/or drawings.
1.2.1.2 Should any item to be furnished or labor to be performed as specified under more than one Section of the Specification, it will be premised that Subcontractors have included said product and/or labor, unless he shall have obtained a written decision from the Architect prior to the bid. The Architect will decide who shall provide such items. Proper credit shall be given to the Owner when the cost has been included more than once.
1.2.1.3 Should any item or equipment required to be furnished within the drawings or specifications fail to have any or all of its connections or utilities indicated, the General Contractor, Contractors or Subcontractors shall provide (as a minimum) services, utilities and connections to ensure the permanent, proper, code compliant operation of the item or equipment; unless such condition shall have been brought to the attention of the Architect prior to the Bid and a decision rendered through the issuance of addenda or other items of clarification.
1.2.1.4 The General Contractor, Subcontractors, and Material Suppliers shall not take advantage of errors or omissions on Drawings or Specifications.
1.2.1.5 If any errors or omissions appear in Drawings, Specifications, or other Contract Documents, the Contractor and Subcontractors shall notify the General Contractor before time of submitting bid. The General Contractor will notify and resolve the issues with the Architect prior to submitting a bid price to the Owner. Should conflict occur in or between Drawings and Specifications; Contractors and Subcontractors are deemed to have estimated on the more expensive product, method of installation, and/or the greater quantity, unless he has requested and obtained a written decision before submission of proposals as to which method, product, or quantity will be required.
1.2.1.6 References to known standard specifications shall mean the latest edition of such specifications adopted and published at date of invitation to submit proposal. Words which have well-known technical or trade meanings are used herein accordance with such recognized meanings.
1.2.1.7 When dimensions as shown on the Drawings are affected by conditions already established, the Subcontractor shall take measurements to verify the given scale or figure dimensions in the Drawings.
1.2.1.8 The Specifications, detailed description or omission of it, concerning any work to be provided shall be regarded as meaning that only the best general practice of the trade is to prevail and that only materials and workmanship of the first quality are to be used. All interpretations of these Specifications shall be made upon this basis and all interpretations shall be made by the Architect.
1.2.1.9 Execute work as per Contract Documents. Make no changes without having first received written permission from the Architect. Where detailed information is lacking, before proceeding with work, refer matter to the Architect for additional information.
1.2.1.10 THE MECHANICAL AND ELECTRICAL SYSTEM DRAWINGS ARE DIAGRAMMATIC IN NATURE AND THE FIELD CONDITIONS MAY ARISE THAT WILL PREVENT THEIR BEING INSTALLED AS PER DRAWING (EX.), SUCH AS PIPE AND CONDUIT RUNS, CROSSOVERS, RISERS, DOORS, FLOOR, WALLS AND CEILING PATTERN COVERING LAYOUTS, ETC. THEREFORE, IT SHALL BE THE RESPONSIBILITY OF EACH AND ALL SUBCONTRACTORS, FOR THE COORDINATION, TIMING AND PROTECTION OF ALL CONDITIONS; AND IN EACH CASE WHERE THERE IS ANY QUESTION OR PROBLEM AS TO CONDITIONS OR LOCATIONS OF THESE ITEMS, SUBMIT A WORKABLE SOLUTION TO THE GENERAL CONTRACTOR AND THE ARCHITECT FOR REVIEW AND WRITTEN APPROVAL BEFORE COMMENCING WITH QUESTIONABLE WORK. IF SUCH ADJUSTMENT SHALL BE MADE BY THE SUBCONTRACTOR WITHOUT WRITTEN APPROVAL, IT SHALL BE AT THEIR OWN RISK AND EXPENSE. ANY REMOVAL OF NON-APPROVED AREAS SHALL BE THE RESPONSIBILITY AND EXPENSE OF THE SUBCONTRACTORS.
1.2.1.11 Where there is conflict between the Drawings, or between Drawings and Specifications, or doubt as to meaning, the Contractor and Subcontractors shall obtain a written decision from the Architect, except where the Contractor or Subcontractor deems that there could be immediate damages to life or property. He shall not proceed in uncertainty in any instance.
1.2.1.12 In the case of discrepancies between the INFORMATION TO BIDDERS, DRAWINGS, SPECIFICATIONS, OR ADDENDA as it relates to each Subcontractor's Work Category responsibilities, the most stringent case applies as determined by the Architect.
1.2.2 Add the following:

1.2.2.1 Construction Specifications Institute (C.S.I. Uniform System): To assist the Contract, the Specifications are divided into Divisions and Section numbers conforming to "Uniform System for Construction Specifications.

ARTICLE 2:
OWNER:

2.1 GENERAL:
2.1.1 Add the following subparagraphs:
2.1.1.1 THE TERM "ARCHITECT" AS USED IN THE GENERAL CONDITIONS SHALL MEAN FLORIDA ARCHITECTS, INC. WHERE THE TERM "A/E", "ARCHITECT/ENGINEER", OR "ENGINEER" IS USED IN THE DOCUMENTS, IT SHALL BE CONSIDERED AS BEING SYNONYMOUS WITH THE TERM "ARCHITECT" AS DEFINED IN THE GENERAL CONDITIONS.
2.1.1.2 THE TERM “OWNER’S REPRESENTATIVE” AS USED IN THE GENERAL CONDITIONS SHALL MEAN DEWBERRY|PREBLE-RISH.
2.1.1.3 The use of phrases "as directed", "as instructed", "reviewed", "authorized", "accepted", and similar terms implies that such action will be taken by the Architect unless specifically stated otherwise.

2.2 INFORMATION AND SERVICES REQUIRED OF THE OWNER:
2.2.5.1 Add the following:
2.2.5.1 The General Contractor will be furnished with ONE (1) set of reproducible Drawings and Specifications by the Owner (other sets may be furnished but are not a requirement under this contract). A complete set of portable document format (.pdf) documents (plans and specifications) may be made available to the General Contractor for the printing and distribution processes. Subcontractors shall be furnished with TWO (2) set of Drawings and TWO (2) set of Specifications upon contract award from the General Contractor. If additional sets are required by the Subcontractor, they will furnished by the General Contractor upon written request and payment for the cost of printing, handling and shipping as applicable.

2.4 OWNERS RIGHT TO CARRY OUT THE WORK:
2.4.1 Add the following:
2.4.1 The Owner will assist the Architect and General Contractor in determining in general that the Work of the Contractor/Subcontractors is being performed in accordance with the Contract Documents, and will assist to endeavor to guard the Owner against defects and deficiencies in the Work of the Contractor/Subcontractors.

ARTICLE 3:
CONTRACTOR:

3.2 REVIEW OF CONTRACT DOCUMENTS AND FIELD CONDITIONS BY CONTRACTOR:
3.2.1 Add the Following:
3.2.1.1 The Contractor shall execute the "Form of Agreement" indicated in the Bidding Documents and return within five (5) days after receiving the same.
3 2.1.2 Examination of site shall include determination of the nature and scope of the work and all difficulties that accompany its execution.
3.2.2
3.2.2 Add the following:
3.2.2.1 The General Contractor shall instruct Subcontractors and material suppliers, and shall assist in their studying and understanding the complete Drawings, Specifications, Addenda and revision drawings to determine the extent and limitations of this Construction Contract.
3.2.3 Add the following:
3.2.3.1 The Contractor/Subcontractors and material suppliers shall examine the Architectural, Structural, Mechanical, Plumbing, and Electrical Drawings and Specifications, and verify all measurements and requirements before ordering materials or performing any work to avoid problems during construction.
3.2.3.2 Before ordering materials or doing any work, the Contractor/Subcontractors shall verify all measurements at the project site and shall be responsible for their correctness. No extra compensation

will be allowed on account of differences between actual dimensions and those indicated on the Drawings. Any decided difference which may be found shall be reported to the Architect in writing, for consideration before proceeding with the Work.

3.4 LABOR AND MATERIALS:
3.4.1 Add the following:
3.4.1.1 Material Standards - Unless otherwise specifically provided in this Contract, reference to any equipment, material, article, or patented process, by trade name, make, or catalog number, shall establish a standard of quality and the Base Bid shall include only materials and items exactly as specified or called for by name.
3.4.2 Delete subparagraph 3.4.2 and substitute the following:
3.4.2 Substitutions During Bidding Period - Requests for substitutions during the bidding period will be considered and treated only as stated in Specification Section 008200, Special Conditions, Article 15, Substitution of Materials and Equipment. Once bids have been received, the Owner and Architect will prepare the Contract on the basis that all items are those specified in the Specifications, shown on the Drawings, or approved in Addenda during the bidding period. The approval of a product during the bid period does not negate the requirement for the submission of complete data during the construction in accordance with the Section 013300, Submittals, nor does it negate the burden of complying with any and all specification requirements. Should further investigation of a product approved during the bid period indicate that the product does not meet the essential requirements of the project the Subcontractors shall make such modifications as are necessary to meet these essential requirements or provide the specified basis of design product.
3.4.2.1 Approval After Bids Are Opened - Substitutions or approval of products will be considered after bids are opened only under the following conditions:
.1 The Subcontractor shall place orders for specified materials and equipment promptly upon award of Contract. No excuses or proposed substitutions will be considered for materials and equipment due to unavailability, unless proof is submitted that firm orders were promptly placed for the item listed in the Specifications.
.2 The reason for the unavailability shall be beyond the control of the Subcontractor, such as strikes, lockouts. bankruptcy, discontinuance of the manufacturer or a product, or acts of god, and shall be made known in writing to the Architect within five (5) days of the date that the Subcontractor ascertains that he cannot obtain the material or equipment specified. Requests shall be accompanied by a complete description of the materials or equipment which the Subcontractor wishes to use as a substitute.
3.4.3 Add the following:
3.4.3.1 If any person employed on the Work is found, in the judgment of the General Contractor, Architect/Engineer or Owner, to be incompetent, disorderly, unfaithful, or disobedient so far as to endanger proper fulfillment of the Contract, he shall, if directed, be discharged immediately and not employed again on any part of the Work.

3.5 WARRANTY:
Add the following:
3.5.1 Under this warranty for a period of one (1) year from date of Completion, as evidenced by the date of "Substantial Completion" of the Work, the Contractor/Subcontractor shall remedy, at his own expense, any such failure to conform on any such defects. Where warranties are written in any Section for longer than one (1) year, such terms will apply.
3.5.2 Nothing in the above intends or implies that this warranty shall apply to work which has been abused or neglected by the Owner.

3.6 TAXES:
3.6 Add the following:
3.6.1 Unless otherwise specified, the Bid price includes all Federal, State and local taxes imposed prior to the execution of the Agreement and which are applicable to the Work. If any new privilege, sales gross receipt or other excise tax, exclusive of taxes and net income or undistributed profit applicable to the Work and payable by the Contractor/Subcontractor is imposed by the State of Florida, or such present tax be increased as of the date thereof, then the Contract price will be adjusted accordingly and the Owner will reimburse the Contractor/Subcontractor therefore without any allowance for overhead or profit upon separate payment application containing such pertinent details as the Owner may require." The General

Contractor will organize, implement and manage the owner's direct purchase tax recovery program for any order over three-thousand dollars ($3,000.00).

3.7 PERMITS, FEES, NOTICES AND COMPLIANCE WITH LAWS:
3.7 Delete paragraph 3.7.1 and substitute the following:
3.7.1 A local building permit will be required for this project. The "Florida Building Code 2007 shall govern. The Owner has engaged the Bay County Building Department to facilitate the document review and building permit process, as well as, related inspection services in accordance with the FBC. The Owner is exempt from all other county, district, municipal, and local building codes, ordinances, interpretations, building permits and assessments of fees for building permits, impact fees and service availability fees other than those defined within the Florida Building Code 2007, the Florida Statutes and the Florida Administrative Code. The Contractor/Subcontractor shall secure and pay for all other permits, governmental fees, anti-pollution fees, and licenses necessary for the proper execution and completion of his Work, which are applicable at the time the bids are received. The Contractor/Subcontractors shall be familiar with all Federal, State, and local laws, codes, ordinances, and regulations which in any manner effect those engaged or employed in the Work and any material or equipment used in the conduct of the Work.
3.7.1.1 Before proceeding with the Work, securing permits or necessary licenses, the Contractor/Subcontractors shall carefully study and compare the Drawings and Specifications and shall at once report in writing, to the Architect/Engineer, any error or omission he may discover that is in variance with applicable laws, statutes, building codes, and regulations.
3.7.2 Add the following:
3.7.2.1 The Contractor/Subcontractors at all times shall comply with the Florida Building Code 2007 (including amendments and supplements), and all Federal, State and local laws, codes, ordinances and regulations as applicable, which in any manner effect the Work, and he and his surety shall indemnify and hold harmless the Owner, and Architect/Engineer against any claim or liability arising from or based on the violation of such law or decree, whether by himself or his employees.

3.10 CONTRACTOR'S CONSTRUCTION SCHEDULES:
3.10.1.1 Add the following:
3.10.1.1 Each Contractor/Subcontractor shall comply and adhere to such schedule. The parts of the Work performed by each Subcontractor and the time schedule applicable to each part shall be acknowledged and accepted by each Subcontractor before submission of the Bid. The form of the Schedule shall be as indicated in SECTION 013200 – CONSTRUCTION PROGRESS DOCUMENTATION.

3.11 DOCUMENTS AND SAMPLES AT THE SITE:
3.11.1 Add the following:
3.11.1 At the completion of the Work, each Contractor or Subcontractor shall submit "Record Drawings" to the General Contractor who, in turn, will produce (or cause to have produced) As-Built Drawings. These As-Built Documents shall be ELECTRONIC MEDIA on Autodesk Architectural Desktop (Latest Version). Said Drawings shall be delivered to the Architect for review. The Architect will forward reviewed As-Built Drawings to the Owner.
3.11.1.1 Pipelines and ducts which are installed in furred spaces, pipe chases, or other spaces which can be readily inspected by the use of access panels or other means of access will not be considered as being concealed. With reference to electrical and mechanical work the exact (not diagrammatic) conduit, pipe, and duct runs shall be shown on these drawings.
3.11.1.2 Record Drawings shall be the daily in-use set of contract documents at the job site. At the end of each day, the foreman of each trade shall mark and date any and all changes that occurred during the course of the days work. Lines shall be located by dimension and equipment shall be noted and located. These documents will be delivered to the General Contractor as noted in 3.11.2.1 above.
3.11.1.3 Upon completion of the work this data shall be recorded to scale, by a competent draftsman on electronic media copies of the contract drawings. Design drawings electronic media will be furnished to the General Contractor. Changes and actual locations are to be recorded. Where the work was installed exactly as shown on the contract drawings the black line prints shall not be disturbed other than being marked "As-Built". In showing the changes the same legend shall be used to identify piping, etc., as was used on the contract drawings. A separate set of drawings shall be prepared for electrical, plumbing, heating, air conditioning, and ventilating work unless two (2) or more divisions are shown on the same

sheets of the contract drawings. Each change of the original Contract Documents shall be “clouded” and referenced and each sheet shall bear the date and name of the Subcontractor submitting the changes to the drawings
3.11.1.4 The General Contractor shall review the complete As-Built drawings. He shall ascertain and certify that all data furnished on the drawings are accurate and truly represent the work as actually installed. When manholes, boxes, underground conduits, plumbing, hot or chilled water lines, inverts, etc. are involved as part of the work, the Subcontractor shall furnish true elevations and locations, all properly referenced by using the original bench mark for the project. The “Record Drawings” from each Contractor/Subcontractor, including those unchanged and changed, shall be submitted to the Architect, when completed, together with two (2) sets of black line prints (produced from the As-Built Electronic Media) with the General Contractor’s and each Subcontractor's certification of accurate As-Built Drawings for review and forwarding to the Owner at the time of Substantial Completion. Final payment shall not be made until said “As-Built” documents have been received by the Architect, reviewed and accepted as complete, and in accordance with the contract documents.
3.11.1.5 The General Contractor shall be responsible for collecting, identifying, indexing and collating the following materials from the Subcontractors, and will deliver three (3) copies of the finished documents to the Architect. Complete equipment diagrams, operating instructions, maintenance manuals, parts lists, wiring diagrams, pneumatic and/or electrical control diagrams, test and balance reports, inspection reports, guarantee and warranties, as applicable for each and every piece of fixed equipment furnished under this contract to be supplied in a three ring binder, hard-cover book, properly indexed for ready reference with printed covers and spines indicating the project name. Also, specific information regarding manufacturer's name and address, nearest distributor and service representative's name and address, office and home phone numbers, make and model numbers, operating design and characteristics, etc. will be required. All information submitted shall be updated to reflect existing conditions. Final payment shall not be made until said documents have been received by the Architect/Engineer, reviewed and accepted as complete and in accordance with the contract documents. Refer to Section 017700, Close-Out Procedures.

3.12 SHOP DRAWINGS, PRODUCT DATA AND SAMPLES:
3.12.11 Add the following Subparagraph:
3.12.11The requirements of Article 3.12 are supplemented by a separate Section, Submittals in Division One, Section 013300.

3.14 CUTTING AND PATCHING OF WORK:
3.14 Add the following Subparagraphs:
3.14.3 The Subcontractor shall do all cutting required for installation of his work. Patching required because of such cutting shall be performed as follows:
3.14.3.1 Wherever cutting occurs within unexposed materials, or in materials which are to remain unfinished when completed, patching shall be performed by the Subcontractor who did the cutting. This includes all concrete and masonry other than listed below.
3.14.3.2 Wherever cutting occurs in finished surfaces, patching shall be performed by the Subcontractor specializing in that particular trade, and paid for by the Subcontractor who did the cutting. This includes, but is not limited to, roofing, painting of plaster and finished surfaces, ceramic tile, structural facing tile, marble, concrete block in finished areas, metal lath and plaster, acoustical materials and their supports.

ARTICLE 4:
ARCHITECT:

4.1 GENERAL:
4.1 Add the following paragraph:
4.1.4 Disputes arising under Subparagraph 4.1.2 and 4.1.3 shall be subject to litigation.

ARTICLE 5:
SUBCONTRACTORS:

5.1 DEFINITIONS:

5.1. Add the following:
5.1.3 Material Supplier is a person or organization who has furnished materials to the General Contractor, Subcontractor, Sub-subcontractor or Owner to be used in the construction of the Work, a building or structure, but has not performed any on or off site work other than delivering construction materials, and shall not have or created any contractual relation between the Owner or the Architect/Engineer.
5.1.4 The General Contractor, and all Contractors, Subcontractors, Sub-Subcontractors and Material Suppliers shall be responsible for reading, studying, and understanding the Drawings and Specifications, as well as the requirements and limitations of the Construction Documents.

5.2 AWARD OF SUBCONTRACTS AND OTHER CONTRACTS FOR PORTIONS OF THE WORK:
5.2.1 Add the following Subparagraphs:
5.2.1.1 This requirement is an addition to the requirements for names of specific Subcontractors and major material suppliers. This list shall be submitted by the low Bidder within five (5) days after the bid opening and prior to the first application for payment.
5.2.1.2 The Contractor/Subcontractor agrees to sign contracts with the firms listed in the "List of Proposed Sub-Bidders" and "Material Suppliers/Manufacturers" as soon as the Agreement between the Owner and General Contractor has been executed. Once the Contractor and Subcontractor has submitted the name of Subcontractor/Sub-Subcontractors, he waives any future objection to contracting with these named Subcontractors/Sub-Subcontractors, Material Suppliers/Manufacturers. The Contractor/Subcontractor will be allowed to request a change of those previously mentioned if sufficient evidence is presented in that the success of the project would be in jeopardy and that those are not qualified or able to perform as required. This request for change by the Contractor/Subcontractor must be mutually accepted by the Owner and Architect, and that no additional compensation will be allowed if a change is approved.
5.2.4 Add the following Subparagraph:
5.2.4.1 If any Subcontractor or Material Supplier is found by the General Contractor, or the Architect or Owner to be incompetent, careless, or neglectful, or unduly delays progress of work, he shall be dismissed. Another shall then be employed in his place, as approved by the General Contractor, Architect and the Owner at no additional cost to the Owner.

ARTICLE 6:
CONSTRUCTION BY OWNER OR BY SEPARATE CONTRACTORS:

6.4 Add the following paragraph:
6.4 INSTALLATION OF EQUIPMENT:
6.4.1 The General Contractor and Subcontractors shall allow the Owner to take possession of the use of any completed portions of this structure or Work, or to place and install as much equipment and machinery during the progress of the Work, as is possible without interference before its entire completion. Such possession and use of structure of work or such placing and installation of equipment, or both, shall not in any way evidence the completion of the Work or any portion of it, or signify the Owner's acceptance of the Work or any portion of it.

ARTICLE 7:
CHANGES IN THE WORK:

7.2 CHANGE ORDERS:
7.2.1.3 Add the following:
7.2.1.3.1 Contract Time will only be adjusted where the Critical Path is impeded by the Owner or the Owner’s agent.

7 3 CONSTRUCTION CHANGE DIRECTIVES:
7.3.3 Delete paragraph and substitute the following:
7.3.3 The cost or credit to the Owner resulting from a change in the Work shall be determined as follows:

1. By Unit Prices stated in the Contract Documents or subsequently agreed upon; or for changes not covered by Unit Prices;
2. By mutual acceptance of a lump sum properly itemized and supported by sufficient substantiating data to permit evaluation; or if no agreement can be reached,
3. By the method provided in Subparagraph 7.3.6.

The lump sum proposals shall be based upon:

1. Estimate of Labor.
2. Estimate of Materials.
3. Estimate of Applicable Taxes.
4. Estimate of Equipment Rentals.
5. Estimate of Subcontractor Costs.
6. Estimate of Contractor Costs.
7. Estimate of Field Supervision (directly attributed to change) shall be included in labor breakdown.
8. Cost of Bond Premium.
9. Subcontractor overhead and profit applied to the above items shall not exceed seven and one-half percent (7½%) percent for both the Contractor and the Subcontractor. Contractor overhead and profit shall not exceed seven and one-half percent (7½%) plus the cost for related bond premium. All lump sum proposals shall include a detailed cost breakdown for each component of work indicating both quantities and unit prices and shall be submitted to the Architect within seven (7) calendar days after receipt of the proposal request.

7 3.7 Add the following:

7.3.7.1.1 All labor, material, and equipment expenditures for work performed at actual cost shall be approved daily by the Architect and Owner. Material invoices shall be presented to the Owner and Architect with all payment requests.

7.3.7.1.2 No percentage of overhead and profit, or general conditions, will be allowed on items of social security, old age, fringe benefits, and unemployment insurance.

ARTICLE 8:
TIME:

8.2 PROGRESS AND COMPLETION

8.2 Add the following paragraph:

8.2.4 The work to be performed under the Contract shall be commenced no later than five (5) consecutive days from the Notice to Proceed issued by the Architect/Engineer, and be substantially complete within the time agreed upon by Owner as set forth in the form of Agreement. The Contractor and Subcontractors agree to pay to the Owner, as liquidated damages due to failure to complete the work on time, the sum of $3,000.00 for each and every calendar day beyond the one-hundred-eighty-nine (189) days indicated to complete the work but that the on-site playing field irrigation and grass to be installed by October 12, 2017 (83 days). Additionally, the General Contractor and Subcontractors have twenty-one (21) consecutive calendar days from time of Approved Substantial Completion to obtain Final Completion approval from the Architect/Engineer and Owner. The Contractors and Subcontractors shall pay to the Owner, as liquidated damages due to failure to complete the work on time, the sum of $1,500.00 for each calendar day beyond the 21 days indicated to complete the final work.

8.3 DELAYS AND EXTENSIONS OF TIME:

8.3 Add the following:

8.3 1.1 Only those delays which impede the critical path and are authorized by the Owner, or by delay authorized by the Owner pending litigation or by any other causes which the Architect determines may justify the delay, then the Contract Time shall be extended by Change Order for such reasonable time as the Architect may determine. Labor disputes occurring on the construction site will not be sufficient grounds for time extensions.

8.3.2.1 The Contractor and Subcontractors expressly agrees that an extension of time shall constitute the Contractors and Subcontractors sole and exclusive remedy should the Contractor and Subcontractors be delayed, interfered with, disrupted, or hindered in his work. In which case the Owner shall owe the Contractor only an extension of time for completion equal to the delay caused, and then only if written notice of delay is made to the Owner, through the Architect, within forty- eight (48) hours from the time of the beginning of the delay, interference, disruption, or hindrance. The General Contractor's notice of

delay must be by certified mail to the Owner in care of the Architect, and must contain evidence establishing the delay. The Owner's findings shall be final and conclusive as to the contractor's entitlement for time extension.

ARTICLE 9:
PAYMENTS AND COMPLETION:

9.3 APPLICATIONS FOR PAYMENT:
9.3.1 Delete paragraph and subparagraph and replace with the following:
9.3.I On or before the eighteenth (18th) day of each month, the Subcontractor shall submit to the General Contractor, an itemized partial payment request supported by such data substantiating the Subcontractor's right to payment for work completed during the period since the previous pay request. Partial payment requests shall be based upon one hundred percent (100%) of the value of the work installed, and the actual invoice amount of materials (fabricated) and equipment suitably stored and protected at the site. Payment request submittals by a Subcontractor will not require Subcontractor lien releases, however, payment for the submittal will not be made until the General Contractor has received and forwarded to the Owner appropriate Partial or Final Lien Release from the Subcontractor. The General Contractor will verify that “As-Built” drawings are up-to-date prior to processing the application for payment. Partial payment requests by Subcontractors shall be accompanied by lien releases from the Subcontractors and Suppliers and, or Sub-Subcontractors, who have issued Notice To Owner (“NTO”). Such releases will be for labor, services or materials which were supplied to the Subcontractor through the date of the previous pay request of the Subcontractor. All lien releases shall be submitted on the form bound herein and must be shown the amount paid. Subcontractor payment requests submitted after the 20th day of the month will not be processed until the following month.
9.3.2 Supplement as following:
9.3.2.1. Applications for Payment shall be made on three copies of notarized A.I.A. Documents G702 and G703, available from the American Institute of Architects, 1735 New York Avenue, N W, Washington, D. C. 20006. Stored material shall be reported on the "Stored Materials for Pay Request" form incorporated herein. Include partial Lien Waivers and copies of backup information such as billing/delivery tickets, etc.
9.3.2.2. The General Contractor and the Architect will certify to the Owner that payment in the sum of 90% of the value of work accomplished and materials stored on site is due the General Contractor and Subcontractors according to his best judgment of correct amounts. Ten percent (10%) of the value of each monthly request will be retained by the Owner.
9.3.2.3. When seventy five percent (75%) of the value of the Owner’s Contract has been completed, retainage may be reduced for a given category of work for an individual Subcontractor. The Subcontractor must have met, and continue to meet his schedule commitments. If said Subcontractor subsequently fails to meet schedule commitments, the ten percent (10%) retainage will be reinstated. The implementation of this reduction in retainage is not automatic and must be approved by the Architect and the Owner.
9.3.2.4. Upon determination by the Architect that satisfactory progress has been made, payment authorized at the time of Substantial Completion may include the total retainage in the Contract, except that an amount equal to twice the cost estimated by the Architect to complete or correct items on a tentative punch list of uncompleted items will be retained until final completion.
9.3.3 Supplement as follows:
9.3.3.1 This provision shall not be construed as relieving the General Contractor and/or Subcontractors from the responsibility for the care and protection of materials and work upon which payments have been made, or the restoration of any damaged work or materials, or as a waiver of the right of the Owner to require the fulfillment of all terms of the Contract.

9.5 DECISION TO WITHHOLD CERTIFICATION:
9.5 Add the following:
9.5.4 The Architect may withhold or cause to be withheld, from any monies payable on account for work performed by the General Contractor, or Subcontractor, such sums as may administratively be determined to be necessary to satisfy any liabilities of such Contractors, or Subcontractors for damages.

9.10 FINAL COMPLETION AND FINAL PAYMENT:
9.10.2 Add the following paragraph:

9.10.2.1 Final payment consisting of the entire unpaid balance of the Contract Amount will be paid by the Owner to the General Contractor after receipt of the Final Certificate for Payment from the Architect, Close-Out Documents, and the “Final Consent of Surety”. Final payment will be made within fourteen (14) days after documents have been received by the Owner, accepted and certified by the Architect. Final payment will not be made until all close-out documents have been submitted and approved. General Contractor will make payments to Subcontractors within fourteen (14) days after receipt of cleared funds from the Owner. Final Payment will not be made until all Close-Out Documents and As-Built Drawings have been submitted and approved. The Final Lien Waivers submitted shall be on the form bound herein and shall be submitted to the Owner within ten (10) days after final payments are made to Subcontractors.

ARTICLE 10:
PROTECTION OF PERSONS AND PROPERTY:

10.2 SAFETY OF PERSONS AND PROPERTY:
10.2.2 Add the following subparagraphs:
10.2.2.1 This requirement shall include, but not necessarily be limited to, all health, safety, and fire protection regulations of the Florida Industrial Commission and the Department of Labor Safety and Health Regulations and construction promulgated under the Occupational Safety and Health Act of 1970 (Pl9l-596) and under Section 107 of the Contract Work Hours and Safety Standards Act (P191-54). These regulations are administered by the Department of Labor who shall have full access to the Project for inspection, etc. Compliance with the above is strictly and exclusively the responsibility of the Contractor and Subcontractors and shall in no event be considered reason for additional time or monetary compensation. In the event that a hurricane or storm emergency is imminent, the Contractor and Subcontractors shall, at his own expense and without cost to the Owner, take all necessary measures to secure all his movable property, building work or plant in such a manner that no damage to public or private property or to persons may result by reason of displacement of the Contractor’s/Subcontractor's material, equipment or plant during such hurricane or storm.
10.2.7 Add the following subparagraphs:
10.2.7.1 The Subcontractor shall adequately protect preceding and existing Work from damage caused by his operations. Breakage or damage shall be repaired by the erector of the Work at cost to the party causing the damage. The Architect shall be the sole judge determining the party causing the damage.

ARTICLE 11:
INSURANCE:

11.1 CONTRACTOR'S LIABILITY INSURANCE:
11.1.1 In the first line following the word "business", insert the words "in the State of Florida and satisfactory to the Owner, such insurance...".
11.1.2 Add the following:
11.1.2.1 The insurance required by Subparagraph 11.1.1 shall be written for not less than the following, or greater if required by law.

1. Worker's Compensation:
   a. State: Statutory
   b. Employers Liability (Underlying)
      $1,000,000.00 - Each Occurrence
   c. Umbrella Limit
      $1,000,000.00
2. Comprehensive General Liability (including Premises-Operations: Independent Contractor's Protective; Products and Completed Operations Broad Form of Comprehensive General Liability):
   a. Bodily Injury: (Underlying)
      $1,000,000.00 - Each Occurrence.
      $1,000,000.00 - Annual Aggregate.
   b. Property Damage: Underlying
      $500,000.00 - Each Occurrence.
      $1,000,000.00 - Annual Aggregate.

c. Umbrella Limit:
$1,000,000.00
d. Products and Completed Operations shall be maintained for one (1) year after final payment.
e. Property Damage Liability Insurance shall provide X, C and/or U Coverage.

3. Contractual Liability:
   a. Bodily Injury:
   $1,000,000.00 - Each Occurrence.
   b. Property Damage:
   $1,000,000.00 - Each Occurrence.
   c. Personal Injury with Employment Inclusion
   Same as stated above.
4. Comprehensive Catastrophic Liability:
   a. Excess Liability: (Commercial Umbrella)
   $1,000,00.00 - Combined Single Limit.
5. Comprehensive Automobile Liability:
   a. Bodily Injury: (Underlying)
   $ 500,000.00 - Each Person.
   $1,000,00.00 - Each Occurrence.
   b. Property Damage: (Underlying)
   $500,000.00
   c. Umbrella Limit:
   $1,000,000.00
6. The insurance required by Subparagraph 11.1 shall name the Owner as an additional named insured.

11.3 PROPERTY INSURANCE:
11.3.1 Delete paragraph and substitute the following:
11.3.1 The Owner will purchase and maintain Property Insurance upon the entire Work at the site in full insurable value thereof. This insurance shall include the interest in the Work of the Owner, the Construction Manager / General Contractor and the Subcontractors, and Sub-Subcontractors, and shall insure against the perils of Fire and Extended Coverage and shall include "All Risk" insurance for physical loss or damage including, without duplication, theft, vandalism, malicious mischief, collapse, and water damage. New construction will be insured immediately upon commencement of construction. The property of the Contractors and/or their employees, such as tools and equipment, sheds, machinery, etc. will not be covered by the Owner's insurance. Each Contractor shall purchase and maintain similar Property Insurance on portions of the Work stored off site or in transit when such portions of Work are approved to be included in an Application for Payment. The deductible of $1,000 per event included in the Property Insurance shall be the responsibility of the Subcontractor.
11.3.8 Delete paragraph and substitute the following:
11.3.8 The Owner, as trustee, shall have power to adjust and settle any loss with the insurers, unless one (1) of the parties in interest shall object in writing five (5) days after the occurrence of loss, to the Owner's exercise of this power.
11.3.9 In the third sentence of Subparagraph 11.4.9, delete the words "in accordance with the award by arbitration in which case the procedure shall be as provided in Paragraph 15.3"
11.4.1.1 Contractor shall furnish Performance Bond and Payment Bond on the date of execution of the Contract.

ARTICLE 13:
MISCELLANEOUS PROVISIONS:

13.1 GOVERNING LAW:
13.1 Add the following:
13.1.1 The Subcontractors, and General Contractor shall comply with all applicable provisions of the Florida Building Code 2014 (with latest supplements), Florida Fire Prevention Code 2014, applicable portions of the Florida Administrative Code, federal, state, and local law. All limits or standards set forth in this contract to be observed in the performance of the project are minimum requirements, and shall not affect the application of more restrictive standards to the performance of the project.

13.7 COMMENCEMENT OF STATUTORY LIMITATION PERIOD:
13.7.1 Add the following:
13.7.1 As between the Owner and General Contractor: Chapter 95, Florida Statutes, shall govern limitations of actions under or resulting from this agreement.

ARTICLE 15:
CLAIMS AND DISPUTES:

15.2 INITIAL DECISION:
15.2 Delete Paragraphs in its' entirety and substitute the following:
15.2.1 Any claim, dispute or other matter in question between the General Contractor, Subcontractor and the Owner, shall be referred to the Initial Decision Maker (the Architect will serve as the Initial Decision Maker unless otherwise indicated in the agreement), except those relating to artistic effect, and except those which have been waived by the making or acceptance of final payment, shall be subject to litigation at instance of the aggrieved party. However, no litigation of any such claim, dispute or other matter may be commenced until the earlier of (1); the date on which the Initial Decision Maker had rendered a written decision, or (2); the tenth (10) day after the parties have presented their evidence to the Initial Decision Maker, or have been given a reasonable opportunity to do so, if the Initial Decision Maker has not rendered his written decision by that date. When such a written decision of the Initial Decision Maker states (1); that the decision is final, but subject to appeal, and (2); that any litigation of a dispute or other matter covered by such decisions must be made within thirty (30) days after the date on which the party making the demand received the written decision. Failure to commence litigation within said thirty (30) day period will result in the Initial Decision Maker's decision becoming final and binding upon the General Contractor, Owner and the Subcontractor.

ARTICLE 17:
EQUAL OPPORTUNITY:

ADD the following Article:
17.1 The Contractor shall maintain policies of employment compliant with Executive Order #11246 as follows:
17.1.1 Neither the Contractors or any Subcontractors shall discriminate against any employee or applicant for employment because of race, religion, color, sex, national origin, or age. Such action shall include, but not be limited to the following: employment, upgrading, demotion or transfer, recruitment or advertising; layoff or termination; rates of pay or other forms of compensation; and selection for training, including apprenticeship. The General Contractor and Subcontractors agree to post in conspicuous places, available to employees and applicants of employment, notices setting forth the policies of non-discrimination.
17.1.2 The Contractor and all Subcontractors shall, in all solicitations advertisements for employees placed by them or on their behalf, state that all qualified applicants will receive consideration for employment without regard to race, religion, color, sex, national, origin, or age.

END OF SECTION 008000

SECTION 008200 – SPECIAL CONDITIONS

TABLE OF CONTENTS:

PART I - GENERAL REQUIREMENTS:
These Special Conditions are hereby made a part of every Section of these Specifications and shall be binding upon each Contractor, Subcontractor, and Material Supplier.

ARTICLE 1: PERMITS AND FEES:

A. Building Permit: A local building permit is required for this project. The Contractor shall obtain all required approvals and inspections for the construction project through the Owner's Building Official. The Subcontractors and Suppliers shall cooperate with the Contractor in obtaining required approvals and inspections. The Owner has made arrangements with the Code South (Panama City) for Plan Review and Inspection Services and shall pay for the permit and inspection fees.
B. Utility service connection fees and required utility service fees, if any, will be paid for and coordinated by the Contractor.
C. Other Permits and Fees: Other than as noted above, the General Contractor shall obtain and pay for payment for all other permits, assessments, fees, bonds, and other charges as necessary to perform and complete the work of this contract, including any related inspection fees, in accordance with the contract between the Owner and the General Contractor.
D. The General Contractor and all Subcontractors will be subject to all applicable County and local Municipal Occupational License Fees and Taxes.

ARTICLE 2: PROJECT SIGNS:

A. The General Contractor will provide the project sign as designed by the Architect. The sign will be two 8' x 12' professionally painted (or digital printed and mounted) plywood

signs indicating the Architect, Contractor and the Owner. No other signs or advertising shall be displayed on the premises without the approval of the Architect. This does not exclude the posting of required trade notices and cautionary signage by the General Contractor or the Contractors. Directional signage indicating construction entrances, contractor parking, and other miscellaneous information shall be provided as required by the Contractor and as approved by the Owner.

B. See SECTION 015000 – TEMPORARY FACILITIES AND CONTROLS for additional requirements.

ARTICLE 3: LAYOUT OF WORK:

A. The Contractor will accurately establish all principal lines, grades, levels, building base lines, and control points. Each Contractor/Subcontractor shall lay out his own work to dimension from principal lines and be responsible for layout of his Subcontractors' work. Each Contractor shall make provision to preserve control points, monuments, stakes, bench marks, or other datum points, and if any of these should be lost or displaced through neglect of the Contractor or Subcontractor, they shall be replaced at his cost.

B. The Contractor shall be responsible for the correct location, dimensions, and elevations of his work. As the Work progresses, the Contractor shall lay out the exact locations of Work under his Contract, as a guide to all trades. Prior to any installation, HVAC, plumbing, and electrical contractors shall exchange layout drawings and coordinate the Work through the General Contractor.

C. The General Contractor shall be responsible to take such field measurements as may be required to determine the size of ordered materials. In the event "Guaranteed Dimensions" are required, the General Contractor shall advise other Contractors or Material Suppliers by use of drawings, templates, or mock-ups of the required conditions.

D. All work, and in particular piping, ducts, conduit, and similar items, shall be neatly and carefully laid out to provide the most useful space utilization and the most orderly appearance. Except as otherwise indicated or directed, piping and similar work shall be installed as close to ceilings and walls as conditions reasonably permit, located to prevent interference with other work or with the use of the spaces in the manner required by the functions of the space and the Owner. Valves and clean-outs shall be located in inconspicuous but accessible locations and shall be field verified before proceeding with any work where exposed to view. The Subcontractors shall carefully plan the layout and review any questionable installations with the General Contractor and the Architect.

ARTICLE 4: TEMPORARY FENCING AND SECURITY:

A. A temporary fencing enclosure around the work perimeter will not be required for the duration of the construction period. The General Contractor will provide and remove temporary fencing with gates at roadways for required access to the construction area, temporary facilities, storage, and staging areas. The Contractors and Subcontractors shall repair or replace fencing and surrounding areas damaged as a result of their operations. The Contractor shall remove and replace fencing and gates as required to provide access for oversized items. Temporary fencing shall be removed at the end of the project and the area shall be restored to it's original condition, or the designed condition as may be appropriate.

B. The services of a watchman will not be provided by the General Contractor, Owner or the Architect. The Contractor and each Subcontractor shall be responsible for, and make good, any loss due to theft or vandalism during construction.

C. Contractors shall advise the General Contractor and the Architect of any theft or damage which might delay the execution of the Work.

D. See SECTION 015000 – TEMPORARY FACILITIES AND CONTROLS for additional requirements.

ARTICLE 5: MATERIAL STORAGE:

A. Each Contractor shall provide sufficient protection for his materials and equipment from damages by weather or construction work. Location shall be coordinated and approved by the General Contractor. During progress of work and upon completion of the work, remove all debris and leave the area in a clean and orderly condition.
B. See SECTION 015000 – TEMPORARY FACILITIES AND CONTROLS for additional requirements.

ARTICLE 6: TEMPORARY TOILET FACILITIES:

A. The General Contractor will obtain and maintain sanitary temporary toilet facilities acceptable to the local Health Department for use by all crew and workmen.
B. Contractors will not have access to existing toilet facilities within this facility or the adjacent buildings for the use of his crew and workmen.
C. See SECTION 015000 – TEMPORARY FACILITIES AND CONTROLS for additional requirements.

ARTICLE 7: USE OF PREMISES, BARRICADES AND PROTECTION:

A. Subcontractors shall be subject to such rules and regulations for the conduct of the Work as the General Contractor, Owner or Architect may establish.
B. Before entering upon the Work, ascertain from the General Contractor, as approved by the Owner and Architect, what entrances, routes, or roadways shall be used for access to the work, and use only the entrance, routes, and roadways designed for movement of personnel, materials, and vehicles to and from the work.
C. Each Contractor shall provide and maintain in good repair barricades, fences, overhead protection, guard railings, etc., as required by law or necessary for the protection of the public and personnel engaged in the Work from hazards incidental to this contract. Do everything necessary to protect Owner's employees, the public, and workmen from injury or damage to vehicles or other property.
D. Whenever the Contractor/Subcontractor intends to depart from the normal work hours, he shall notify the General Contractor and the Architect at least twenty (20) hours in advance. Failure of the Contractor to give such timely notice may be cause for the Architect to require the removal or uncovering of the Work performed during such time without the knowledge of the Architect but is subject to the approval of the Owner.
E. Protect pavement, curbs, and all existing construction and improvements during the course of the Work and repair all parts of same which become damaged. Each Contractor and Subcontractor shall be responsible for the necessary cleaning and repairing of adjacent streets and other improvements resulting from his operations.
F. Each Contractor and Subcontractor shall be responsible for all damage to the Owner’s property and this project due to his operations under this contract. Repair or replacement of damaged items shall be to the satisfaction of the General Contractor, Owner and the Architect.
G. Provide and maintain proper shoring and bracing for existing underground utilities, sewers, and building foundations, encountered during excavation work to protect them from collapse or movement, or other type of damage until such time as they are removed or repaired, incorporated into the new work, or can be properly backfilled upon completion of new work.
H. Maintain clearances adjacent to and in connection with the work performed.
I. Each Contractor or Subcontractor shall effectively confine dust, dirt, and noise to the actual construction areas.
J. All employees shall maintain procedures as stated in the General Contractor’s safety program.
K. All Contractors and Subcontractors are required to provide on-site storage facilities in the areas designated by the General Contractor and approved by the Architect. Each Contractor shall assume full responsibility for the protection and safekeeping of products

under his control which are stored on the site. Subcontractors must move any stored products, under Subcontractor's control, which interfere with operations of the General Contractor, Owner or separate Contractor as directed by the General Contractor.

L. Contractors and Subcontractors must also obtain and pay for use of additional storage or work areas needed for his operations. The General Contractor shall receive from each Subcontractor, a receipt of shipment for all equipment stored on-site (or off-site if approved). No materials or equipment shall be removed from the site without the permission of the General Contractor and the Architect. No materials may be stored off-site unless approved in writing by the General Contractor, Architect and Owner.

M. Each Contractor shall not load or permit any part of a structure to be loaded with a weight that will endanger its safety, or the safety of persons or property.

N. All employees of the General Contractor and Subcontractors shall conduct themselves in a proper manner. Any disruptive behavior by any employee will cause that employee to be barred from the construction site and the Owner’s property. The use of AM/FM radios is prohibited. Animals are not allowed on the property.

O. All pumping, bailing, or well point equipment necessary to keep excavations and trenches free from the accumulation of water during the entire progress of this work shall be the responsibility of the Contractor performing said excavations and trenches due to their scope of work. Dispose of water in such a manner as will not endanger public health or cause damage or expense to public or private property. Abide by the requirements of any public agencies having jurisdiction.

P. General Contractor shall prepare a Safety Plan which clearly delineates areas for construction, safety barriers, exits, construction traffic during the various phases of the project prior to initiating construction.

ARTICLE 8: TEMPORARY FIELD OFFICES FACILITIES AND PARKING:

A. The General Contractor, Owner and the Architect will designate an area for construction trailers (if provided) and parking for all construction workers. Placement and schedule shall be coordinated with the General Contractor.

B. Contractors may provide a temporary field office and other temporary buildings as may be necessary for his operations as approved by the General Contractor. Storage and maintenance facilities shall be as required in accordance with the local Fire Marshall having jurisdiction. The Contractor shall arrange for the telephones and temporary electrical service in his area for their use.

C. Each Contractor or Subcontractor shall maintain his designated space for office and sheds. This includes removal of weeds, debris, and trash. Clean and restore space at completion of the work.

D. Temporary field offices and sheds shall not be used for living quarters.

E. Offices and sheds, when provided, shall be of suitable and safe design, maintenance, and appearance. Temporary facilities shall be securely anchored to the ground to resist wind speed at the specific site of construction.

F. All temporary offices and sheds must be removed within seven (7) days of written notice from the General Contractor or the Architect. Structures not removed in a timely manner will be removed by the Owner at the Contractor's expense.

ARTICLE 9: COOPERATION - DISPUTES:

A. The completion of the Project within the described time is dependent upon the close and active cooperation at all those engaged therein. Therefore, it is expressly understood and agreed that each Contractor and Subcontractor shall lay out and install his work at such time, and in such manner as not to delay or interfere with the carrying forward of the work of others, and as directed by the General Contractor.

B. In the event of any dispute arising as to possible or alleged interference between the various Subcontractors, which may retard the progress of the Work, the same shall be adjusted by the General Contractor.

ARTICLE 10: CLEANUP:

Contractors and Subcontractors shall be responsible for clean up in accordance with the General Contractor's bid package requirements.

ARTICLE 11: QUALITY CONTROL:

A. It is the General Contractor's and the Subcontractor's responsibility to familiarize himself with all required tolerances and quality assurance clauses, which appear as part of the Contract Documents. It is also the General Contractor's and the Subcontractor's responsibility to reject or condemn work performed by his forces or the Sub-Subcontractor's forces which does not comply with the requirements set forth in the Contract Documents, or as required by law, codes, etc. NOTE: If a conflict appears between the tolerances and quality assurance of published industry standards and the requirements of the Contract Documents, the Contract Document requirements will govern.

B. The Owner, Engineer and Architect will conduct periodic observations of the Work as it progresses. Should the Owner, Engineer or the Architect reject any portion of the Work, he will promptly notify the General Contractor with a Notice of Non-Conformance / Rejected Work. The General Contractor will immediately provide the responsible Contractor with a Notice of Non-Conformance / Rejected Work and upon receipt of such notification shall, within 48 hours, inform the General Contractor, Owner and Architect of his intended corrective plan of action.

C. The General Contractor and Subcontractors should be aware that no monies will be awarded against defective work until such work is completed in a manner satisfactory to the Owner and Architect. In addition, the Architect/Engineer, depending on the extent of the rejected work, may decide to withhold additional monies to compensate for the projected cost of repairs.

ARTICLE 12: CHANGES TO THE WORK:

During the course of the General Contractor's and Subcontractor's performance of the work necessary to complete the subject Project, certain events may occur which have the effect of changing the conditions under which the work is to be performed as specified and described in the Bidding Documents and/or the nature and extent of the work as specified and described in the Contract Documents. The occurrence of such events may cause the General Contractor and Subcontractors to incur greater or less cost and expense to perform the work required to complete the subject Project. The General Contractor, Subcontractor or the Owner shall respectively be entitled to either an increase or decrease in the Contract Sum, whichever is the case. The changes shall be made as documented in Section 007000 AIA form A201 and Section 008000 Supplementary General Conditions.

ARTICLE 13: PRIORITY:

A. In case of close quarters for installation of mechanical and electrical systems, and in the absence of instructions to the contrary, the following order or precedence shall be followed:
1. Special Equipment - Electric Devices
2. Light Fixtures
3. Sheet Metal Duct Work
4. Plumbing Work, including fire protection piping
5. Mechanical Work, including Electrical and A/C pipes
6. Electrical Work
7. Control System

B. After award of contracts and prior to start of construction the General Contractor will schedule a meeting with the Contractors/Subcontractors responsible for the work items listed above. The purpose of the meeting will be to introduce the coordination program and to determine its implementation in relation to the progress schedule.

C. At the initial coordination meeting, the General Contractor will provide to the HVAC and Electrical Contractors the digital AutoCad drawings for the project upon receipt of a liability release form by the Architect. The HVAC and Electrical Contractors, with reference and consideration to the structural, mechanical, electrical, fire protection, plumbing, and reflected ceiling plans, shall draw to scale, his proposed installation showing duct sizes, equipment layouts, and dimensions from column lines and from finished floors to bottom of ducts. Ductwork shall be maintained as tight as possible to the underside of floor slabs and/or beams. In congested areas, the HVAC Contractor shall, in addition, prepare drawings in section view. During this phase of the program, it shall be the Electrical Contractor's and the Fire Protection System Contractor's responsibility to furnish the HVAC Contractor with recessed lighting and sprinkler installation and clearance requirements. This information shall be outlined on the drawings by the HVAC Contractor.

D. In the event a Contractor or Subcontractor fails to cooperate in the coordination program, he will be held responsible for all costs incurred for adjustments to the work of others made necessary to accommodate the uncooperative Subcontractor's installations.

E. When a change order request is issued, the affected Contractors shall review the Coordination Drawings and bring to the attention of the General Contractor any revisions necessary to the work of others not directly affected by the change order.

ARTICLE 14: COOPERATION WITH PUBLIC SERVICE COMPANIES:

A. Contractors/Subcontractors shall notify the appropriate persons within local utilities 48 hours before commencement of any work, to verify location of existing below grade pipes, cables, poles, towers, and right-of-ways that could be hazardous to life, limb, health or property. The Contractors/Subcontractors will he held solely responsible for any damage to existing utilities, or damaged property.

ARTICLE 15: SUBSTITUTION OF MATERIALS AND EQUIPMENT:

A. All bids submitted shall be based on materials, equipment, and apparatus of the quality and make specified. The Bidder’s attention is directed to Section 255.04, Florida Statutes, which requires that on public building contracts, Florida products and labor shall be used wherever price and quality are equal. However, Bidders wishing to obtain approval of an article, device, product, material, fixture, form, or type of construction other than specified or shown by name, make, or catalog number, shall make written request to the Architect timed so as to reach the Architect at least seven (7) working days prior to the date of receipt of bids. Such requests shall be accompanied by data supporting the claim to equality or equivalence.

B. "Or Equal": The General Contractor and Subcontractors shall not decide that another product is equal or equivalent to the brand, or model specified. The Architect is solely charged with this responsibility and judgment. Where "or equal" is stated in the Specifications, it is the Architect/Engineer's and not the General Contractor’s or Subcontractor's decision as to what brands or suppliers qualify as equal, or equivalent, or do not qualify as equal or equivalent.

C. The Bidder shall submit drawings and other descriptive data of any modification, or items of assemblies, necessary to provide approved compliance with requirements and compatibility with adjacent components.

D. Approval by the Architect, if given, will be made by Addendum. Said approval will indicate that the additional article, device, product material, fixture, form, or type of construction is approved for use insofar as the requirements of this Project are concerned. However, it is the responsibility of the Contractor and Subcontractor to ensure that the approved item meets all requirements of the Contract. Bids shall not be

based on assumed acceptance of any item which has not been approved by Addendum or specified herein. If a substitute item is bid without prior written approval, the Architect holds the option to void that bid, or require that the work be incorporated as specified at no additional cost to the Owner or Architect.

E. Under no circumstance will the Architect/Engineer be required to prove that a product proposed for substitution is, or is not, equal or equivalent quality to the product specified. It is mandatory that the Bidder submit a complete description of the proposed substitute, the name of the material or equipment for which it is to be substituted, drawings, cuts, performance and test data, and any other data, samples or information necessary for a complete evaluation. Insufficient data will not be considered.

F. Where more than one (1) manufacturer's product is listed, the listing is not necessarily in order of preference, and all will be considered as equally acceptable as long as they meet the all design requirements of the Contract Documents and as determined by the Architect/Engineer.

G. The Contractor shall provide the same guarantee for an approved substitution, if approved, that is originally required for the originally specified product.

ARTICLE 16: FASTENING DEVICES:

All exposed screw and bolt heads in secure spaces throughout the Project (this specifically excludes mechanical and electrical rooms) shall comply with the following:

A. Any item which requires periodic access for maintenance shall have "spanner-head" fastening devices, or approved equal, which enables removal of the fastener with appropriate special tools.

B. All exposed fastening devices shall be of tamper-proof design, where ever possible, as approved by the Architect/Engineer.

C. All exterior fasteners shall be stainless steel unless otherwise specified by individual Sections.

ARTICLE 17: PROJECT CLOSE-OUT/DOCUMENTS:

The General Contractor, and each Subcontractor shall be responsible for collecting, identifying, and collating the following materials, as applicable to his portion of the Work, and shall submit the same (in triplicate) to the Architect. The General Contractor, shall properly organize the materials from himself and the various Contractors and Subcontractors into hard cover, 3-ring binders, and shall deliver copies of the finished books to the Architect and Engineer for verification. The Architect/Engineer will retain one (1) copy in his file and will deliver the remaining copies to the Owner for approval. This process, together with the As-Built Drawing requirements, must be completed before the Final Certificate for Payment will be issued by the Architect.

A. INDEXING: All information shall be organized with categories indexed as per the project close-out index. The individual categories shall also be organized and indexed as per Section of the Specifications.

B. LISTING OF CONTRACTOR AND SUB-CONTRACTORS: The Contractor shall provide a listing of all Sub-Contractors performing work on the site. Required information shall be as follows:

(Example)

Division 1	CM / Contractor Address	Representative's Name Phone Number
Division 2	Earth Moving and Site Grading Company Name Address	Representative's Name Title Phone Number

C. CERTIFICATE OF SUBSTANTIAL COMPLETION: The General Contractor shall insert, at this point, a copy of the fully executed Certificate of Substantial Completion on the form incorporated in the project documents, as future reference for the Owner.

D. CERTIFICATE OF STRUCTURES LOCATIONS: The General Contractor shall have a state registered surveyor certify, in writing, with seal affixed, that the location of all new structure(s) is in compliance with the Contract Documents.

E. TESTING, INSPECTIONS AND CERTIFICATE OF OCCUPANCY: The General Contractor shall provide copies of all test and balance reports from his Contractors and Subcontractors as required. (See Division 21 thru 28.) Provide copies of all Certificates of Inspection from controlling authorities for each trade, division, or section of work, as required. Provide a copy of final executed Certificate of Occupancy.

F. LIEN WAIVERS: All releases and waivers of liens from the General Contractor, Contractors, Subcontractors, and Material Suppliers shall be on the form incorporated in the project documents.

G. CONTRACTORS AFFIDAVIT OR PAYMENT OF DEBTS AND CLAIMS: The General Contractor and Subcontractors shall provide a certification on A.I.A. Document G706, Latest Edition, that all work covered by the bills of material and equipment, or other indebtedness connected with the Work for which the Owner or his property might in any way be responsible, have been paid or otherwise satisfied.

H. CONSENT OF SURETY: The General Contractor and Contractors shall provide a Consent of Surety on A.I.A. Document G707, Latest Edition.

I. WARRANTY, GUARANTEE AND BONDS:
1. The General Contractor and Contractors shall, and hereby does guarantee all Work and materials called for in the Contract Documents, including all work performed by his Subcontractors, for a minimum period of one (1) year from the date of Substantial Completion of the building, unless a longer Warranty/Guarantee time is specified by individual Sections. Walk-thru will occur during the 11th month from the date of substantial completion.
2. Warranty, guarantee and bonds will be as stated in the General Contractor’s contract.

J. INSTRUCTION/OPERATION MANUALS AND KEYS:
1. Contractors shall provide all equipment diagrams, instruction/operation manuals, wiring diagrams, and pneumatic and/or electrical control diagrams as applicable for each working characteristic of mechanical, electrical, and special equipment furnished under this Contract, and submitted at Substantial Completion.
2. The Contractors and Subcontractors shall provide a competent and experienced person(s) thoroughly familiar with the work, for a reasonable period of time to instruct the Owner's personnel in operation and maintenance of equipment, materials, and control systems. This instruction shall include normal start-up, run, stop, and emergency operations, location and operation of all controls, alarms, and alarm systems.
3. Label turn-over all keys.

K. MAINTENANCE MANUALS AND SPARE PARTS:
(All items in this Section are required prior to issuance of Certificate of Substantial Completion.)
1. Contractors shall provide all instructions and maintenance manuals for products, mechanical, electrical, and special equipment. This instruction shall include tracing the system in the field and on the diagrams in the manuals so that maintenance personnel will be thoroughly familiar with both systems and the data supplied.

2. Contractors shall submit all parts lists, spare parts, tools, fuses, bulbs, and motor listing, containing locations, motor nameplate, rating, and size of overload relay installed.
3. Contractors shall also provide all maintenance letters as listed in the specifications for manufacturer's cleaning procedures, materials and equipment to be used, including instruction as listed above.

L. AS-BUILT DRAWINGS:
1. Final corrected "As-Built" or "Record" drawings shall be complete and accepted by the Architect/Engineer. The A/E will provide digital AutoCAD 2007 drawing files to the Contractors upon receipt by the A/E of the liability release form attached in Specification Section 013310. Architect will not release documents in any other format or edition of AutoCAD. The Contractors will revise the AutoCAD drawing files in accordance with the actual construction of their work. The Subcontractors will then submit the revised documents to the General Contractor who will verify that the drawings reflect the actual construction. The General Contractor will forward approved As-Built/Record Drawings to the A/E for review.
2. Pipelines and ducts which are installed in furred spaces, pipe chases, or other spaces which can be readily inspected by the use of access panels or other means of access will not be considered as being concealed. With reference to electrical and mechanical work the exact (not diagrammatic) conduit, pipe, and duct runs shall be shown on these drawings.
3. The documents shall be prepared by a competent draftsman and printed and submitted together with six sets of black line prints of the contract drawings - marked “As-Built/Record Drawings.” In showing the changes the same legend shall be used to identify piping, etc., as was used on the contract drawings. A separate set of drawings shall be prepared for electrical, plumbing, heating, air conditioning, and ventilating work unless two (2) or more divisions are shown on the same sheets of the contract drawings, in which case the various Subcontractors shall also show their changes on the same sheets. Each sheet shall bear the date and name of the subcontractor submitting the drawings. Final payment shall not be made until said as-built documents have been received by the Architect, reviewed and accepted as complete and in accordance with the contract documents.”

ARTICLE 18: HISTORICAL AND ARCHAEOLOGICAL DATA PRESERVATION:

A. The Contractor agrees to facilitate the preservation and enhancement of structures and objects of historical, architectural or archaeological significance and when such items are found and/or unearthed during the course of project construction. Any excavation by the Contractor that uncovers an historical or archaeological artifact shall be immediately reported to the Owner and a representative of the Architect. Construction within the immediate area shall be temporarily halted pending the notification process and further directions issued by the Architect after consultation with the State Historic Preservation Officer (SHPO) for recovery of the items. *See* the National Historic Preservation Act of 1966 (80 Stat 915, 16 U.S.C. § 470) and Executive Order No. 11593 of May 31, 1971.

ARTICLE 19 ENVIRONMENTAL REQUIREMENTS:

A. Endangered Species. The Contractor shall comply with the Endangered Species Act, which provides for the protection of endangered and/or threatened species and critical habitat. Should any evidence of the presence of endangered and/or threatened species or their critical habitat be brought to the attention of the Contractor, the Contractor will immediately report this evidence to the Owner and a representative of the Architect. Construction within the affected area shall be temporarily halted pending the notification process and further directions issued by the Architect after consultation with the Florida Fish and Wildlife Conservation Commission.

ARTICLE 20: INDEMNIFICATION:

A. To be as stated in General Contractor's contract

END OF SECTION

CERTIFICATE OF SUBSTANTIAL COMPLETION

Date: Project No.

The work performed under the Contract dated _____

between GULF COAST STATE COLLEGE (the Owner)

and _____(the Contractor),

for the construction of ITB#2-2016/2017; GCSC SOFTBALL COMPLEX PROJECT (Building/Project Name)

was found to be Substantially Completed as of _____.

The term "Substantial Completion" shall mean that the construction is sufficiently completed in accordance with the Plans and Specifications, as modified in any Change Order agreed to by the parties, so that the Owner can occupy the building and/or utilize the facility/project for the use for which it was intended without hazard to the occupants or to the facility.

A list of items to be completed or corrected is appended hereto. This list may not be exhaustive and the failure to include an item on it does not alter the responsibility of the General Contractor or the Contractor to complete all the work in accordance with the Contract Documents, including authorized changes thereto.

The Contractor will complete or correct the work on the list of items appended hereto within thirty (30) calendar days from the Date of Substantial Completion.

Owner assumed full possession of the facility above described on _____.
The responsibility of the General Contractor to provide utilities, under the Contract Documents shall cease that date and the one-year warranty period or other specified warranty/guarantees so specified shall begin. Insurance coverage shall continue in accordance with provisions as amended of the Contract Documents.

_____

(Architect/Engineer) (General Contractor)

_____

(Authorized Representative) (Authorized Representative)

_____

Department of

_____

(Owner)

_____

(Authorized Representative)

CERTIFICATE OF CONTRACT COMPLETION

AGENCY: GULF COAST STATE COLLEGE

PROJECT: ITB#6-2016/2017; GCSC SOFTBALL COMPLEX PROJECT

CONTRACTOR:

CONTRACT FOR:

CONTRACT DATE: CONTRACT AMOUNT:

CONTRACTOR'S AFFIDAVIT

I solemnly swear (or affirm): That the work under the above named Contract and all Amendments thereto have been satisfactorily completed; that all amounts payable for materials, labor and other charges against the project have been paid; that no liens have been attached against the project; that no suits are pending by reason of work on the project under the Contract; that all Workers' Compensation Claims are covered by Workers' Compensation Insurance as required by law; and that all public liability claims are covered by insurance.

GENERAL CONTRACTOR: ARCHITECT:

Signature:_____ Signature: _____

(SEAL) (SEAL)

Title: _____ Title: _____

Date:_____ Date: _____

STATE OF _____

COUNTY OF _____

Personally appeared before me this _____ day of _____, 2018, known (or made known) to me to be the

(OWNER) OR (PARTNER)_____

of ,

(Corporate Officer-Title)_____

Contractor(s), who, being by me duly sworn, subscribed to the foregoing affidavit in my presence.

(Notary Public)

(Type Name):

My Commission Expires:

WARRANTY – GUARANTEE

Division No.: _____

Section No.: _____

Title No.: _____

TO: GULF COAST STATE COLLEGE

(Owner)

RE: ITB#6-2016/2017; GCSC SOFTBALL COMPLEX PROJECT

(Project Name)

(Contractor's Name) _____, does hereby certify to all guarantees and warranties taking effect on the date of Substantial Completion and shall remain in force as required by the Contract Documents for the Construction of; and further certifies that all labor, materials, equipment or items necessary to execute said guarantees and warranties shall be furnished at no cost to the Owner for the duration of each guarantee or warranty period.

(Contractor's Name) _____

(Address)

By: _____

(type name of signee below)

Title: _____

Sworn to and subscribed before me this

(NOTARIAL SEAL) _____ day of _____, 2018.

Notary Public, State of Florida

My Commission Expires:

END OF SECTION 008200

SECTION 009000 – PUBLIC ENTITY CRIMES

PART 1 - GENERAL

1.1 PUBLIC ENTITY CRIMES:

A. The following statement informs you of the provisions of paragraph (2)(a) of Section 287.133, Florida Statutes, which reads as follows: " A person or affiliate who has been placed on the convicted vendor list following a conviction for public entity crime may not submit a bid on a contract to provide any goods or services to a public entity, may not submit a bid on a contract with a public entity for the construction or repair of a public building or public work, may not be awarded or perform work as a contractor, supplier, subcontractor, or consultant under a contract with any public entity, and may not transact business with any public entity in excess of the threshold amount provide in Section 287.017, for CATEGORY TWO FOR A PERIOD OF 36 MONTHS FROM THE DATE OF BEING PLACED ON THE CONVICTED VENDOR LIST."

B. Complete the attached EXHIBIT "F" Sworn Statement and include with the Bid Form.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 009000

SECTION 009100 - TRENCH SAFETY AFFIDAVIT

_____ (NAME OF CONTRACTOR) hereby provides written assurance that compliance with applicable Trench Safety Standards identified in the Occupational Safety and Health Administration's Excavation Safety Standards, (OSHA) 29 C.F.R.S. 1926.650 Subparagraph P will be adhered to during trench excavation in accordance with tentative assignments to Florida Statute 553.60 through 553.64 inclusive (1990), "Trench Safety Act."

Description	Quantity	Unit	Unit Cost
Trench Safety			

_____
(Signature) (Date)

STATE OF _____

COUNTY OF _____

I HEREBY CERTIFY that on this day before me, an officer duly qualified to take acknowledgements, personally appeared _____, personally known to me ___, or who produced _____ as identification, and who did ___ or did not ___ take an oath, and to me known to be the person described in and who executed the foregoing instrument and acknowledged before me that he/she executed the same.

WITNESS my hand and official seal in the County and State last aforesaid this _____day of _____, 20__.

_____
Notary Public

_____
Type/Print Name

_____
Notary Public Commission No.

_____
My Commission expires:

END OF SECTION 009100

SECTION 011000 - SUMMARY

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

Section includes:

1. Project information.
2. Work covered by Contract Documents.
3. Phased construction.
4. Work by Owner.
5. Work under separate contracts.
6. Purchase contracts.
7. Owner-furnished products.
8. Access to site.
9. Coordination with occupants.
10. Work restrictions.
11. Specification and drawing conventions.

Related Section:

12. Division 01 Section "Temporary Facilities and Controls" for limitations and procedures governing temporary use of Owner's facilities.

1.3 PROJECT INFORMATION

Project Identification:

ITB#6-2016/2017 GCSC SOFTBALL COMPLEX PROJECT
FLA Project No. 4228

1. Project Location:
   GULF COAST STATE COLLEGE
   5230 West US Highway 98
   (23RD Street Property)
   Panama City, FL 32401

Owner: The District Board of Trustees of Gulf Coast State College
Contact: Mr. Jim McDougall, Director of Facilities & Operations.

Owner's Project Representative:

Dewberry|Preble-Rish
203 Aberdeen Parkway
Panama City, FL 32405
850.522.0644

Architect:
Florida Architects, Inc.
648 Florida Avenue
Panama City, Florida 32401
850.257.5400

Project Website: Secure Project Website(s) administered by the Architect will be used for purposes of managing communication and documents during the construction stage.

2. See Division 01 Section "Project Management and Coordination" for Contractor's requirements for utilizing the Project Website.

1.4 WORK COVERED BY CONTRACT DOCUMENTS

The Work of the Project is defined by the Contract Documents and generally consists of the following:

1. The Softball Complex Project includes: new parking and roadways; new and modified underground utilities and infrastructure; modified and new stormwater collection system; new concrete curbs and walkways; brick pavers; asphaltic concrete paving systems; area LED pole lighting and wireless control system; landscaping and irrigation work; new Locker Building; new pre-engineered grandstand and press box building; new dugouts; new pre-engineered storage building; sports playing field and sports lighting; score board; flagpole; and other minor improvements.

Type of Contract

2. Project will be constructed under a single prime contract.

1.5 WORK BY OWNER

General: Cooperate fully with Owner so work may be carried out smoothly, without interfering with or delaying work under this Contract or work by Owner. Coordinate the Work of this Contract with work performed by Owner.

1.6 OWNER-FURNISHED PRODUCTS

Owner may furnish some of the products to be incorporated into the project. The Work includes receiving, unloading, handling, storing, protecting, and installing Owner-furnished products and making utility / infrastructure services connections.
Owner-Furnished Products:

1. Owner has eight general area light poles and LED fixtures (see electrical drawings)

1.7 ACCESS TO SITE

General: Contractor shall have limited use of Project site for construction operations as indicated on Drawings by the Contract limits and as indicated by requirements of this Section.
Use of Site: Limit use of Project site to areas within the Contract limits indicated. Do not disturb portions of Project site beyond areas in which the Work is indicated.

1. Limits: Limit site disturbance, including earthwork and clearing of vegetation, to 40 feet beyond construction perimeter; 20 feet beyond surface walkways, patios, surface parking, and utilities less than 12 inches in diameter; 20 feet beyond primary roadway curbs and main utility branch trenches; and 25 feet beyond constructed areas with

permeable surfaces (such as pervious paving areas, stormwater detention facilities, and playing fields) that require additional staging areas in order to limit compaction in the constructed area.

2. Driveways, Walkways and Entrances: Keep driveways loading areas, and entrances serving premises clear and available to Owner, Owner's employees, and emergency vehicles at all times. Do not use these areas for parking or storage of materials.

    a. Schedule deliveries to minimize use of driveways and entrances by construction operations.
    b. Schedule deliveries to minimize space and time requirements for storage of materials and equipment on-site.

1.8 COORDINATION WITH OCCUPANTS

Owner Occupancy: Owner will NOT occupy site during entire construction period. Maintain existing exits unless otherwise indicated.

Owner Limited Occupancy of Completed Areas of Construction: Owner reserves the right to occupy and to place and install equipment in completed portions of the Work, prior to Substantial Completion of the Work, provided such occupancy does not interfere with completion of the Work. Such placement of equipment and limited occupancy shall not constitute acceptance of the total Work.

1. Architect will prepare a Certificate of Substantial Completion for each specific portion of the Work to be occupied prior to Owner acceptance of the completed Work.
2. Obtain a Certificate of Occupancy from authorities having jurisdiction before limited Owner occupancy.
3. Before limited Owner occupancy, mechanical and electrical systems shall be fully operational, and required tests and inspections shall be successfully completed. On occupancy, Owner will operate and maintain mechanical and electrical systems serving occupied portions of Work.
4. On occupancy, Owner will assume responsibility for maintenance and custodial service for occupied portions of Work.

1.9 WORK RESTRICTIONS

Work Restrictions, General: Comply with restrictions on construction operations.

1. Comply with limitations on use of public streets and other requirements of authorities having jurisdiction.

On-Site Work Hours: Limit work on the property to working hours of 7:00 a.m. to 10:00 p.m., Monday through Friday, except as otherwise indicated or as approved by the Owner.

2. Weekend Hours: None without Owner’s permission.
3. Early Morning Hours: 4:00 a.m. to 7:00 a.m. with Owners permission.

Existing Utility Interruptions: Do not interrupt utilities serving facilities occupied by Owner or others unless permitted under the following conditions and then only after providing temporary utility services according to requirements indicated:

4. Notify Architect and Owner not less than two (2) days in advance of proposed utility interruptions.
5. Obtain Owner's written permission before proceeding with utility interruptions.

Noise, Vibration, Dust, and Odors: Coordinate operations that may result in high levels of noise and vibration, dust, odors, or other disruption to Owner occupancy with Owner.

6. Notify Architect and Owner not less than two (2) days in advance of proposed disruptive operations.
7. Obtain Owner's written permission before proceeding with disruptive operations.

Nonsmoking Campus: Smoking is not permitted at any stage of construction or during construction operations.
Controlled Substances: Use of tobacco products and other controlled substances on the Project site is not permitted.
Employee Identification: Provide identification tags for Contractor personnel working on the Project site. Require personnel to utilize identification tags at all times.
Employee Screening: Comply with Owner's requirements regarding drug and background screening of Contractor personnel working on the Project site.

8. Maintain list of approved screened personnel with Owner's Representative.

1.10 SPECIFICATION AND DRAWING CONVENTIONS

Specification Content: The Specifications use certain conventions for the style of language and the intended meaning of certain terms, words, and phrases when used in particular situations. These conventions are as follows:

1. Imperative mood and streamlined language are generally used in the Specifications. The words "shall," "shall be," or "shall comply with," depending on the context, are implied where a colon (:) is used within a sentence or phrase.
2. Specification requirements are to be performed by Contractor unless specifically stated otherwise.

Division 01 General Requirements: Requirements of Sections in Division 01 apply to the Work of all Sections in the Specifications.
Drawing Coordination: Requirements for materials and products identified on the Drawings are described in detail in the Specifications. One or more of the following are used on the Drawings to identify materials and products:

3. Terminology: Materials and products are identified by the typical generic terms used in the individual Specifications Sections.
4. Abbreviations: Materials and products are identified by abbreviations published as part of the U.S. National CAD Standard and/or as scheduled on Drawings.
5. Architectural Dictionary: A Concise Dictionary of Architectural Terms By John Henry Parker

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 011000

SECTION 012500 - SUBSTITUTION PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section includes administrative and procedural requirements for substitutions.
B. Related Sections:

1. Division 01 Section "Alternates" for products selected under an alternate (if included).
2. Division 01 Section "Product Requirements" for requirements for submitting comparable product submittals for products by listed manufacturers.
3. Divisions 02 through 49 Sections for specific requirements and limitations for substitutions.

1.3 DEFINITIONS

A. Substitutions: Changes in products, materials, equipment, and methods of construction from those required by the Contract Documents and proposed by Contractor.

1. Substitutions for Cause: Changes proposed by Contractor that are required due to changed Project conditions, such as unavailability of product, regulatory changes, or unavailability of required warranty terms.
2. Substitutions for Convenience: Changes proposed by Contractor or Owner that are not required in order to meet other Project requirements but may offer advantage to Contractor or Owner.

1.4 SUBMITTALS

A. Substitution Requests: Requests for substitution will not be accepted by the Architect after the bidding process and only in accordance with Section 008200, Special Conditions (Article 15, Substitution of Materials and Equipment) unless the Architect agrees to consider afterwards. Submit three copies of each request for consideration. Identify product or fabrication or installation method to be replaced. Include Specification Section number and title and Drawing numbers and titles.

1. Submit Request for Substitution at least thirty (30) days prior to the scheduled submittal date of the specified product or service noted in paragraph “A” above.
2. Documentation: Show compliance with requirements for substitutions and the following, as applicable:

a. Statement indicating why specified product or fabrication or installation cannot be provided, if applicable.
b. Coordination information, including a list of changes or modifications needed to other parts of the Work and to construction to be performed by Owner and

separate contractors, that will be necessary to accommodate proposed substitution.

c. Detailed comparison of significant qualities of proposed substitution with those of the Work specified. Include annotated copy of applicable specification section. Significant qualities may include attributes such as performance, weight, size, durability, visual effect, sustainable design characteristics, warranties, and specific features and requirements indicated. Indicate deviations, if any, from the Work specified.
d. Product Data, including drawings and descriptions of products and fabrication and installation procedures.
e. Samples, where applicable or requested.
f. Certificates and qualification data, where applicable or requested.
g. List of similar installations for completed projects with project names and addresses and names and addresses of architects and owners.
h. Material test reports from a qualified testing agency indicating and interpreting test results for compliance with requirements indicated.
i. Research reports evidencing compliance with building code in effect for Project, from FBC.
j. Detailed comparison of Contractor's construction schedule using proposed substitution with products specified for the Work, including effect on the overall Contract Time. If specified product or method of construction cannot be provided within the Contract Time, include letter from manufacturer, on manufacturer's letterhead, stating date of receipt of purchase order, lack of availability, or delays in delivery.
k. Cost information, including a proposal of change, if any, in the Contract Sum.
l. Contractor's certification that proposed substitution complies with requirements in the Contract Documents except as indicated in substitution request, is compatible with related materials, and is appropriate for applications indicated.
m. Contractor's waiver of rights to additional payment or time that may subsequently become necessary because of failure of proposed substitution to produce indicated results.

3. Architect's Action: If necessary, Architect will request additional information or documentation for evaluation within seven days of receipt of a request for substitution. Architect will notify Contractor of acceptance or rejection of proposed substitution within 10 days of receipt of request, or seven days of receipt of additional information or documentation, whichever is later.

a. Forms of Acceptance: Change Order, Construction Change Directive, or Architect's Supplemental Instructions for minor changes in the Work.
b. Use product specified if Architect does not issue a decision on use of a proposed substitution within time allocated.

1.5 QUALITY ASSURANCE

A. Compatibility of Substitutions: Investigate and document compatibility of proposed substitution with related products and materials. Engage qualified testing agency to perform compatibility tests recommended by manufacturers.

1.6 PROCEDURES

A. Coordination: Modify or adjust affected work as necessary to integrate work of the approved substitutions.

PART 2 - PRODUCTS

2.1 SUBSTITUTIONS

A. Substitutions for Cause: Submit requests for substitution immediately upon discovery of need for change, but not later than 10 days prior to time required for preparation and review of related submittals.

1. Conditions: Architect will consider Contractor's request for substitution when the following conditions are satisfied. If the following conditions are not satisfied, Architect will return requests without action, except to record noncompliance with these requirements:

a. Requested substitution is consistent with the Contract Documents and will produce indicated results.
b. Requested substitution will not adversely affect the calculated LEED credits for the project.
c. Substitution request is fully documented and properly submitted including all credits due the Owner as a result of accepting this request.
d. Requested substitution will not adversely affect Contractor's construction schedule.
e. Requested substitution has received necessary approvals of authorities having jurisdiction; including NOA’s where required.
f. Requested substitution is compatible with all portions of the Work.
g. Requested substitution has been coordinated with all portions of the Work.
h. Requested substitution provides either specified or extended warranty.
i. If requested substitution involves more than one contractor, requested substitution has been coordinated with all other portions of the Work, is uniform and consistent, is compatible with all other products, and is acceptable to all contractors involved.

B. Substitutions for Convenience: Architect will consider requests for substitution if received within 30 days after the Notice to Proceed. Requests received after that time may be considered or rejected at discretion of Architect.

1. Conditions: Architect will consider Contractor's request for substitution when the following conditions are satisfied. If the following conditions are not satisfied, Architect will return requests without action, except to record noncompliance with these requirements:

a. Requested substitution offers Owner a substantial advantage in cost, time, energy conservation, or other considerations, after deducting additional responsibilities Owner must assume. Owner's additional responsibilities include compensation to Architect for redesign and evaluation services, increased cost of other construction by Owner, and other similar considerations.
b. Requested substitution is not of foreign manufacture and/or the manufacturer is not currently under investigation or litigation for production of products, or have been found guilty of production of products, that contain chemicals that may be harmful to human health.
c. Requested substitution will not adversely affect the calculated LEED credits for the project.
d. Requested substitution does not require revisions to the Contract Documents. If changes to the documents are contemplated, additional Owner responsibilities have been included as noted in no. one (1) above
e. Requested substitution is consistent with the Contract Documents and will produce indicated results.
f. Substitution request is fully documented and properly submitted.
g. Requested substitution will not adversely affect Contractor's construction schedule.
h. Requested substitution has received necessary approvals of authorities having jurisdiction; including NOA’s where required.
i. Requested substitution is compatible with all other portions of the Work.
j. Requested substitution has been coordinated with all other portions of the Work.
k. Requested substitution provides either specified or extended warranty.

l. If requested substitution involves more than one contractor, requested substitution has been coordinated with all other portions of the Work, is uniform and consistent, is compatible with all other products, and is acceptable to all contractors involved.

PART 3 - EXECUTION (Not Used)

END OF SECTION 012500

SECTION 012600 - CONTRACT MODIFICATION PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section includes administrative and procedural requirements for handling and processing Contract modifications.
B. Related Sections:

1. Division 01 Section "Product Requirements" for administrative procedures for handling requests for substitutions made after Contract award.

1.3 MINOR CHANGES IN THE WORK

A. Architect will issue supplemental instructions authorizing minor changes in the Work, not involving adjustment to the Contract Sum or the Contract Time, on AIA Document G710, "Architect's Supplemental Instructions."

1.4 PROPOSAL REQUESTS

A. Owner-Initiated Proposal Requests: Architect will issue a detailed description of proposed changes in the Work that may require adjustment to the Contract Sum or the Contract Time. If necessary, the description will include supplemental or revised Drawings and Specifications.

1. Proposal Requests issued by Architect are not instructions either to stop work in progress or to execute the proposed change.
2. Within time specified in Proposal Request or 10 days, when not otherwise specified, after receipt of Proposal Request, submit a quotation estimating cost adjustments to the Contract Sum and the Contract Time necessary to execute the change.

a. Include a list of quantities of products required or eliminated and unit costs, with total amount of purchases and credits to be made. If requested, furnish survey data to substantiate quantities.
b. Indicate applicable taxes, delivery charges, equipment rental, and amounts of trade discounts.
c. Include costs of labor and supervision directly attributable to the change.
d. Include an updated Contractor's construction schedule that indicates the effect of the change, including, but not limited to, changes in activity duration, start and finish times, and activity relationship. Use available total float before requesting an extension of the Contract Time.
e. Quotation Form: Use forms acceptable to Architect.

B. Contractor-Initiated Proposals: If latent or changed conditions require modifications to the Contract, Contractor may initiate a claim by submitting a request for a change to Architect.

1. Include a statement outlining reasons for the change and the effect of the change on the Work. Provide a complete description of the proposed change. Indicate the effect of the proposed change on the Contract Sum and the Contract Time.
2. Include a list of quantities of products required or eliminated and unit costs, with total amount of purchases and credits to be made. If requested, furnish survey data to substantiate quantities.
3. Indicate applicable taxes, delivery charges, equipment rental, and amounts of trade discounts.
4. Include costs of labor and supervision directly attributable to the change.
5. Include an updated Contractor's construction schedule that indicates the effect of the change, including, but not limited to, changes in activity duration, start and finish times, and activity relationship. Use available total float before requesting an extension of the Contract Time.
6. Comply with requirements in Division 01 Section "Substitution Procedures" if the proposed change requires substitution of one product or system for product or system specified.
7. Proposal Request Form: Use form acceptable to Architect.

1.5 CHANGE ORDER PROCEDURES

A. On Owner's approval of a Proposal Request, Architect will issue a Change Order for signatures of Owner and Contractor on AIA Document G701.

1.6 CONSTRUCTION CHANGE DIRECTIVE

A. Construction Change Directive: Architect may issue a Construction Change Directive on AIA Document G714. Construction Change Directive instructs Contractor to proceed with a change in the Work, for subsequent inclusion in a Change Order.

1. Construction Change Directive contains a description of change in the Work. It also designates method to be followed to determine change in the Contract Sum or the Contract Time.

B. Documentation: Maintain detailed records on a time and material basis of work required by the Construction Change Directive.

1. After completion of change, submit an itemized account and supporting data necessary to substantiate cost and time adjustments to the Contract.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 012600

SECTION 012900 - PAYMENT PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section includes administrative and procedural requirements necessary to prepare and process Applications for Payment.
B. Related Requirements:

1. Division 01 Section "Supplementary General Conditions" for additional dates for processing the Application for Payment.
2. Division 01 Section "Allowances" for procedural requirements governing the handling and processing of allowances if specified.
3. Division 01 Section "Unit Prices" for administrative requirements governing the use of unit prices if specified.
4. Division 01 Section "Contract Modification Procedures" for administrative procedures for handling changes to the Contract.
5. Division 01 Section "Construction Progress Documentation" for administrative requirements governing the preparation and submittal of the Contractor's construction schedule.
6. Division 01 sustainable design requirements Section for administrative requirements governing submittal of cost breakdown information required for LEED documentation if specified.

1.3 DEFINITIONS

A. Schedule of Values: A statement furnished by Contractor allocating portions of the Contract Sum to various portions of the Work and used as the basis for reviewing Contractor's Applications for Payment.

1.4 SCHEDULE OF VALUES

A. Coordination: Coordinate preparation of the schedule of values with preparation of Contractor's construction schedule. Cost-loaded Critical Path Method Schedule may serve to satisfy requirements for the schedule of values.

1. Coordinate line items in the schedule of values with other required administrative forms and schedules, including the following:

a. Application for Payment forms with continuation sheets.
b. Submittal schedule.
c. Items required to be indicated as separate activities in Contractor's construction schedule.

2. Submit the schedule of values to Architect at earliest possible date, but no later than seven days before the date scheduled for submittal of initial Applications for Payment.
3. Subschedules for Separate Elements of Work: Where the Contractor's construction schedule defines separate elements of the Work, provide subschedules showing values coordinated with each element.

B. Format and Content: Use Project Manual table of contents as a guide to establish line items for the schedule of values. Provide at least one line item for each Specification Section.

1. Identification: Include the following Project identification on the schedule of values:

    a. Project name and location.
    b. Name of Architect.
    c. Architect's project number.
    d. Contractor's name and address.
    e. Date of submittal.

2. Arrange schedule of values consistent with format of AIA Document G703.
3. Provide a breakdown of the Contract Sum in enough detail to facilitate continued evaluation of Applications for Payment and progress reports. Coordinate with Project Manual table of contents. Provide multiple line items for principal subcontract amounts in excess of five percent of the Contract Sum.

    a. Include separate line items under Contractor and principal subcontracts for LEED documentation and other Project closeout requirements in an amount totaling five percent of the Contract Sum and subcontract amount.

4. Round amounts to nearest whole dollar; total shall equal the Contract Sum.
5. Provide a separate line item in the schedule of values for each part of the Work where Applications for Payment may include materials or equipment purchased or fabricated and stored, but not yet installed.

    a. Differentiate between items stored on-site and items stored off-site. If required, include evidence of insurance.

6. Provide separate line items in the schedule of values for initial cost of materials, for each subsequent stage of completion, and for total installed value of that part of the Work.
7. Allowances: Provide a separate line item in the schedule of values for each allowance. Show line-item value of unit-cost allowances, as a product of the unit cost, multiplied by measured quantity. Use information indicated in the Contract Documents to determine quantities.
8. Purchase Contracts: Provide a separate line item in the schedule of values for each purchase contract. Show line-item value of purchase contract. Indicate owner payments or deposits, if any, and balance to be paid by Contractor.
9. Each item in the schedule of values and Applications for Payment shall be complete. Include total cost and proportionate share of general overhead and profit for each item.

    a. Temporary facilities and other major cost items that are not direct cost of actual work-in-place may be shown either as separate line items in the schedule of values or distributed as general overhead expense, at Contractor's option.

10. Schedule Updating: Update and resubmit the schedule of values before the next Applications for Payment when Change Orders, Construction Change Directives, or Owner Direct Purchases result in a change in the Contract Sum.

1.5 APPLICATIONS FOR PAYMENT

A. Each Application for Payment following the initial Application for Payment shall be consistent with previous applications and payments as certified by Architect and paid for by Owner.

1. Initial Application for Payment, Application for Payment at time of Substantial Completion, and final Application for Payment involve additional requirements.

B. Payment Application Times: Submit Application for Payment to Architect by the 25th of the month. The period covered by each Application for Payment is one month, ending on the 18th.

1. Submit draft copy of Application for Payment seven days prior to due date for review by Architect.

C. Application for Payment Forms: Use AIA Document G702 and AIA Document G703 as form for Applications for Payment.

D. Application Preparation: Complete every entry on form. Notarize and execute by a person authorized to sign legal documents on behalf of Contractor. Architect will return incomplete applications without action.

1. Entries shall match data on the schedule of values and Contractor's construction schedule. Use updated schedules if revisions were made.
2. Include amounts for work completed following previous Application for Payment, whether or not payment has been received. Include only amounts for work completed at time of Application for Payment.
3. Include amounts of Change Orders and Construction Change Directives issued before last day of construction period covered by application.
4. Indicate separate amounts for work being carried out under Owner-requested project acceleration.

E. Stored Materials: Include in Application for Payment amounts applied for materials or equipment purchased or fabricated and stored, but not yet installed. Differentiate between items stored on-site and items stored off-site.

1. Provide certificate of insurance, evidence of transfer of title to Owner, and consent of surety to payment, for stored materials.
2. Provide supporting documentation that verifies amount requested, such as paid invoices. Match amount requested with amounts indicated on documentation; do not include overhead and profit on stored materials.
3. Provide summary documentation for stored materials indicating the following:

    a. Value of materials previously stored and remaining stored as of date of previous Applications for Payment.
    b. Value of previously stored materials put in place after date of previous Application for Payment and on or before date of current Application for Payment.
    c. Value of materials stored since date of previous Application for Payment and remaining stored as of date of current Application for Payment.

F. Transmittal: Submit four signed and notarized original copies of each Application for Payment to Architect by a method ensuring receipt within 24 hours. One copy shall include waivers of lien and similar attachments if required.

1. Transmit each copy with a transmittal form listing attachments and recording appropriate information about application.

G. Waivers of Mechanic's Lien: With each Application for Payment, submit waivers of mechanic's liens from subcontractors, sub-subcontractors, and suppliers for construction period covered by the previous application.

1. Submit partial waivers on each item for amount requested in previous application, after deduction for retainage, on each item.
2. When an application shows completion of an item, submit conditional final or full waivers.
3. Owner reserves the right to designate which entities involved in the Work must submit waivers.
4. Submit final Application for Payment with or preceded by conditional final waivers from every entity involved with performance of the Work covered by the application who is lawfully entitled to a lien.
5. Waiver Forms: Submit executed waivers of lien on forms, acceptable to Owner.

H. Initial Application for Payment: Administrative actions and submittals that must precede or coincide with submittal of first Application for Payment include the following:

1. List of subcontractors.
2. Schedule of values.
3. Submittal for project materials cost data.
4. Contractor's construction schedule (preliminary if not final).
5. Products list (preliminary if not final).
6. Schedule of unit prices.
7. Submittal schedule (preliminary if not final).
8. List of Contractor's staff assignments.
9. Copies of building permits.
10. Copies of authorizations and licenses from authorities having jurisdiction for performance of the Work.
11. Initial progress report.
12. Report of preconstruction conference.
13. Certificates of insurance and insurance policies.
14. Performance and payment bonds.
15. Data needed to acquire Owner's insurance.

I. Application for Payment at Substantial Completion: After Architect issues the Certificate of Substantial Completion, submit an Application for Payment showing 100 percent completion for portion of the Work claimed as substantially complete.

1. Include documentation supporting claim that the Work is substantially complete and a statement showing an accounting of changes to the Contract Sum.
2. This application shall reflect Certificate(s) of Substantial Completion issued previously for Owner occupancy of designated portions of the Work.

J. Final Payment Application: After completing Project closeout requirements, submit final Application for Payment with releases and supporting documentation not previously submitted and accepted, including, but not limited, to the following:

1. Evidence of completion of Project closeout requirements.
2. Insurance certificates for products and completed operations where required and proof that taxes, fees, and similar obligations were paid.
3. Updated final statement, accounting for final changes to the Contract Sum.
4. AIA Document G706, "Contractor's Affidavit of Payment of Debts and Claims."
5. AIA Document G706A, "Contractor's Affidavit of Release of Liens."
6. AIA Document G707, "Consent of Surety to Final Payment."
7. Evidence that claims have been settled.
8. Final liquidated damages settlement statement.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 012900

SECTION 013100 - PROJECT MANAGEMENT AND COORDINATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section includes administrative provisions for coordinating construction operations on Project including, but not limited to, the following:

1. General project coordination procedures.
2. Administrative and supervisory personnel.
3. Requests for Information (RFIs).
4. Project Website.
5. Project meetings.

B. Related Sections:

1. Division 01 Section "Construction Progress Documentation" for preparing and submitting Contractor's construction schedule.
2. Division 01 Section "Execution" for procedures for coordinating general installation and field-engineering services, including establishment of benchmarks and control points.
3. Division 01 Section "Closeout Procedures" for coordinating closeout of the Contract.

1.3 DEFINITIONS

A. RFI: Request from Owner, Architect, or Contractor seeking information from each other during construction.

1.4 COORDINATION

A. Coordination: Coordinate construction operations included in different Sections of the Specifications to ensure efficient and orderly installation of each part of the Work. Coordinate construction operations, included in different Sections that depend on each other for proper installation, connection, and operation.

1. Schedule construction operations in sequence required to obtain the best results where installation of one part of the Work depends on installation of other components, before or after its own installation.
2. Coordinate installation of different components to ensure maximum performance and accessibility for required maintenance, service, and repair.
3. Make adequate provisions to accommodate items scheduled for later installation.

B. Prepare memoranda for distribution to each party involved, outlining special procedures required for coordination. Include such items as required notices, reports, and list of attendees at meetings.

1. Prepare similar memoranda for Owner and separate contractors if coordination of their Work is required.

C. Administrative Procedures: Coordinate scheduling and timing of required administrative procedures with other construction activities to avoid conflicts and to ensure orderly progress of the Work. Such administrative activities include, but are not limited to, the following:

1. Preparation of Contractor's construction schedule.
2. Preparation of the schedule of values.
3. Installation and removal of temporary facilities and controls.
4. Delivery and processing of submittals.
5. Progress meetings.
6. Pre-installation conferences.
7. Project closeout activities.
8. Startup and adjustment of systems.
9. Project closeout activities.

D. Conservation: Coordinate construction activities to ensure that operations are carried out with consideration given to conservation of energy, water, and materials. Coordinate use of temporary utilities to minimize waste.

1. Salvage materials and equipment involved in performance of, but not actually incorporated into, the Work. Refer to other Sections for disposition of salvaged materials that are designated as Owner's property.

1.5 KEY PERSONNEL

A. Key Personnel Names: Within 10 days of starting construction operations, submit a list of key personnel assignments, including superintendent and other personnel in attendance at Project site. Identify individuals and their duties and responsibilities; list addresses and telephone numbers, including home, office, and cellular telephone numbers and email addresses. Provide names, addresses, and telephone numbers of individuals assigned as standbys in the absence of individuals assigned to Project.

1. Post copies of list in project meeting room, in temporary field office, on Project Website, and by each temporary telephone. Keep list current at all times.

1.6 REQUESTS FOR INFORMATION (RFIs)

A. General: Immediately on discovery of the need for additional information or interpretation of the Contract Documents, Contractor shall prepare and submit an RFI in the form specified.

1. Architect will return RFIs submitted to Architect by other entities controlled by Contractor with no response.
2. Coordinate and submit RFIs in a prompt manner so as to avoid delays in Contractor's work or work of subcontractors.

B. Frivolous RFIs

1. RFIs submitted to the Architect, where the response is clearly obvious in the contract documents, shall be returned indicating only where the response may be located.
2. The time involved in reviewing the documents to locate the response and the time required to prepare the response shall be billed to the Construction Manager at the Project Architect’s prevailing wage rate.

C. Content of the RFI: Include a detailed, legible description of item needing information or interpretation and the following:

1. Project name.
2. Project number.
3. Date.
4. Name of Contractor.
5. Name of Architect.
6. RFI number, numbered sequentially.
7. RFI subject.
8. Specification Section number and title and related paragraphs, as appropriate.
9. Drawing number and detail references, as appropriate.
10. Field dimensions and conditions, as appropriate.
11. Contractor's suggested resolution. If Contractor's solution(s) impacts the Contract Time or the Contract Sum, Contractor shall state impact in the RFI.
12. Contractor's signature.
13. Attachments: Include sketches, descriptions, measurements, photos, Product Data, Shop Drawings, coordination drawings, and other information necessary to fully describe items needing interpretation.

    a. Include dimensions, thicknesses, structural grid references, and details of affected materials, assemblies, and attachments on attached sketches.

D. RFI Forms: [AIA Document G716].

E. Architect's Action: Architect will review each RFI, determine action required, and respond. Allow seven working days for Architect's response for each RFI. RFIs received by Architect after 1:00 p.m. will be considered as received the following working day.

1. The following RFIs will be returned without action:

    a. Requests for approval of submittals.
    b. Requests for approval of substitutions.
    c. Requests for coordination information already indicated in the Contract Documents.
    d. Requests for adjustments in the Contract Time or the Contract Sum.
    e. Requests for interpretation of Architect's actions on submittals.
    f. Incomplete RFIs or inaccurately prepared RFIs.

2. Architect's action may include a request for additional information, in which case Architect's time for response will date from time of receipt of additional information.
3. Architect's action on RFIs that may result in a change to the Contract Time or the Contract Sum may be eligible for Contractor to submit Change Proposal according to Division 01 Section "Contract Modification Procedures."

    a. If Contractor believes the RFI response warrants change in the Contract Time or the Contract Sum, notify Architect in writing within 7 days of receipt of the RFI response.

F. On receipt of Architect's action, update the RFI log and immediately distribute the RFI response to affected parties. Review response and notify Architect within seven days if Contractor disagrees with response.

G. RFI Log: Prepare, maintain, and submit a tabular log of RFIs organized by the RFI number. Submit log weekly. Use software log that is part of Project Website or can be posted to the Project Website. Include the following:

1. Project name.
2. Name and address of Contractor.
3. Name and address of Architect.
4. RFI number including RFIs that were dropped and not submitted.

5. RFI description.
6. Date the RFI was submitted.
7. Date Architect's response was received.
8. Identification of related Minor Change in the Work, Construction Change Directive, and Proposal Request, as appropriate.

1.7 PROJECT WEBSITE

A. Use Architect's Project Website for purposes of hosting and managing project communication and documentation until Final Completion. Project Website shall include the following functions:

1. Project directory.
2. Project correspondence.
3. Meeting minutes.
4. Contract modifications forms and logs.
5. RFI forms and logs.
6. Task and issue management.
7. Photo documentation.
8. Schedule and calendar management.
9. Submittals forms and logs.
10. Payment application forms.
11. Drawing and specification document hosting, viewing, and updating.
12. Online document collaboration.
13. Reminder and tracking functions.
14. Archiving functions.

B. Upon completion of Project, provide one complete archive copy of Project Website files to Owner and to Architect in a digital storage format acceptable to the Architect.

C. Provide the following Project Website software packages under their current published licensing agreements:

1. Basecamp by 37 Signals.

D. Contractor, subcontractors, and other parties granted access by the Contractor to project Website shall execute a data licensing agreement in the form of Agreement included in this Project Manual.

1.8 PROJECT MEETINGS

A. General: Schedule and conduct meetings and conferences at Project site, unless otherwise indicated.

1. Attendees: Inform participants and others involved, and individuals whose presence is required, of date and time of each meeting. Notify Owner and Architect of scheduled meeting dates and times.
2. Agenda: Prepare the meeting agenda. Distribute the agenda to all invited attendees.
3. Minutes: Entity responsible for conducting meeting will record significant discussions and agreements achieved. Distribute the meeting minutes to everyone concerned, including Owner and Architect, within three days of the meeting.

B. Preconstruction Conference: Schedule and conduct a preconstruction conference before starting construction, at a time convenient to Owner and Architect, but no later than 15 days after execution of the Agreement.

1. Conduct the conference to review responsibilities and personnel assignments.

2. Attendees: Authorized representatives of Owner, Owner's Commissioning Authority, Architect, and their consultants; Contractor and its superintendent; major subcontractors; suppliers; and other concerned parties shall attend the conference. Participants at the conference shall be familiar with Project and authorized to conclude matters relating to the Work.
3. Agenda: Discuss items of significance that could affect progress, including the following:

    a. Tentative construction schedule.
    b. Critical work sequencing and long-lead items.
    c. Designation of key personnel and their duties.
    d. Lines of communications.
    e. Procedures for processing field decisions and Change Orders.
    f. Procedures for RFIs.
    g. Procedures for testing and inspecting.
    h. Procedures for processing Applications for Payment.
    i. Distribution of the Contract Documents.
    j. Submittal procedures.
    k. Sustainable design requirements.
    l. Preparation of record documents.
    m. Use of the premises and existing building.
    n. Work restrictions.
    o. Working hours.
    p. Owner's occupancy requirements.
    q. Responsibility for temporary facilities and controls.
    r. Procedures for moisture and mold control.
    s. Procedures for disruptions and shutdowns.
    t. Construction waste management and recycling.
    u. Parking availability.
    v. Office, work, and storage areas.
    w. Equipment deliveries and priorities.
    x. First aid.
    y. Security.
    z. Progress cleaning.

4. Minutes: Entity responsible for conducting meeting will record and distribute meeting minutes.

C. Preinstallation Conferences: Conduct a preinstallation conference at Project site before each construction activity that requires coordination with other construction.

1. Attendees: Installer and representatives of manufacturers and fabricators involved in or affected by the installation and its coordination or integration with other materials and installations that have preceded or will follow, shall attend the meeting. Advise Architect, and Owner's Commissioning Authority, of scheduled meeting dates.
2. Agenda: Review progress of other construction activities and preparations for the particular activity under consideration, including requirements for the following:

    a. Contract Documents.
    b. Options.
    c. Related RFIs.
    d. Related Change Orders.
    e. Purchases.
    f. Deliveries.
    g. Submittals.
    h. Review of mockups.
    i. Possible conflicts.
    j. Compatibility problems.
    k. Time schedules.
    l. Weather limitations.

m. Manufacturer's written recommendations.
n. Warranty requirements.
o. Compatibility of materials.
p. Acceptability of substrates.
q. Temporary facilities and controls.
r. Space and access limitations.
s. Regulations of authorities having jurisdiction.
t. Testing and inspecting requirements.
u. Installation procedures.
v. Coordination with other work.
w. Required performance results.
x. Protection of adjacent work.
y. Protection of construction and personnel.

3. Record significant conference discussions, agreements, and disagreements, including required corrective measures and actions.
4. Reporting: Distribute minutes of the meeting to each party present and to other parties requiring information.
5. Do not proceed with installation if the conference cannot be successfully concluded. Initiate whatever actions are necessary to resolve impediments to performance of the Work and reconvene the conference at earliest feasible date.

D. Project Closeout Conference: Schedule and conduct a Project closeout conference, at a time convenient to Owner and Architect, but no later than 14 days prior to the scheduled date of Substantial Completion.

1. Conduct the conference to review requirements and responsibilities related to Project closeout.
2. Attendees: Authorized representatives of Owner, Owner's Commissioning Authority, Architect, and their consultants; Contractor and its superintendent; major subcontractors; suppliers; and other concerned parties shall attend the meeting. Participants at the meeting shall be familiar with Project and authorized to conclude matters relating to the Work.
3. Agenda: Discuss items of significance that could affect or delay Project closeout, including the following:

a. Preparation of record documents.
b. Procedures required prior to inspection for Substantial Completion and for final inspection for acceptance.
c. Submittal of written warranties.
d. Requirements for preparing operations and maintenance data.
e. Requirements for demonstration and training.
f. Preparation of Contractor's punch list.
g. Procedures for processing Applications for Payment at Substantial Completion and for final payment.
h. Submittal procedures.
i. Owner's partial occupancy requirements.
j. Installation of Owner's furniture, fixtures, and equipment.
k. Responsibility for removing temporary facilities and controls.

4. Minutes: Entity conducting meeting will record and distribute meeting minutes.

E. Progress Meetings: Conduct progress meetings at weekly intervals.

1. Coordinate dates of meetings with preparation of payment requests.
2. Attendees: In addition to representatives of Owner, Owner's Commissioning Authority and Architect, each contractor, subcontractor, supplier, and other entity concerned with current progress or involved in planning, coordination, or performance of future activities

shall be represented at these meetings. All participants at the meeting shall be familiar with Project and authorized to conclude matters relating to the Work.

3. Agenda: Review and correct or approve minutes of previous progress meeting. Review other items of significance that could affect progress. Include topics for discussion as appropriate to status of Project.

    a. Contractor's Construction Schedule: Review progress since the last meeting. Determine whether each activity is on time, ahead of schedule, or behind schedule, in relation to Contractor's construction schedule. Determine how construction behind schedule will be expedited; secure commitments from parties involved to do so. Discuss whether schedule revisions are required to ensure that current and subsequent activities will be completed within the Contract Time.

        1) Review schedule for next period.

    b. Review present and future needs of each entity present, including the following:

        1) Interface requirements.
        2) Sequence of operations.
        3) Status of submittals.
        4) Deliveries.
        5) Off-site fabrication.
        6) Access.
        7) Site utilization.
        8) Temporary facilities and controls.
        9) Progress cleaning.
        10) Quality and work standards.
        11) Status of correction of deficient items.
        12) Field observations.
        13) Status of RFIs.
        14) Status of proposal requests.
        15) Pending changes.
        16) Status of Change Orders.
        17) Pending claims and disputes.
        18) Documentation of information for payment requests.

4. Minutes: Entity responsible for conducting the meeting will record and distribute the meeting minutes to each party present and to parties requiring information.

    a. Schedule Updating: Revise Contractor's construction schedule after each progress meeting where revisions to the schedule have been made or recognized. Issue revised schedule concurrently with the report of each meeting.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 013100

SECTION 013200 - CONSTRUCTION PROGRESS DOCUMENTATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section includes administrative and procedural requirements for documenting the progress of construction during performance of the Work, including the following:

1. Startup construction schedule.
2. Contractor's construction schedule.
3. Construction schedule updating reports.
4. Daily construction reports.
5. Material location reports.
6. Site condition reports.
7. Special reports.

B. Related Requirements:

1. Division 01 Section "Submittal Procedures" for submitting schedules and reports.
2. Division 01 Section "Quality Requirements" for submitting a schedule of tests and inspections.

1.3 DEFINITIONS

A. Activity: A discrete part of a project that can be identified for planning, scheduling, monitoring, and controlling the construction project. Activities included in a construction schedule consume time and resources.

1. Critical Activity: An activity on the critical path that must start and finish on the planned early start and finish times.
2. Predecessor Activity: An activity that precedes another activity in the network.
3. Successor Activity: An activity that follows another activity in the network.

B. Cost Loading: The allocation of the schedule of values for the completion of an activity as scheduled. The sum of costs for all activities must equal the total Contract Sum unless otherwise approved by Architect.
C. CPM: Critical path method, which is a method of planning and scheduling a construction project where activities are arranged based on activity relationships. Network calculations determine when activities can be performed and the critical path of Project.
D. Critical Path: The longest connected chain of interdependent activities through the network schedule that establishes the minimum overall Project duration and contains no float.
E. Event: The starting or ending point of an activity.
F. Float: The measure of leeway in starting and completing an activity.

1. Float time is not for the exclusive use or benefit of either Owner or Contractor, but is a jointly owned, expiring Project resource available to both parties as needed to meet schedule milestones and Contract completion date.
2. Free float is the amount of time an activity can be delayed without adversely affecting the early start of the successor activity.
3. Total float is the measure of leeway in starting or completing an activity without adversely affecting the planned Project completion date.

G. Resource Loading: The allocation of manpower and equipment necessary for the completion of an activity as scheduled.

1.4 INFORMATIONAL SUBMITTALS

A. Format for Submittals: Submit required submittals in the following format:

1. Working electronic copy of schedule file, where indicated.
2. PDF electronic file.
3. Two paper copies.

B. Startup construction schedule.

1. Approval of cost-loaded, startup construction schedule will not constitute approval of schedule of values for cost-loaded activities.

C. Startup Network Diagram: Of size required to display entire network for entire construction period. Show logic ties for activities.

D. Contractor's Construction Schedule: Initial schedule, of size required to display entire schedule for entire construction period.

1. Submit a working electronic copy of schedule, using software indicated, and labeled to comply with requirements for submittals. Include type of schedule (initial or updated) and date on label.

E. CPM Reports: Concurrent with CPM schedule, submit each of the following reports. Format for each activity in reports shall contain activity number, activity description, cost and resource loading, original duration, remaining duration, early start date, early finish date, late start date, late finish date, and total float in calendar days.

1. Activity Report: List of all activities sorted by activity number and then early start date, or actual start date if known.
2. Logic Report: List of preceding and succeeding activities for all activities, sorted in ascending order by activity number and then early start date, or actual start date if known.
3. Total Float Report: List of all activities sorted in ascending order of total float.
4. Earnings Report: Compilation of Contractor's total earnings from commencement of the Work until most recent Application for Payment.

F. Construction Schedule Updating Reports: Submit with Applications for Payment.
G. Daily Construction Reports: Submit at monthly intervals.
H. Material Location Reports: Submit at monthly intervals.
I. Site Condition Reports: Submit at time of discovery of differing conditions.
J. Special Reports: Submit at time of unusual event.
K. Qualification Data: For scheduling consultant.

1.5 QUALITY ASSURANCE

A. Scheduling Consultant Qualifications: An experienced specialist in CPM scheduling and reporting, with capability of producing CPM reports and diagrams within 24 hours of Architect's request.
B. Prescheduling Conference: Conduct conference at Project site to comply with requirements in Division 01 Section "Project Management and Coordination." Review methods and procedures related to the preliminary construction schedule and Contractor's construction schedule, including, but not limited to, the following:

1. Review software limitations and content and format for reports.
2. Verify availability of qualified personnel needed to develop and update schedule.
3. Discuss constraints, including phasing work stages area separations interim milestones and partial Owner occupancy.
4. Review delivery dates for Owner-furnished products.
5. Review schedule for work of Owner's separate contracts.
6. Review submittal requirements and procedures.
7. Review time required for review of submittals and resubmittals.
8. Review requirements for tests and inspections by independent testing and inspecting agencies.
9. Review time required for Project closeout and Owner startup procedures, including commissioning activities.
10. Review and finalize list of construction activities to be included in schedule.
11. Review procedures for updating schedule.

1.6 COORDINATION

A. Coordinate preparation and processing of schedules and reports with performance of construction activities and with scheduling and reporting of separate contractors.
B. Coordinate Contractor's construction schedule with the schedule of values, list of subcontracts, submittal schedule, progress reports, payment requests, and other required schedules and reports.

1. Secure time commitments for performing critical elements of the Work from entities involved.
2. Coordinate each construction activity in the network with other activities and schedule them in proper sequence.

PART 2 - PRODUCTS

2.1 CONTRACTOR'S CONSTRUCTION SCHEDULE, GENERAL

A. Time Frame: Extend schedule from date established for commencement of the Work to date of final completion.

1. Contract completion date shall not be changed by submission of a schedule that shows an early completion date, unless specifically authorized by Change Order.

B. Activities: Treat each story or separate area as a separate numbered activity for each main element of the Work. Comply with the following:

1. Activity Duration: Define activities so no activity is longer than 20 days, unless specifically allowed by Architect.
2. Procurement Activities: Include procurement process activities for the following long lead items and major items, requiring a cycle of more than 60 days, as separate activities in schedule. Procurement cycle activities include, but are not limited to, submittals, approvals, purchasing, fabrication, and delivery.

3. Submittal Review Time: Include review and resubmittal times indicated in Division 01 Section "Submittal Procedures" in schedule. Coordinate submittal review times in Contractor's construction schedule with submittal schedule.
4. Startup and Testing Time: Include no fewer than 15 days for startup and testing.
5. Substantial Completion: Indicate completion in advance of date established for Substantial Completion, and allow time for Architect's and Construction Manager's administrative procedures necessary for certification of Substantial Completion.
6. Punch List and Final Completion: Include not more than 30 days for completion of punch list items and final completion.

C. Constraints: Include constraints and work restrictions indicated in the Contract Documents and as follows in schedule, and show how the sequence of the Work is affected.

1. Phasing: Arrange list of activities on schedule by phase.
2. Work under More Than One Contract: Include a separate activity for each contract.
3. Work by Owner: Include a separate activity for each portion of the Work performed by Owner.
4. Products Ordered in Advance: Include a separate activity for each product. Include delivery date indicated in Division 01 Section "Summary." Delivery dates indicated stipulate the earliest possible delivery date.
5. Owner-Furnished Products: Include a separate activity for each product. Include delivery date indicated in Division 01 Section "Summary." Delivery dates indicated stipulate the earliest possible delivery date.
6. Work Restrictions: Show the effect of the following items on the schedule:

    a. Coordination with existing construction.
    b. Uninterruptible services.
    c. Partial occupancy before Substantial Completion.
    d. Use of premises restrictions.
    e. Seasonal variations.
    f. Environmental control.

7. Work Stages: Indicate important stages of construction for each major portion of the Work, including, but not limited to, the following:

    a. Subcontract awards.
    b. Submittals.
    c. Purchases.
    d. Mockups.
    e. Fabrication.
    f. Sample testing.
    g. Deliveries.
    h. Installation.
    i. Tests and inspections.
    j. Adjusting.
    k. Curing.
    l. Startup and placement into final use and operation.

8. Construction Areas: Identify each major area of construction for each major portion of the Work. Indicate where each construction activity within a major area must be sequenced or integrated with other construction activities to provide for the following:

    a. Structural completion.
    b. Temporary enclosure and space conditioning.
    c. Permanent space enclosure.
    d. Completion of mechanical installation.
    e. Completion of electrical installation.
    f. Substantial Completion.

D. Milestones: Include milestones indicated in the Contract Documents in schedule, including, but not limited to, the Notice to Proceed, Substantial Completion, and final completion, and the following interim milestones:

1. Temporary enclosure and space conditioning.

E. Cost Correlation: Superimpose a cost correlation timeline, indicating planned and actual costs. On the line, show planned and actual dollar volume of the Work performed as of planned and actual dates used for preparation of payment requests.

1. See Division 01 Section "Payment Procedures" for cost reporting and payment procedures.

F. Upcoming Work Summary: Prepare summary report indicating activities scheduled to occur or commence prior to submittal of next schedule update. Summarize the following issues:

1. Unresolved issues.
2. Unanswered Requests for Information.
3. Rejected or unreturned submittals.
4. Notations on returned submittals.
5. Pending modifications affecting the Work and Contract Time.

G. Recovery Schedule: When periodic update indicates the Work is 14 or more calendar days behind the current approved schedule, submit a separate recovery schedule indicating means by which Contractor intends to regain compliance with the schedule. Indicate changes to working hours, working days, crew sizes, and equipment required to achieve compliance, and date by which recovery will be accomplished.

H. Computer Scheduling Software: Prepare schedules using current version of a program that has been developed specifically to manage construction schedules.

1. Use Scheduling component of Project Website software specified in Division 01 Section "Project Management and Coordination," for Windows operating system.

2.2 STARTUP CONSTRUCTION SCHEDULE

A. Bar-Chart Schedule: Submit startup, horizontal, bar-chart-type construction schedule within seven days of date established for commencement of the Work.

B. Preparation: Indicate each significant construction activity separately. Identify first workday of each week with a continuous vertical line. Outline significant construction activities for first 10 days of construction. Include skeleton diagram for the remainder of the Work and a cash requirement prediction based on indicated activities.

2.3 REPORTS

A. Daily Construction Reports: Prepare a daily construction report recording the following information concerning events at Project site:

1. List of subcontractors at Project site.
2. List of separate contractors at Project site.
3. Approximate count of personnel at Project site.
4. Equipment at Project site.
5. Material deliveries.
6. High and low temperatures and general weather conditions, including presence of rain.
7. Accidents.
8. Meetings and significant decisions.
9. Unusual events (see special reports).

10. Stoppages, delays, shortages, and losses.
11. Emergency procedures.
12. Orders and requests of authorities having jurisdiction.
13. Change Orders received and implemented.
14. Construction Change Directives received and implemented.
15. Services connected and disconnected.
16. Equipment or system tests and startups.
17. Partial completions and occupancies.
18. Substantial Completions authorized.

B. Material Location Reports: At monthly intervals, prepare and submit a comprehensive list of materials delivered to and stored at Project site. List shall be cumulative, showing materials previously reported plus items recently delivered. Include with list a statement of progress on and delivery dates for materials or items of equipment fabricated or stored away from Project site. Indicate the following categories for stored materials:

1. Material stored prior to previous report and remaining in storage.
2. Material stored prior to previous report and since removed from storage and installed.
3. Material stored following previous report and remaining in storage.

C. Site Condition Reports: Immediately on discovery of a difference between site conditions and the Contract Documents, prepare and submit a detailed report. Submit with a Request for Information. Include a detailed description of the differing conditions, together with recommendations for changing the Contract Documents.

2.4 SPECIAL REPORTS

A. General: Submit special reports directly to Owner within one day(s) of an occurrence. Distribute copies of report to parties affected by the occurrence.
B. Reporting Unusual Events: When an event of an unusual and significant nature occurs at Project site, whether or not related directly to the Work, prepare and submit a special report. List chain of events, persons participating, response by Contractor's personnel, evaluation of results or effects, and similar pertinent information. Advise Owner in advance when these events are known or predictable.

PART 3 - EXECUTION

3.1 CONTRACTOR'S CONSTRUCTION SCHEDULE

A. Scheduling Consultant: Engage a consultant or qualified staff member to provide planning, evaluation, and reporting using CPM scheduling.

1. In-House Option: If Contractor employs skilled personnel with experience in CPM scheduling and reporting techniques. Submit qualifications.
2. Meetings: Scheduling consultant shall attend all meetings related to Project progress, alleged delays, and time impact.

B. Contractor's Construction Schedule Updating: At monthly intervals, update schedule to reflect actual construction progress and activities. Issue schedule one week before each regularly scheduled progress meeting.

1. Revise schedule immediately after each meeting or other activity where revisions have been recognized or made. Issue updated schedule concurrently with the report of each such meeting.

2. Include a report with updated schedule that indicates every change, including, but not limited to, changes in logic, durations, actual starts and finishes, and activity durations.
3. As the Work progresses, indicate final completion percentage for each activity.

C. Distribution: Distribute copies of approved schedule to Architect, Construction Manager, Owner, separate contractors, testing and inspecting agencies, and other parties identified by Contractor with a need-to-know schedule responsibility.

1. Post copies in Project meeting rooms and temporary field offices.
2. When revisions are made, distribute updated schedules to the same parties and post in the same locations. Delete parties from distribution when they have completed their assigned portion of the Work and are no longer involved in performance of construction activities.

END OF SECTION 013200

SECTION 013233 - PHOTOGRAPHIC DOCUMENTATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section includes administrative and procedural requirements for the following:

1. Preconstruction photographs.
2. Periodic construction and aerial photographs.
3. Final completion construction photographs.

B. Related Sections:

1. Division 01 Section "Submittal Procedures" for submitting photographic documentation.
2. Division 01 Section "Closeout Procedures" for submitting photographic documentation as project record documents at Project closeout.

1.3 INFORMATIONAL SUBMITTALS

A. Qualification Data: For photographer.
B. Key Plan: Submit key plan of Project site and building with notation of vantage points marked for location and direction of each photograph. Indicate elevation or story of construction. Include same information as corresponding photographic documentation.
C. Digital Photographs: Submit image files within three days of taking photographs.

1. Digital Camera: Minimum sensor resolution of 8 megapixels.
2. Format: Minimum 1600 by 1200 pixels, 400 dpi minimum, in unaltered original files, with same aspect ratio as the sensor, uncropped, date- and time- stamped, in folder named by date of photograph, accompanied by key plan file.
3. Identification: Provide the following information with each image description in file metadata tag:

a. Name of Project.
b. Name and contact information for photographer.
c. Name of Architect.
d. Name of Contractor.
e. Date photograph was taken.
f. Description of vantage point, indicating location, direction (by compass point), and elevation or story of construction.
g. Unique sequential identifier keyed to accompanying key plan.

D. Construction Photographs: Submit JPEG digital files of each photographic view within seven days of taking photographs.
E. Aerial Photographs: Submit JPEG digital files of each photographic from each point of the compass within seven days of taking photographs.

1.4 QUALITY ASSURANCE

A. Photographer Qualifications: An individual who has been regularly engaged as a professional photographer of construction projects for not less than three years.

1.5 COORDINATION

A. Auxiliary Services: Cooperate with photographer and provide auxiliary services requested, including access to Project site and use of temporary facilities, including temporary lighting required to produce clear, well-lit photographs.

1.6 USAGE RIGHTS

A. Obtain and transfer copyright usage rights from photographer to Owner for unlimited reproduction of photographic documentation.

PART 2 - PRODUCTS

2.1 PHOTOGRAPHIC MEDIA

A. Digital Images: Provide images in JPG format, produced by a digital camera with minimum sensor size of 8 megapixels, and at an image resolution of not less than 1600 by 1200 pixels and 300 dpi.

PART 3 - EXECUTION

3.1 CONSTRUCTION PHOTOGRAPHS

A. Photographer: Engage a qualified photographer to take construction photographs.
B. General: Take photographs using the maximum range of depth of field, and that are in focus, to clearly show the Work. Photographs with blurry or out-of-focus areas will not be accepted.

1. Maintain key plan with each set of construction photographs that identifies each photographic location.

C. Digital Images: Submit digital images exactly as originally recorded in the digital camera, without alteration, manipulation, editing, or modifications using image-editing software.

1. Date and Time: Include date and time in file name for each image.
2. Field Office Images: Maintain one set of images accessible in the field office at Project site, available at all times for reference. Identify images in the same manner as those submitted to Architect.

D. Preconstruction Photographs: Before starting construction, take photographs of Project site and surrounding properties, including existing items to remain during construction, from different vantage points.

1. Flag construction limits before taking construction photographs.
2. Take 10 photographs to show existing conditions adjacent to property before starting the Work.

3. Take additional photographs as required to record settlement or cracking of adjacent structures, pavements, and improvements.

E. Periodic Construction Photographs: Take 10 photographs monthly, coinciding with the cutoff date associated with each Application for Payment. Select vantage points to show status of construction and progress since last photographs were taken.

F. Final Completion Construction Photographs: Take 10 color photographs after date of Substantial Completion for submission as project record documents.

1. Do not include date stamp.

G. Additional Photographs: Architect may request photographs in addition to periodic photographs specified. Additional photographs will be paid for by Change Order and are not included in the Contract Sum.

1. Three days' notice will be given, where feasible.
2. In emergency situations, take additional photographs within 24 hours of request.
3. Circumstances that could require additional photographs include, but are not limited to, the following:

a. Special events planned at Project site.
b. Immediate follow-up when on-site events result in construction damage or losses.
c. Substantial Completion of a major phase or component of the Work.
d. Extra record photographs at time of final acceptance.
e. Owner's request for special publicity photographs.

H. Aerial Photographs: Take 2 color aerial photographs monthly to coincide with Payment Applications.

END OF SECTION 013233

SECTION 013300 - SUBMITTAL PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section includes requirements for the submittal schedule and administrative and procedural requirements for submitting Shop Drawings, Product Data, Samples, and other submittals.
B. Related Sections:

1. Division 01 Section "Payment Procedures" for submitting Applications for Payment and the schedule of values.
2. Division 01 Section "Construction Progress Documentation" for submitting schedules and reports, including Contractor's construction schedule.
3. Division 01 Section "Operation and Maintenance Data" for submitting operation and maintenance manuals.
4. Division 01 Section "Project Record Documents" for submitting record Drawings, record Specifications, and record Product Data.
5. Division 01 Section "Demonstration and Training" for submitting video recordings of demonstration of equipment and training of Owner's personnel.

1.3 DEFINITIONS

A. Action Submittals: Written and graphic information and physical samples that require Architect's responsive action. Action submittals are those submittals indicated in individual Specification Sections as action submittals.
B. Informational Submittals: Written and graphic information and physical samples that do not require Architect's responsive action. Submittals may be rejected for not complying with requirements. Informational submittals are those submittals indicated in individual Specification Sections as informational submittals.
C. File Transfer Protocol (FTP): Communications protocol that enables transfer of files to and from another computer over a network and that serves as the basis for standard Internet protocols. An FTP site is a portion of a network located outside of network firewalls within which internal and external users are able to access files.
D. Portable Document Format (PDF): An open standard file format licensed by Adobe Systems used for representing documents in a device-independent and display resolution-independent fixed-layout document format.

1.4 ACTION SUBMITTALS

A. Submittal Schedule: Submit a schedule of submittals, arranged in chronological order by dates required by construction schedule. Include time required for review, ordering, manufacturing, fabrication, and delivery when establishing dates. Include additional time required for making corrections or modifications to submittals noted by the Architect and additional time for handling and reviewing submittals required by those corrections.

1. Coordinate submittal schedule with list of subcontracts, the schedule of values, and Contractor's construction schedule.
2. Initial Submittal: Submit concurrently with start-up construction schedule. Include submittals required during the first 60 days of construction. List those submittals required to maintain orderly progress of the Work and those required early because of long lead time for manufacture or fabrication.
3. Final Submittal: Submit concurrently with the first complete submittal of Contractor's construction schedule.

    a. Submit revised submittal schedule to reflect changes in current status and timing for submittals.

4. Format: Arrange the following information in a tabular format:

    a. Scheduled date for first submittal.
    b. Specification Section number and title.
    c. Submittal category: Action, informational.
    d. Name of subcontractor.
    e. Description of the Work covered.
    f. Scheduled date for Architect's final release or approval.
    g. Scheduled dates for purchasing.
    h. Scheduled dates for installation.
    i. Activity or event number.

1.5 SUBMITTAL ADMINISTRATIVE REQUIREMENTS

A. Architect's Digital Data Files: Electronic copies of CAD Drawings of the Contract Drawings will be provided by Architect for Contractor's use in preparing submittals.

1. Architect will furnish Contractor one set of digital data drawing files of the Contract Drawings for use in preparing Shop Drawings and Project record drawings.

    a. Architect makes no representations as to the accuracy or completeness of digital data drawing files as they relate to the Contract Drawings.
    b. Digital Drawing Software Program: The Contract Drawings are available in AUTO Cad 2007.
    c. Contractor shall execute a data licensing agreement in the form of Agreement included in Project Manual.

B. Coordination: Coordinate preparation and processing of submittals with performance of construction activities.

1. Coordinate each submittal with fabrication, purchasing, testing, delivery, other submittals, and related activities that require sequential activity.
2. Submit all submittal items required for each Specification Section concurrently unless partial submittals for portions of the Work are indicated on approved submittal schedule.
3. Submit action submittals and informational submittals required by the same Specification Section as separate packages under separate transmittals.
4. Coordinate transmittal of different types of submittals for related parts of the Work so processing will not be delayed because of need to review submittals concurrently for coordination.

    a. Architect reserves the right to withhold action on a submittal requiring coordination with other submittals until related submittals are received.

C. Processing Time: Allow time for submittal review, including time for resubmittals, as follows. Time for review shall commence on Architect's receipt of submittal. No extension of the

Contract Time will be authorized because of failure to transmit submittals enough in advance of the Work to permit processing, including resubmittals.

1. Initial Review: Allow 10 days for initial review of each submittal. Allow additional time if coordination with subsequent submittals is required. Architect will advise Contractor when a submittal being processed must be delayed for coordination.
2. Intermediate Review: If intermediate submittal is necessary, process it in same manner as initial submittal.
3. Resubmittal Review: Allow 7 days for review of each resubmittal.
4. Sequential Review: Where sequential review of submittals by Architect's consultants, Owner, or other parties is indicated, allow 14 days for initial review of each submittal.

D. Identification and Information: Place a permanent label or title block on each paper copy submittal item for identification.

1. Indicate name of firm or entity that prepared each submittal on label or title block.
2. Include the following information for processing and recording action taken:

    a. Project name.
    b. Date.
    c. Name of Architect.
    d. Name of Contractor.
    e. Name of subcontractor.
    f. Name of supplier.
    g. Name of manufacturer.
    h. Submittal number or other unique identifier, including revision identifier.

        1) Submittal number shall use Specification Section number followed by a decimal point and then a sequential number (e.g., 061000.01). Resubmittals shall include an alphabetic suffix after another decimal point (e.g., 061000.01.A).

    i. Number and title of appropriate Specification Section.
    j. Drawing number and detail references, as appropriate.
    k. Location(s) where product is to be installed, as appropriate.
    l. Other necessary identification.

E. Identification and Information: Identify and incorporate information in each electronic submittal file as follows:

1. Assemble complete submittal package into a single indexed file with links enabling navigation to each item.
2. Name file with submittal number or other unique identifier, including revision identifier.

    a. File name shall use project identifier and Specification Section number followed by a decimal point and then a sequential number (e.g., LNHS-061000.01). Resubmittals shall include an alphabetic suffix after another decimal point (e.g., LNHS-061000.01.A).

3. Provide means for insertion to permanently record Contractor's review and approval markings and action taken by Architect.
4. Include the following information on an inserted cover sheet:

    a. Project name.
    b. Date.
    c. Name and address of Architect.
    d. Name of Contractor.
    e. Name of firm or entity that prepared submittal.
    f. Name of subcontractor.

g. Name of supplier.
h. Name of manufacturer.
i. Number and title of appropriate Specification Section.
j. Drawing number and detail references, as appropriate.
k. Location(s) where product is to be installed, as appropriate.
l. Related physical samples submitted directly.
m. Other necessary identification.

5. Include the following information as keywords in the electronic file metadata:

a. Project name.
b. Number and title of appropriate Specification Section.
c. Manufacturer name.
d. Product name.

F. Options: Identify options requiring selection by the Architect.
G. Deviations: Identify deviations from the Contract Documents on submittals.
H. Additional Paper Copies: Unless additional copies are required for final submittal, and unless Architect observes noncompliance with provisions in the Contract Documents, initial submittal may serve as final submittal.

1. Submit one copy of submittal to concurrent reviewer in addition to specified number of copies to Architect.

I. Transmittal: Assemble each submittal individually and appropriately for transmittal and handling. Transmit each submittal using a transmittal form. Architect will discard submittals received from sources other than Contractor.

1. Transmittal Form: Use AIA Document G810.
2. Transmittal Form: Provide locations on form for the following information:

a. Project name.
b. Date.
c. Destination (To:).
d. Source (From:).
e. Names of subcontractor, manufacturer, and supplier.
f. Category and type of submittal.
g. Submittal purpose and description.
h. Specification Section number and title.
i. Indication of full or partial submittal.
j. Drawing number and detail references, as appropriate.
k. Transmittal number, numbered consecutively.
l. Submittal and transmittal distribution record.
m. Remarks.
n. Signature of transmitter.

3. On an attached separate sheet, prepared on Contractor's letterhead, record relevant information, requests for data, revisions other than those requested by Architect on previous submittals, and deviations from requirements in the Contract Documents, including minor variations and limitations. Include same identification information as related submittal.

J. Resubmittals: Make resubmittals in same form and number of copies as initial submittal.

1. Note date and content of previous submittal.
2. Note date and content of revision in label or title block and clearly indicate extent of revision.
3. Resubmit submittals until they are marked with approval notation from Architect's action stamp.

K. Distribution: Furnish copies of final submittals to manufacturers, subcontractors, suppliers, fabricators, installers, authorities having jurisdiction, and others as necessary for performance of construction activities. Show distribution on transmittal forms.
L. Use for Construction: Use only final submittals that are marked with approval notation from Architect's action stamp.

PART 2 - PRODUCTS

2.1 SUBMITTAL PROCEDURES

A. General Submittal Procedure Requirements: Prepare and submit submittals required by individual Specification Sections. Types of submittals are indicated in individual Specification Sections.

1. Post electronic submittals as PDF electronic files directly to Project Website specifically established for Project.

    a. Architect will return annotated file. Annotate and retain one copy of file as an electronic Project record document file.

2. Action Submittals: Submit three paper copies of each submittal, unless otherwise indicated. Architect will return two copies.
3. Informational Submittals: Submit two paper copies of each submittal, unless otherwise indicated. Architect will not return copies.
4. Closeout Submittals and Maintenance Material Submittals: Comply with requirements specified in Division 01 Section "Closeout Procedures."
5. Certificates and Certifications Submittals: Provide a statement that includes signature of entity responsible for preparing certification. Certificates and certifications shall be signed by an officer or other individual authorized to sign documents on behalf of that entity.

    a. Provide a digital signature with digital certificate on electronically-submitted certificates and certifications where indicated.
    b. Provide a notarized statement on original paper copy certificates and certifications where indicated.

6. Test and Inspection Reports Submittals: Comply with requirements specified in Division 01 Section "Quality Requirements."

B. Product Data: Collect information into a single submittal for each element of construction and type of product or equipment.

1. If information must be specially prepared for submittal because standard published data are not suitable for use, submit as Shop Drawings, not as Product Data.
2. Mark each copy of each submittal to show which products and options are applicable.
3. Include the following information, as applicable:

    a. Manufacturer's catalog cuts.
    b. Manufacturer's product specifications.
    c. Standard color charts.
    d. Statement of compliance with specified referenced standards.
    e. Testing by recognized testing agency.
    f. Application of testing agency labels and seals.
    g. Notation of coordination requirements.
    h. Availability and delivery time information.

4. For equipment, include the following in addition to the above, as applicable:

    a. Wiring diagrams showing factory-installed wiring.
    b. Printed performance curves.
    c. Operational range diagrams.
    d. Clearances required to other construction, if not indicated on accompanying Shop Drawings.

5. Submit Product Data before or concurrent with Samples.
6. Submit Product Data in the following format:

    a. PDF electronic file.
    b. Three paper copies of Product Data, unless otherwise indicated. Architect will return two copies.

C. Shop Drawings: Prepare Project-specific information, drawn accurately to scale. Do not base Shop Drawings on reproductions of the Contract Documents or standard printed data.

1. Preparation: Fully illustrate requirements in the Contract Documents. Include the following information, as applicable:

    a. Identification of products.
    b. Schedules.
    c. Compliance with specified standards.
    d. Notation of coordination requirements.
    e. Notation of dimensions established by field measurement.
    f. Relationship and attachment to adjoining construction clearly indicated.
    g. Seal and signature of professional engineer if specified.

2. Sheet Size: Except for templates, patterns, and similar full-size drawings, submit Shop Drawings on sheets at least 8-1/2 by 11 inches but no larger than 30 by 42 inches.
3. Submit Shop Drawings in the following format:

    a. PDF electronic file.
    b. If required by Architect, two opaque (bond) copies of each submittal. Architect will return one copy.

D. Samples: Submit Samples for review of kind, color, pattern, and texture for a check of these characteristics with other elements and for a comparison of these characteristics between submittal and actual component as delivered and installed.

1. Transmit Samples that contain multiple, related components such as accessories together in one submittal package.
2. Identification: Attach label on unexposed side of Samples that includes the following:

    a. Generic description of Sample.
    b. Product name and name of manufacturer.
    c. Sample source.
    d. Number and title of applicable Specification Section.

3. Disposition: Maintain sets of approved Samples at Project site, available for quality-control comparisons throughout the course of construction activity. Sample sets may be used to determine final acceptance of construction associated with each set.

    a. Samples that may be incorporated into the Work are indicated in individual Specification Sections. Such Samples must be in an undamaged condition at time of use.

b. Samples not incorporated into the Work, or otherwise designated as Owner's property, are the property of Contractor.

4. Samples for Initial Selection: Submit manufacturer's color charts consisting of units or sections of units showing the full range of colors, textures, and patterns available.

   a. Number of Samples: Submit one full set(s) of available choices where color, pattern, texture, or similar characteristics are required to be selected from manufacturer's product line. Architect will return submittal with options selected.

5. Samples for Verification: Submit full-size units or Samples of size indicated, prepared from same material to be used for the Work, cured and finished in manner specified, and physically identical with material or product proposed for use, and that show full range of color and texture variations expected. Samples include, but are not limited to, the following: partial sections of manufactured or fabricated components; small cuts or containers of materials; complete units of repetitively used materials; swatches showing color, texture, and pattern; color range sets; and components used for independent testing and inspection.

   a. Number of Samples: Submit three sets of Samples. Architect may retain two Sample sets; remainder will be returned. Mark up and retain one returned Sample set as a Project record sample.

      1) Submit a single Sample where assembly details, workmanship, fabrication techniques, connections, operation, and other similar characteristics are to be demonstrated.
      2) If variation in color, pattern, texture, or other characteristic is inherent in material or product represented by a Sample, submit at least three sets of paired units that show approximate limits of variations.

E. Product Schedule: As required in individual Specification Sections, prepare a written summary indicating types of products required for the Work and their intended location. Include the following information in tabular form:

   1. Type of product. Include unique identifier for each product.
   2. Manufacturer and product name, and model number if applicable.
   3. Number and name of room or space.
   4. Location within room or space.
   5. Submit product schedule in the following format:

      a. PDF electronic file.
      b. If required by Architect, three paper copies of product schedule or list, unless otherwise indicated. Architect will return two copies.

F. Contractor's Construction Schedule: Comply with requirements specified in Division 01 Section "Construction Progress Documentation."

G. Application for Payment: Comply with requirements specified in Division 01 Section "Payment Procedures."

H. Schedule of Values: Comply with requirements specified in Division 01 Section "Payment Procedures."

I. Subcontract List: Prepare a written summary identifying individuals or firms proposed for each portion of the Work, including those who are to furnish products or equipment fabricated to a special design. Include the following information in tabular form:

   1. Name, address, and telephone number of entity performing subcontract or supplying products.
   2. Number and title of related Specification Section(s) covered by subcontract.
   3. Drawing number and detail references, as appropriate, covered by subcontract.
   4. Submit subcontract list in the following format:

a. PDF electronic file.
b. Number of Copies: Three paper copies of subcontractor list, unless otherwise indicated. Architect will return two copies.

J. Qualification Data: Prepare written information that demonstrates capabilities and experience of firm or person. Include lists of completed projects with project names and addresses, contact information of architects and owners, and other information specified.

K. Welding Certificates: Prepare written certification that welding procedures and personnel comply with requirements in the Contract Documents. Submit record of Welding Procedure Specification and Procedure Qualification Record on American Welding Society (AWS) forms. Include names of firms and personnel certified.

L. Installer Certificates: Submit written statements on manufacturer's letterhead certifying that Installer complies with requirements in the Contract Documents and, where required, is authorized by manufacturer for this specific Project.

M. Manufacturer Certificates: Submit written statements on manufacturer's letterhead certifying that manufacturer complies with requirements in the Contract Documents. Include evidence of manufacturing experience where required.

N. Product Certificates: Submit written statements on manufacturer's letterhead certifying that product complies with requirements in the Contract Documents.

O. Material Certificates: Submit written statements on manufacturer's letterhead certifying that material complies with requirements in the Contract Documents.

P. Material Test Reports: Submit reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting test results of material for compliance with requirements in the Contract Documents.

Q. Product Test Reports: Submit written reports indicating current product produced by manufacturer complies with requirements in the Contract Documents. Base reports on evaluation of tests performed by manufacturer and witnessed by a qualified testing agency, or on comprehensive tests performed by a qualified testing agency.

R. Research Reports: Submit written evidence, from a model code organization acceptable to authorities having jurisdiction, that product complies with building code in effect for Project. Include the following information:

1. Name of evaluation organization.
2. Date of evaluation.
3. Time period when report is in effect.
4. Product and manufacturers' names.
5. Description of product.
6. Test procedures and results.
7. Limitations of use.

S. Schedule of Tests and Inspections: Comply with requirements specified in Division 01 Section "Quality Requirements."

T. Preconstruction Test Reports: Submit reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of tests performed before installation of product, for compliance with performance requirements in the Contract Documents.

U. Compatibility Test Reports: Submit reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of compatibility tests performed before installation of product. Include written recommendations for primers and substrate preparation needed for adhesion.

V. Field Test Reports: Submit reports indicating and interpreting results of field tests performed either during installation of product or after product is installed in its final location, for compliance with requirements in the Contract Documents.

W. Maintenance Data: Comply with requirements specified in Division 01 Section "Operation and Maintenance Data."

X. Design Data: Prepare and submit written and graphic information, including, but not limited to, performance and design criteria, list of applicable codes and regulations, and calculations. Include list of assumptions and other performance and design criteria and a summary of loads. Include load diagrams if applicable. Provide name and version of software, if any, used for calculations. Include page numbers.

2.2 DELEGATED-DESIGN SERVICES

A. Performance and Design Criteria: Where professional design services or certifications by a design professional are specifically required of Contractor by the Contract Documents, provide products and systems complying with specific performance and design criteria indicated.

1. If criteria indicated are not sufficient to perform services or certification required, submit a written request for additional information to Architect.

B. Delegated-Design Services Certification: In addition to Shop Drawings, Product Data, and other required submittals, submit digitally-signed PDF electronic file and three paper copies of certificate, signed and sealed by the responsible design professional, for each product and system specifically assigned to Contractor to be designed or certified by a design professional.

1. Indicate that products and systems comply with performance and design criteria in the Contract Documents. Include list of codes, loads, and other factors used in performing these services.

PART 3 - EXECUTION

3.1 CONTRACTOR'S REVIEW

A. Action and Informational Submittals: Review each submittal and check for coordination with other Work of the Contract and for compliance with the Contract Documents. Note corrections and field dimensions. Mark with approval stamp before submitting to Architect.
B. Project Closeout and Maintenance/Material Submittals: Refer to requirements in Division 01 Section "Closeout Procedures."
C. Approval Stamp: Stamp each submittal with a uniform, approval stamp. Include Project name and location, submittal number, Specification Section title and number, name of reviewer, date of Contractor's approval, and statement certifying that submittal has been reviewed, checked, and approved for compliance with the Contract Documents.

3.2 ARCHITECT'S ACTION

A. General: Architect will not review submittals that do not bear Contractor's approval stamp and will return them without action.
B. Action Submittals: Architect will review each submittal, make marks to indicate corrections or modifications required, and return it. Architect will stamp each submittal with an action stamp and will mark stamp appropriately to indicate action.
C. Informational Submittals: Architect will review each submittal and will not return it, or will return it if it does not comply with requirements. Architect will forward each submittal to appropriate party.
D. Partial submittals prepared for a portion of the Work will be reviewed when use of partial submittals has received prior approval from Architect.
E. Incomplete submittals are not acceptable, will be considered nonresponsive, and will be returned without review.
F. Submittals not required by the Contract Documents may not be reviewed and may be discarded.

END OF SECTION 013300

SECTION 013320 - ROUTING TRANSMITTAL

CONTRACTOR: _____

SPEC. SECTION NO._____

ITEM _____

SUB-CONTRACTOR / SUPPLIER _____

_____

DATE SENT _____NO. COPIES _____

VARIANCE ATTACHED YES _____ NO _____

ARCHITECT — Florida Architects, Inc.
648 Florida Ave.
Panama City, Florida 32401

Project No. — 4228

Project Name — GCSC SOFTBALL COMPLEX

OWNER — GULF COAST STATE COLLEGE

DATE RECEIVED

FLA to CONSULTANT _____ DATE RECEIVED BY CONSULTANT

DATE SENT _____NO. COPIES _____

ENGINEER _____

ATTN: _____

CONSULTANT to FLA _____ DATE RECEIVED BY FLA

DATE SENT _____NO. COPIES _____

REVIEWED BY _____

COMMENTS _____

FLA to CONTRACTOR _____ DATE RECEIVED BY CONTRACTOR

DATE SENT _____

TO CONTRACTOR _____

AGENCY _____ OWNER _____ FILE _____

ACTION TAKEN:

_____ Rejected
_____ Revise and Resubmit as Noted
_____ Conforms with Design Concept as Noted
_____ Conforms with Design Concept
_____ Submit Corrected Copy
_____ No Action Taken

END OF SECTION 013320

SECTION 014000 - QUALITY REQUIREMENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section includes administrative and procedural requirements for quality assurance and quality control.
B. Testing and inspecting services are required to verify compliance with requirements specified or indicated. These services do not relieve Contractor of responsibility for compliance with the Contract Document requirements.

1. Specific quality-assurance and -control requirements for individual construction activities are specified in the Sections that specify those activities. Requirements in those Sections may also cover production of standard products.
2. Specified tests, inspections, and related actions do not limit Contractor's other quality-assurance and -control procedures that facilitate compliance with the Contract Document requirements.
3. Requirements for Contractor to provide quality-assurance and control services required by Architect, Owner, or authorities having jurisdiction are not limited by provisions of this Section.

C. Related Sections:

1. Division 01 Section "Construction Progress Documentation" for developing a schedule of required tests and inspections.
2. Divisions 02 through 49 Sections for specific test and inspection requirements.

1.3 DEFINITIONS

A. Quality-Assurance Services: Activities, actions, and procedures performed before and during execution of the Work to guard against defects and deficiencies and substantiate that proposed construction will comply with requirements.
B. Quality-Control Services: Tests, inspections, procedures, and related actions during and after execution of the Work to evaluate that actual products incorporated into the Work and completed construction comply with requirements. Services do not include contract enforcement activities performed by Architect.
C. Mockups: Full size physical assemblies that are constructed on-site. Mockups are constructed to verify selections made under sample submittals; to demonstrate aesthetic effects and, where indicated, qualities of materials and execution; to review coordination, testing, or operation; to show interface between dissimilar materials; and to demonstrate compliance with specified installation tolerances. Mockups are not Samples. Unless otherwise indicated, approved mockups establish the standard by which the Work will be judged.
D.

1. Integrated Exterior Mockups: Mockups of the exterior envelope erected separately from the building but on the project site, consisting of multiple products, assemblies and subassemblies.

E. Preconstruction Testing: Tests and inspections performed specifically for the Project before products and materials are incorporated into the Work to verify performance or compliance with specified criteria.
F. Product Testing: Tests and inspections that are performed by an NRTL, an NVLAP, or a testing agency qualified to conduct product testing and acceptable to authorities having jurisdiction, to establish product performance and compliance with specified requirements.
G. Source Quality-Control Testing: Tests and inspections that are performed at the source, i.e., plant, mill, factory, or shop.
H. Field Quality-Control Testing: Tests and inspections that are performed on-site for installation of the Work and for completed Work.
I. Testing Agency: An entity engaged to perform specific tests, inspections, or both. Testing laboratory shall mean the same as testing agency.
J. Installer/Applicator/Erector: Contractor or another entity engaged by Contractor as an employee, Subcontractor, or Sub-subcontractor, to perform a particular construction operation, including installation, erection, application, and similar operations.

    1. Use of trade-specific terminology in referring to a trade or entity does not require that certain construction activities be performed by accredited or unionized individuals, or that requirements specified apply exclusively to specific trade or trades.

K. Experienced: When used with an entity or individual, "experienced" means having successfully completed a minimum of five previous projects similar in nature, size, and extent to this Project; being familiar with special requirements indicated; and having complied with requirements of authorities having jurisdiction.

1.4 CONFLICTING REQUIREMENTS

A. Referenced Standards: If compliance with two or more standards is specified and the standards establish different or conflicting requirements for minimum quantities or quality levels, comply with the most stringent requirement. Refer conflicting requirements that are different, but apparently equal, to Architect for a decision before proceeding.
B. Minimum Quantity or Quality Levels: The quantity or quality level shown or specified shall be the minimum provided or performed. The actual installation may comply exactly with the minimum quantity or quality specified, or it may exceed the minimum within reasonable limits. To comply with these requirements, indicated numeric values are minimum or maximum, as appropriate, for the context of requirements. Refer uncertainties to Architect for a decision before proceeding.

1.5 ACTION SUBMITTALS

A. Shop Drawings: For integrated exterior mockups, provide plans, sections, and elevations, indicating materials and size of mockup construction.

    1. Indicate manufacturer and model number of individual components.
    2. Provide axonometric drawings for conditions difficult to illustrate in two dimensions.

1.6 INFORMATIONAL SUBMITTALS

A. Contractor's Quality-Control Plan: For quality-assurance and quality-control activities and responsibilities.
B. Contractor's Quality-Control Manager Qualifications: For supervisory personnel.
C. Contractor's Statement of Responsibility: When required by authorities having jurisdiction, submit copy of written statement of responsibility sent to authorities having jurisdiction before starting work on the following systems.

1. Main wind-force resisting system or a wind-resisting component listed in the wind-force-resisting system quality assurance plan.

D. Testing Agency Qualifications: For testing agencies specified in "Quality Assurance" Article to demonstrate their capabilities and experience. Include proof of qualifications in the form of a recent report on the inspection of the testing agency by a recognized authority.

E. Schedule of Tests and Inspections: Prepare in tabular form and include the following:

1. Specification Section number and title.
2. Entity responsible for performing tests and inspections.
3. Description of test and inspection.
4. Identification of applicable standards.
5. Identification of test and inspection methods.
6. Number of tests and inspections required.
7. Time schedule or time span for tests and inspections.
8. Requirements for obtaining samples.
9. Unique characteristics of each quality-control service.

1.7 CONTRACTOR'S QUALITY-CONTROL PLAN

A. Quality-Control Plan, General: Submit quality-control plan within 7 days of Notice to Proceed, and not less than five days prior to preconstruction conference. Submit in format acceptable to Architect. Identify personnel, procedures, controls, instructions, tests, records, and forms to be used to carry out Contractor's quality-assurance and quality-control responsibilities. Coordinate with Contractor's construction schedule.

B. Quality-Control Personnel Qualifications: Engage qualified full-time personnel trained and experienced in managing and executing quality-assurance and quality-control procedures similar in nature and extent to those required for Project.

1. Project Quality-Control Manager may also serve as Project Superintendent.

C. Submittal Procedure: Describe procedures for ensuring compliance with requirements through review and management of submittal process. Indicate qualifications of personnel responsible for submittal review.

D. Testing and Inspection: Include in quality-control plan a comprehensive schedule of Work requiring testing or inspection, including the following:

1. Contractor-performed tests and inspections including subcontractor-performed tests and inspections. Include required tests and inspections and Contractor-elected tests and inspections.
2. Special inspections required by authorities having jurisdiction and indicated on the "Statement of Special Inspections."
3. Owner-performed tests and inspections indicated in the Contract Documents, including tests and inspections indicated to be performed by the Commissioning Authority.

E. Continuous Inspection of Workmanship: Describe process for continuous inspection during construction to identify and correct deficiencies in workmanship in addition to testing and inspection specified. Indicate types of corrective actions to be required to bring work into compliance with standards of workmanship established by Contract requirements and approved mockups.

F. Monitoring and Documentation: Maintain testing and inspection reports including log of approved and rejected results. Include work Architect has indicated as nonconforming or defective. Indicate corrective actions taken to bring nonconforming work into compliance with requirements. Comply with requirements of authorities having jurisdiction.

1.8 REPORTS AND DOCUMENTS

A. Test and Inspection Reports: Prepare and submit certified written reports specified in other Sections. Include the following:

1. Date of issue.
2. Project title and number.
3. Name, address, and telephone number of testing agency.
4. Dates and locations of samples and tests or inspections.
5. Names of individuals making tests and inspections.
6. Description of the Work and test and inspection method.
7. Identification of product and Specification Section.
8. Complete test or inspection data.
9. Test and inspection results and an interpretation of test results.
10. Record of temperature and weather conditions at time of sample taking and testing and inspecting.
11. Comments or professional opinion on whether tested or inspected Work complies with the Contract Document requirements.
12. Name and signature of laboratory inspector.
13. Recommendations on retesting and reinspecting.

B. Manufacturer's Technical Representative's Field Reports: Prepare written information documenting manufacturer's technical representative's tests and inspections specified in other Sections. Include the following:

1. Name, address, and telephone number of technical representative making report.
2. Statement on condition of substrates and their acceptability for installation of product.
3. Statement that products at Project site comply with requirements.
4. Summary of installation procedures being followed, whether they comply with requirements and, if not, what corrective action was taken.
5. Results of operational and other tests and a statement of whether observed performance complies with requirements.
6. Statement weather conditions, products, and installation will affect warranty.
7. Other required items indicated in individual Specification Sections.

C. Factory-Authorized Service Representative's Reports: Prepare written information documenting manufacturer's factory-authorized service representative's tests and inspections specified in other Sections. Include the following:

1. Name, address, and telephone number of factory-authorized service representative making report.
2. Statement that equipment complies with requirements.
3. Results of operational and other tests and a statement of whether observed performance complies with requirements.
4. Statement weather conditions, products, and installation will affect warranty.
5. Other required items indicated in individual Specification Sections.

D. Permits, Licenses, and Certificates: For Owner's records, submit copies of permits, licenses, certifications, inspection reports, releases, jurisdictional settlements, notices, receipts for fee payments, judgments, correspondence, records, and similar documents, established for compliance with standards and regulations bearing on performance of the Work.

1.9 QUALITY ASSURANCE

A. General: Qualifications paragraphs in this article establish the minimum qualification levels required; individual Specification Sections specify additional requirements.
B. Manufacturer Qualifications: A firm experienced in manufacturing products or systems similar to those indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units.

C. Fabricator Qualifications: A firm experienced in producing products similar to those indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units.

D. Installer Qualifications: A firm or individual experienced in installing, erecting, or assembling work similar in material, design, and extent to that indicated for this Project, whose work has resulted in construction with a record of successful in-service performance.

E. Professional Engineer Qualifications: A professional engineer who is legally qualified to practice in jurisdiction where Project is located and who is experienced in providing engineering services of the kind indicated. Engineering services are defined as those performed for installations of the system, assembly, or product that are similar to those indicated for this Project in material, design, and extent.

F. Specialists: Certain Specification Sections require that specific construction activities shall be performed by entities who are recognized experts in those operations. Specialists shall satisfy qualification requirements indicated and shall be engaged for the activities indicated.

1. Requirements of authorities having jurisdiction shall supersede requirements for specialists.

G. Testing Agency Qualifications: An NRTL, an NVLAP, or an independent agency with the experience and capability to conduct testing and inspecting indicated, as documented according to ASTM E 329; and with additional qualifications specified in individual Sections; and where required by authorities having jurisdiction, that is acceptable to authorities.

1. NRTL: A nationally recognized testing laboratory according to 29 CFR 1910.7.

H. Manufacturer's Technical Representative Qualifications: An authorized representative of manufacturer who is trained and approved by manufacturer to observe and inspect installation of manufacturer's products that are similar in material, design, and extent to those indicated for this Project.

I. Factory-Authorized Service Representative Qualifications: An authorized representative of manufacturer who is trained and approved by manufacturer to inspect installation of manufacturer's products that are similar in material, design, and extent to those indicated for this Project.

J. Preconstruction Testing: Where testing agency is indicated to perform preconstruction testing for compliance with specified requirements for performance and test methods, comply with the following:

1. Contractor responsibilities include the following:

a. Provide test specimens representative of proposed products and construction.
b. Submit specimens in a timely manner with sufficient time for testing and analyzing results to prevent delaying the Work.
c. Provide sizes and configurations of test assemblies, mockups, and laboratory mockups to adequately demonstrate capability of products to comply with performance requirements.
d. Build site-assembled test assemblies and mockups using installers who will perform same tasks for Project.
e. When testing is complete, remove test specimens, assemblies, mockups, and laboratory mockups; do not reuse products on Project.

2. Testing Agency Responsibilities: Submit a certified written report of each test, inspection, and similar quality-assurance service to Architect, with copy to Contractor. Interpret tests and inspections and state in each report whether tested and inspected work complies with or deviates from the Contract Documents.

K. Mockups: Before installing portions of the Work requiring mockups, build mockups for each form of construction and finish required to comply with the following requirements, using materials indicated for the completed Work:

1. Build mockups in location and of size indicated or, if not indicated, as directed by Architect.
2. Notify Architect seven days in advance of dates and times when mockups will be constructed.
3. Employ supervisory personnel who will oversee mockup construction. Employ workers that will be employed during the construction at the Project.
4. Demonstrate the proposed range of aesthetic effects and workmanship.
5. Obtain Architect's approval of mockups before starting work, fabrication, or construction.

    a. Allow five days for initial review and each re-review of each mockup.

6. Maintain mockups during construction in an undisturbed condition as a standard for judging the completed Work.
7. Demolish and remove mockups when directed, unless otherwise indicated.

L. Integrated Exterior Mockups: Construct integrated exterior mockup in accordance with approved Shop Drawings. Coordinate installation of exterior envelope materials and products for which mockups are required in individual specification sections, along with supporting materials.

1.10 QUALITY CONTROL

A. Owner Responsibilities: Where quality-control services are indicated as Owner's responsibility, Owner will engage a qualified testing agency to perform these services.

1. Owner will furnish Contractor with names, addresses, and telephone numbers of testing agencies engaged and a description of types of testing and inspecting they are engaged to perform.
2. Costs for retesting and reinspecting construction that replaces or is necessitated by work that failed to comply with the Contract Documents will be charged to Contractor.

B. Contractor Responsibilities: Tests and inspections not explicitly assigned to Owner are Contractor's responsibility. Perform additional quality-control activities required to verify that the Work complies with requirements, whether specified or not.

1. Unless otherwise indicated, provide quality-control services specified and those required by authorities having jurisdiction. Perform quality-control services required of Contractor by authorities having jurisdiction, whether specified or not.
2. Where services are indicated as Contractor's responsibility, engage a qualified testing agency to perform these quality-control services.

    a. Contractor shall not employ same entity engaged by Owner, unless agreed to in writing by Owner.

3. Notify testing agencies at least 24 hours in advance of time when Work that requires testing or inspecting will be performed.
4. Where quality-control services are indicated as Contractor's responsibility, submit a certified written report, in duplicate, of each quality-control service.
5. Testing and inspecting requested by Contractor and not required by the Contract Documents are Contractor's responsibility.
6. Submit additional copies of each written report directly to authorities having jurisdiction, when they so direct.

C. Manufacturer's Field Services: Where indicated, engage a factory-authorized service representative to inspect field-assembled components and equipment installation, including service connections. Report results in writing as specified in Division 01 Section "Submittal Procedures."

D. Manufacturer's Technical Services: Where indicated, engage a manufacturer's technical representative to observe and inspect the Work. Manufacturer's technical representative's services include participation in preinstallation conferences, examination of substrates and conditions, verification of materials, observation of Installer activities, inspection of completed portions of the Work, and submittal of written reports.

E. Retesting/Reinspecting: Regardless of whether original tests or inspections were Contractor's responsibility, provide quality-control services, including retesting and reinspecting, for construction that replaced Work that failed to comply with the Contract Documents.

F. Testing Agency Responsibilities: Cooperate with Architect and Contractor in performance of duties. Provide qualified personnel to perform required tests and inspections.

1. Notify Architect and Contractor promptly of irregularities or deficiencies observed in the Work during performance of its services.
2. Determine the location from which test samples will be taken and in which in-situ tests are conducted.
3. Conduct and interpret tests and inspections and state in each report whether tested and inspected work complies with or deviates from requirements.
4. Submit a certified written report, in duplicate, of each test, inspection, and similar quality-control service through Contractor.
5. Do not release, revoke, alter, or increase the Contract Document requirements or approve or accept any portion of the Work.
6. Do not perform any duties of Contractor.

G. Associated Services: Cooperate with agencies performing required tests, inspections, and similar quality-control services, and provide reasonable auxiliary services as requested. Notify agency sufficiently in advance of operations to permit assignment of personnel. Provide the following:

1. Access to the Work.
2. Incidental labor and facilities necessary to facilitate tests and inspections.
3. Adequate quantities of representative samples of materials that require testing and inspecting. Assist agency in obtaining samples.
4. Facilities for storage and field curing of test samples.
5. Delivery of samples to testing agencies.
6. Preliminary design mix proposed for use for material mixes that require control by testing agency.
7. Security and protection for samples and for testing and inspecting equipment at Project site.

H. Coordination: Coordinate sequence of activities to accommodate required quality-assurance and -control services with a minimum of delay and to avoid necessity of removing and replacing construction to accommodate testing and inspecting.

1. Schedule times for tests, inspections, obtaining samples, and similar activities.

I. Schedule of Tests and Inspections: Prepare a schedule of tests, inspections, and similar quality-control services required by the Contract Documents as a component of the Contractor's quality-control plan. Coordinate and submit concurrently with Contractor's construction schedule. Update as the Work progresses. .

1. Distribution: Distribute schedule to Owner, Architect, testing agencies, and each party involved in performance of portions of the Work where tests and inspections are required.

1.11 SPECIAL TESTS AND INSPECTIONS

A. Special Tests and Inspections: Owner will engage a qualified testing agency to conduct special tests and inspections required by authorities having jurisdiction as the responsibility of Owner, and as follows:

1. Notifying Architect and Contractor promptly of irregularities and deficiencies observed in the Work during performance of its services.
2. Submitting a certified written report of each test, inspection, and similar quality-control service to Architect with copy to Contractor and to authorities having jurisdiction.
3. Submitting a final report of special tests and inspections at Substantial Completion, which includes a list of unresolved deficiencies.
4. Interpreting tests and inspections and stating in each report whether tested and inspected work complies with or deviates from the Contract Documents.
5. Retesting and reinspecting corrected work.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 TEST AND INSPECTION LOG

A. Prepare a record of tests and inspections. Include the following:

1. Date test or inspection was conducted.
2. Description of the Work tested or inspected.
3. Date test or inspection results were transmitted to Architect.
4. Identification of testing agency or special inspector conducting test or inspection.

B. Maintain log at Project site. Post changes and modifications as they occur. Provide access to test and inspection log for Architect's reference during normal working hours.

3.2 REPAIR AND PROTECTION

A. General: On completion of testing, inspecting, sample taking, and similar services, repair damaged construction and restore substrates and finishes.

1. Provide materials and comply with installation requirements specified in other Specification Sections or matching existing substrates and finishes. Restore patched areas and extend restoration into adjoining areas with durable seams that are as invisible as possible. Comply with the Contract Document requirements for cutting and patching in Division 01 Section "Execution."

B. Protect construction exposed by or for quality-control service activities.
C. Repair and protection are Contractor's responsibility, regardless of the assignment of responsibility for quality-control services.

END OF SECTION 014000

SECTION 014200 - REFERENCES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 DEFINITIONS

A. General: Basic Contract definitions are included in the Conditions of the Contract.
B. "Approved": When used to convey Architect's action on Contractor's submittals, applications, and requests, "approved" is limited to Architect's duties and responsibilities as stated in the Conditions of the Contract.
C. "Directed": A command or instruction by Architect. Other terms including "requested," "authorized," "selected," "required," and "permitted" have the same meaning as "directed."
D. "Indicated": Requirements expressed by graphic representations or in written form on Drawings, in Specifications, and in other Contract Documents. Other terms including "shown," "noted," "scheduled," and "specified" have the same meaning as "indicated."
E. "Regulations": Laws, ordinances, statutes, and lawful orders issued by authorities having jurisdiction, and rules, conventions, and agreements within the construction industry that control performance of the Work.
F. "Furnish": Supply and deliver to Project site, ready for unloading, unpacking, assembly, installation, and similar operations.
G. "Install": Operations at Project site including unloading, temporarily storing, unpacking, assembling, erecting, placing, anchoring, applying, working to dimension, finishing, curing, protecting, cleaning, and similar operations.
H. "Provide": Furnish and install, complete and ready for the intended use.
I. "Project Site": Space available for performing construction activities. The extent of Project site is shown on Drawings and may or may not be identical with the description of the land on which Project is to be built.

1.3 INDUSTRY STANDARDS

A. Applicability of Standards: Unless the Contract Documents include more stringent requirements, applicable construction industry standards have the same force and effect as if bound or copied directly into the Contract Documents to the extent referenced. Such standards are made a part of the Contract Documents by reference.
B. Publication Dates: Comply with standards in effect as of date of the Contract Documents unless otherwise indicated.
C. Copies of Standards: Each entity engaged in construction on Project should be familiar with industry standards applicable to its construction activity. Copies of applicable standards are not bound with the Contract Documents.

    1. Where copies of standards are needed to perform a required construction activity, obtain copies directly from publication source.

1.4 ABBREVIATIONS AND ACRONYMS

A. Industry Organizations: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities indicated in Gale's "Encyclopedia of Associations" or in Columbia Books' "National Trade & Professional Associations of the United States."

B. Industry Organizations: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities in the following list. Names, telephone numbers, and Web sites are subject to change and are believed to be accurate and up-to-date as of the date of the Contract Documents.

AA	Aluminum Association, Inc. (The) www.aluminum.org	(703) 358-2960
AAMA	American Architectural Manufacturers Association www.aamanet.org	(847) 303-5664
AASHTO	American Association of State Highway and Transportation Officials www.transportation.org	(202) 624-5800
ACI	American Concrete Institute www.concrete.org	(248) 848-3700
ACPA	American Concrete Pipe Association www.concrete-pipe.org	(972) 506-7216
AGC	Associated General Contractors of America (The) www.agc.org	(703) 548-3118
AIA	American Institute of Architects (The) www.aia.org	(800) 242-3837 (202) 626-7300
AISC	American Institute of Steel Construction www.aisc.org	(800) 644-2400 (312) 670-2400
AISI	American Iron and Steel Institute www.steel.org	(202) 452-7100
ANSI	American National Standards Institute www.ansi.org	(202) 293-8020
ASCE	American Society of Civil Engineers www.asce.org	(800) 548-2723 (703) 295-6300
ASCE/SEI	American Society of Civil Engineers/Structural Engineering Institute (See ASCE)	
CLFMI	Chain Link Fence Manufacturers Institute www.chainlinkinfo.org	(301) 596-2583
CRRC	Cool Roof Rating Council www.coolroofs.org	(866) 465-2523 (510) 485-7175
CPA	Composite Panel Association www.pbmdf.com	(703) 724-1128
CRSI	Concrete Reinforcing Steel Institute www.crsi.org	(847) 517-1200

CSI	Construction Specifications Institute (The) www.csinet.org	(800) 689-2900 (703) 684-0300
EIMA	EIFS Industry Members Association www.eima.com	(800) 294-3462 (770) 968-7945
EJCDC	Engineers Joint Contract Documents Committee www.ejdc.org	(703) 295-5000
EJMA	Expansion Joint Manufacturers Association, Inc. www.ejma.org	(914) 332-0040
FM Approvals	FM Approvals LLC www.fmglobal.com	(781) 762-4300
FM Global	FM Global (Formerly: FMG - FM Global) www.fmglobal.com	(401) 275-3000
FRSA	Florida Roofing, Sheet Metal & Air Conditioning Contractors Association, Inc. www.floridaroof.com	(407) 671-3772
GS	Green Seal www.greenseal.org	(202) 872-6400
ICRI	International Concrete Repair Institute, Inc. www.icri.org	(847) 827-0830
ISO	International Organization for Standardization www.iso.ch	41 22 749 01 11
	Available from ANSI www.ansi.org	(202) 293-8020
MBMA	Metal Building Manufacturers Association www.mbma.com	(216) 241-7333
MFMA	Metal Framing Manufacturers Association, Inc. www.metalframingmfg.org	(312) 644-6610
MH	Material Handling (Now MHIA)	
MHIA	Material Handling Industry of America www.mhia.org	(800) 345-1815 (704) 676-1190
MPI	Master Painters Institute www.paintinfo.com	(888) 674-8937 (604) 298-7578
NAAMM	National Association of Architectural Metal Manufacturers www.naamm.org	(630) 942-6591
NACE	NACE International (National Association of Corrosion Engineers International) www.nace.org	(800) 797-6623 (281) 228-6200
NCMA	National Concrete Masonry Association www.ncma.org	(703) 713-1900

NFPA	NFPA (National Fire Protection Association) www.nfpa.org	(800) 344-3555 (617) 770-3000
NRCA	National Roofing Contractors Association www.nrca.net	(800) 323-9545 (847) 299-9070
NRMCA	National Ready Mixed Concrete Association www.nrmca.org	(888) 846-7622 (301) 587-1400
PDCA	Painting & Decorating Contractors of America www.pdca.com	(800) 332-7322 (314) 514-7322
PDI	Plumbing & Drainage Institute www.pdionline.org	(800) 589-8956 (978) 557-0720
RCSC	Research Council on Structural Connections www.boltcouncil.org	
SAE	SAE International www.sae.org	(877) 606-7323 (724) 776-4841
SDI	Steel Deck Institute www.sdi.org	(847) 458-4647
SEI/ASCE	Structural Engineering Institute/American Society of Civil Engineers (See ASCE)	
SJI	Steel Joist Institute www.steeljoist.org	(843) 626-1995
SMACNA	Sheet Metal and Air Conditioning Contractors' National Association www.smacna.org	(703) 803-2980
SSINA	Specialty Steel Industry of North America www.ssina.com	(800) 982-0355 (202) 342-8630
SSPC	SSPC: The Society for Protective Coatings www.sspc.org	(877) 281-7772 (412) 281-2331
SWRI	Sealant, Waterproofing, & Restoration Institute www.swrionline.org	(816) 472-7974
TMS	The Masonry Society www.masonrysociety.org	(303) 939-9700
TPI	Truss Plate Institute, Inc. www.tpinst.org	(703) 683-1010
TRI	Tile Roofing Institute www.tileroofing.org	(312) 670-4177
UL	Underwriters Laboratories Inc. www.ul.com	(877) 854-3577 (847) 272-8800
USGBC	U.S. Green Building Council	(800) 795-1747

www.usgbc.org

C. Code Agencies: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities in the following list. Names, telephone numbers, and Web sites are subject to change and are believed to be accurate and up-to-date as of the date of the Contract Documents.

FBC	Florida Building Code www.floridabuildingcode.org	
ICC	International Code Council www.iccsafe.org	(888) 422-7233
ICC-ES	ICC Evaluation Service, Inc. www.icc-es.org	(800) 423-6587 (562) 699-0543
UBC	Uniform Building Code (See ICC)	

D. Federal Government Agencies: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities in the following list. Names, telephone numbers, and Web sites are subject to change and are believed to be accurate and up-to-date as of the date of the Contract Documents.

CE	Army Corps of Engineers www.usace.army.mil	(202) 761-0011
CPSC	Consumer Product Safety Commission www.cpsc.gov	(800) 638-2772 (301) 504-7923
DOC	Department of Commerce www.commerce.gov	(202) 482-2000
DOD	Department of Defense http://.dodssp.daps.dla.mil	(215) 697-6257
DOE	Department of Energy www.energy.gov	(202) 586-9220
EPA	Environmental Protection Agency www.epa.gov	(202) 272-0167
GSA	General Services Administration www.gsa.gov	(800) 488-3111
NIST	National Institute of Standards and Technology www.nist.gov	(301) 975-6478
OSHA	Occupational Safety & Health Administration www.osha.gov	(800) 321-6742 (202) 693-1999
PBS	Public Buildings Service (See GSA)	
USDA	Department of Agriculture www.usda.gov	(202) 720-2791
USPS	Postal Service	(202) 268-2000

www.usps.com

E. Standards and Regulations: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the standards and regulations in the following list. Names, telephone numbers, and Web sites are subject to change and are believed to be accurate and up-to-date as of the date of the Contract Documents.

ADAAG	Americans with Disabilities Act (ADA) Architectural Barriers Act (ABA) Accessibility Guidelines for Buildings and Facilities Available from U.S. Access Board www.access-board.gov	(800) 872-2253 (202) 272-0080
CFR	Code of Federal Regulations Available from Government Printing Office www.gpoaccess.gov/cfr/index.html	(866) 512-1800 (202) 512-1800
DOD	Department of Defense Military Specifications and Standards Available from Department of Defense Single Stock Point http://dodssp.daps.dla.mil	(215) 697-2664
FED-STD	Federal Standard (See FS)	
FS	Federal Specification Available from Department of Defense Single Stock Point http://dodssp.daps.dla.mil	(215) 697-2664
	Available from Defense Standardization Program www.dps.dla.mil	
	Available from General Services Administration www.gsa.gov	(202) 619-8925
	Available from National Institute of Building Sciences www.wbdg.org/ccb	(202) 289-7800
FTMS	Federal Test Method Standard (See FS)	
MIL	(See MILSPEC)	
MIL-STD	(See MILSPEC)	
MILSPEC	Military Specification and Standards Available from Department of Defense Single Stock Point http://dodssp.daps.dla.mil	(215) 697-2664
UFAS	Uniform Federal Accessibility Standards Available from Access Board www.access-board.gov	(800) 872-2253 (202) 272-0080

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 014200

SECTION 015000 - TEMPORARY FACILITIES AND CONTROLS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section includes requirements for temporary utilities, support facilities, and security and protection facilities.
B. Related Sections:

1. Division 01 Section "Summary" for work restrictions and limitations on utility interruptions.
2. Division 31 Section "Dewatering" for disposal of ground water at Project site.
3. Division 32 Section "Concrete Paving" for construction and maintenance of cement concrete pavement for temporary roads and paved areas.

1.3 USE CHARGES

A. General: Installation and removal of and use charges for temporary facilities shall be included in the Contract Sum unless otherwise indicated. Allow other entities to use temporary services and facilities without cost, including, but not limited to, Owner's construction forces, Architect, occupants of Project, testing agencies, and authorities having jurisdiction.
B. Sewer Service: Contractor to establish sewer service and pay sewer service use charges for sewer usage by all entities for construction operations.
C. Water: Contractor to establish water service and pay water service use charges. Provide connections and extensions of services as required for construction operations.

1.4 INFORMATIONAL SUBMITTALS

A. Site Plan: Show temporary facilities, utility hookups, staging areas, and parking areas for construction personnel.
B. Erosion- and Sedimentation-Control Plan: Show compliance with requirements of EPA Construction General Permit or authorities having jurisdiction, whichever is more stringent.
C. Moisture-Protection Plan: Describe procedures and controls for protecting materials and construction from water absorption and damage, including delivery, handling, and storage provisions for materials subject to water absorption or water damage, discarding water-damaged materials, protocols for mitigating water intrusion into completed Work, and replacing water damaged Work.

1. Indicate sequencing of work that requires water, such as grinding, and describe plans for dealing with water from these operations. Show procedures for verifying that wet construction has dried sufficiently to permit installation of finish materials.

D. Dust-Control and HVAC-Control Plan: Submit coordination drawing and narrative that indicates the dust-control measures proposed for use, proposed locations, and proposed time frame for their operation. Identify further options if proposed measures are later determined to be inadequate. Include the following:

1. Locations of dust-control elements at each phase of the work.
2. Waste management plan.

1.5 QUALITY ASSURANCE

A. Electric Service: Comply with NECA, NEMA, and UL standards and regulations for temporary electric service. Install service to comply with NFPA 70. Contractor shall pay for electrical service during construction. Provide connections and extensions of services as required for construction operations.
B. Tests and Inspections: Arrange for authorities having jurisdiction to test and inspect each temporary utility before use. Obtain required certifications and permits.
C. Accessible Temporary Egress: Comply with applicable provisions in the U.S. Architectural & Transportation Barriers Compliance Board's ADA-ABA Accessibility Guidelines and FBC/ANSI A117.1.

1.6 PROJECT CONDITIONS

A. Temporary Use of Permanent Facilities: Engage installer of each permanent service to assume responsibility for operation, maintenance, and protection of each permanent service during its use as a construction facility before Owner's acceptance, regardless of previously assigned responsibilities.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Chain-Link Fencing: Minimum 2-inch , 0.148-inch- thick, galvanized steel, chain-link fabric fencing; minimum 6 feet high with galvanized steel pipe posts; minimum 2-3/8-inch- OD line posts and 2-7/8-inch- OD corner and pull posts, with 1-5/8-inch- OD top rails.
B. Portable Chain-Link Fencing: Minimum 2-inch , 0.148-inch- thick, galvanized steel, chain-link fabric fencing; minimum 6 feet high with galvanized steel pipe posts; minimum 2-3/8-inch- OD line posts and 2-7/8-inch- OD corner and pull posts, with 1-5/8-inch- OD top and bottom rails. Provide concrete or galvanized steel bases for supporting posts.
C. Dust Control: Provide watering as necessary.

2.2 TEMPORARY FACILITIES

A. Field Offices, General: If provided, prefabricated or mobile units with serviceable finishes, temperature controls, and foundations adequate for normal loading.
B. Storage and Fabrication Sheds: Provide sheds or containers sized, furnished, and equipped to accommodate materials and equipment for construction operations.

1. Store combustible materials apart from buildings.

2.3 EQUIPMENT

A. Fire Extinguishers: Portable, UL rated; with class and extinguishing agent as required by locations and classes of fire exposures.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

A. Locate facilities where they will serve Project adequately and result in minimum interference with performance of the Work. Relocate and modify facilities as required by progress of the Work.

1. Locate facilities to limit site disturbance as specified in Division 01 Section "Summary."

B. Provide each facility ready for use when needed to avoid delay. Do not remove until facilities are no longer needed or are replaced by authorized use of completed permanent facilities.

3.2 TEMPORARY UTILITY INSTALLATION

A. General: Install temporary service or connect to existing service.

1. Arrange with utility company, Owner, and existing users for time when service can be interrupted, if necessary, to make connections for temporary services.

B. Sewers and Drainage: Provide temporary utilities to remove effluent lawfully.

1. Connect temporary sewers to municipal system or private system indicated as directed by authorities having jurisdiction.

C. Water Service: Connect to utility provider’s existing water service facilities. Clean and maintain water service facilities in a condition acceptable to Owner.

D. Sanitary Facilities: Provide temporary toilets, wash facilities, and drinking water for use of construction personnel. Comply with requirements of authorities having jurisdiction for type, number, location, operation, and maintenance of fixtures and facilities.

E. Electric Power Service: Connect to utility provider’s existing electric power service. Maintain equipment in a condition acceptable to Owner.

3.3 SUPPORT FACILITIES INSTALLATION

A. General: Comply with the following:

1. Provide construction for temporary offices, shops, and sheds located within construction area or within 30 feet of building lines that is noncombustible according to ASTM E 136. Comply with NFPA 241.

B. Temporary Roads and Paved Areas: Construct and maintain temporary roads and paved areas adequate for construction operations. Locate temporary roads and paved areas within construction limits indicated on Drawings.

1. Provide dust-control treatment that is nonpolluting and nontracking. Reapply treatment as required to minimize dust.

C. Traffic Controls: Comply with requirements of authorities having jurisdiction.

1. Protect existing site improvements to remain including curbs, pavement, and utilities.
2. Maintain access for fire-fighting equipment and access to fire hydrants.

D. Parking: Provide temporary parking areas for construction personnel.

E. Dewatering Facilities and Drains: Comply with requirements of authorities having jurisdiction. Maintain Project site, excavations, and construction free of water.

1. Dispose of rainwater in a lawful manner that will not result in flooding Project or adjoining properties nor endanger permanent Work or temporary facilities.

F. Project Signs: Provide Project signs as indicated. Unauthorized or additional signs are not permitted.

1. Identification Signs: Provide Project identification signs as indicated on Drawings.
2. Temporary Signs: Provide other signs as indicated and as required to inform public and individuals seeking entrance to Project.

a. Provide temporary, directional signs for construction personnel and visitors.

3. Maintain and touchup signs so they are legible at all times.

G. Waste Disposal Facilities: Comply with requirements specified in Division 01 Section "Construction Waste Management and Disposal."
H. Lifts and Hoists: Provide facilities necessary for hoisting materials and personnel.

1. Truck cranes and similar devices used for hoisting materials are considered "tools and equipment" and not temporary facilities.

3.4 SECURITY AND PROTECTION FACILITIES INSTALLATION

A. Environmental Protection: Provide protection, operate temporary facilities, and conduct construction as required to comply with environmental regulations and that minimize possible air, waterway, and subsoil contamination or pollution or other undesirable effects.

1. Comply with work restrictions specified in Division 01 Section "Summary."
2. Comply with Division 30 requirements.

B. Temporary Erosion and Sedimentation Control: Comply with requirements of authorities having jurisdiction, and requirements specified in Divisions 30 and 31.
C. Stormwater Control: Comply with requirements of authorities having jurisdiction. Provide barriers in and around excavations and subgrade construction to prevent flooding by runoff of stormwater from heavy rains.
D. Tree and Plant Protection: Comply with requirements specified in Division 01 Section "Temporary Tree and Plant Protection."
E. Site Gates: Before construction operations begin, furnish and install site gates in a manner that will prevent people from easily entering site except by entrance gates when opened.

1. Extent of Fence: As required to control traffic onto Project site or portion determined sufficient to accommodate construction operations.

F. Barricades, Warning Signs, and Lights: Comply with requirements of authorities having jurisdiction for erecting structurally adequate barricades, including warning signs and lighting.

3.5 OPERATION, TERMINATION, AND REMOVAL

A. Supervision: Enforce strict discipline in use of temporary facilities. To minimize waste and abuse, limit availability of temporary facilities to essential and intended uses.
B. Maintenance: Maintain facilities in good operating condition until removal.
C. Temporary Facility Changeover: Do not change over from using temporary security and protection facilities to permanent facilities until Substantial Completion.
D. Termination and Removal: Remove each temporary facility when need for its service has ended, when it has been replaced by authorized use of a permanent facility, or no later than Substantial Completion. Complete or, if necessary, restore permanent construction that may

have been delayed because of interference with temporary facility. Repair damaged Work, clean exposed surfaces, and replace construction that cannot be satisfactorily repaired.

1. Materials and facilities that constitute temporary facilities are property of Contractor. Owner reserves right to take possession of Project identification signs.
2. Remove temporary roads and paved areas not intended for or acceptable for integration into permanent construction. Where area is intended for landscape development, remove soil and aggregate fill that do not comply with requirements for fill or subsoil. Remove materials contaminated with road oil, asphalt and other petrochemical compounds, and other substances that might impair growth of plant materials or lawns. Repair or replace street paving, curbs, and sidewalks at temporary entrances, as required by authorities having jurisdiction.
3. At Substantial Completion, repair, renovate, and clean permanent facilities used during construction period. Comply with final cleaning requirements specified in Division 01 Section "Closeout Procedures."

END OF SECTION 015000

SECTION 015010 – PROJECT SIGN

See Attached Documents

END OF SECTION 015010

SECTION 016000 - PRODUCT REQUIREMENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes administrative and procedural requirements for selection of products for use in Project; product delivery, storage, and handling; manufacturers' standard warranties on products; special warranties; product substitutions; and comparable products.
B. Related Sections include the following:

1. Division 01 Section "Alternates" for products selected under an alternate if specified.
2. Division 01 Section "References" for applicable industry standards for products specified.
3. Division 01 Section "Closeout Procedures" for submitting warranties for Contract closeout.
4. Divisions 02 through 49 Sections for specific requirements for warranties on products and installations specified to be warranted.

1.3 DEFINITIONS

A. Products: Items purchased for incorporating into the Work, whether purchased for Project or taken from previously purchased stock. The term "product" includes the terms "material," "equipment," "system," and terms of similar intent.

1. Named Products: Items identified by manufacturer's product name, including make or model number or other designation shown or listed in manufacturer's published product literature that is current as of date of the Contract Documents.
2. New Products: Items that have not previously been incorporated into another project or facility. Products salvaged or recycled from other projects are not considered new products.
3. Comparable Product: Product that is demonstrated and approved through submittal process, or where indicated as a product substitution, to have the indicated qualities related to type, function, dimension, in-service performance, physical properties, appearance, and other characteristics that equal or exceed those of specified product.

    a. An item shall not be considered for a comparable product where the product is of foreign manufacture and/or if the manufacturer is currently under investigation or litigation for production of products, or have been found guilty of production of products, that contain chemicals that may be harmful to human health.

B. Substitutions: Changes in products, materials, equipment, and methods of construction from those required by the Contract Documents and proposed by Contractor. Refer to Section 008200, Special Conditions for Substitution requests procedures.
C. Basis-of-Design Product Specification: Where a specific manufacturer's product is named and accompanied by the words "basis of design," including make or model number or other designation, to establish the significant qualities related to type, function, dimension, in-service

performance, physical properties, appearance, and other characteristics for purposes of evaluating comparable products of other named manufacturers.

1.4 SUBMITTALS

A. Product List: Submit a list, in tabular from, showing specified products. Include generic names of products required. Include manufacturer's name and proprietary product names for each product.

1. Coordinate product list with Contractor's Construction Schedule and the Submittals Schedule.
2. Form: Tabulate information for each product under the following column headings:

a. Specification Section number and title.
b. Generic name used in the Contract Documents.
c. Proprietary name, model number, and similar designations.
d. Manufacturer's name and address.
e. Supplier's name and address.
f. Installer's name and address.
g. Projected delivery date or time span of delivery period.
h. Identification of items that require early submittal approval for scheduled delivery date.

3. Initial Submittal: Within thirty (30) days after date of commencement of the Work, submit 3 copies of initial product list. Include a written explanation for omissions of data and for variations from Contract requirements.

a. At Contractor's option, initial submittal may be limited to product selections and designations that must be established early in Contract period.

4. Completed List: Within ninety (90) days after date of commencement of the Work, submit 3 copies of completed product list. Include a written explanation for omissions of data and for variations from Contract requirements.
5. Architect's Action: Architect will respond in writing to Contractor within fifteen (15) days of receipt of completed product list. Architect's response will include a list of unacceptable product selections and a brief explanation of reasons for this action. Architect's response, or lack of response, does not constitute a waiver of requirement to comply with the Contract Documents.

B. Substitution Requests: Requests for substitution will not be accepted by the Architect after the bidding process and in accordance with Section 008200, Special Conditions (Article 15, Substitution of Materials and Equipment) unless the Architect agrees to consider afterwards. Submit three copies of each request for consideration. Identify product or fabrication or installation method to be replaced. Include Specification Section number and title and Drawing numbers and titles.

1. **Submit Request for Substitution at least thirty (30) days prior to the scheduled submittal date of the specified product or service noted above.**

C. Basis-of-Design Product Specification Submittal: Comply with requirements in Division 01 Section "Submittal Procedures." Show compliance with requirements.

1.5 QUALITY ASSURANCE

A. Compatibility of Options: If Contractor is given option of selecting between two or more products for use on Project, product selected shall be compatible with products previously selected, even if previously selected products were also options.

1.6 PRODUCT DELIVERY, STORAGE, AND HANDLING

A. Deliver, store, and handle products using means and methods that will prevent damage, deterioration, and loss, including theft. Comply with manufacturer's written instructions.
B. Delivery and Handling:

1. Schedule delivery to minimize long-term storage at Project site and to prevent overcrowding of construction spaces.
2. Coordinate delivery with installation time to ensure minimum holding time for items that are flammable, hazardous, easily damaged, or sensitive to deterioration, theft, and other losses.
3. Deliver products to Project site in an undamaged condition in manufacturer's original sealed container or other packaging system, complete with labels and instructions for handling, storing, unpacking, protecting, and installing.
4. Inspect products on delivery to ensure compliance with the Contract Documents and to ensure that products are undamaged and properly protected.

C. Storage:

1. Store products to allow for inspection and measurement of quantity or counting of units.
2. Store materials in a manner that will not endanger Project structure.
3. Store products that are subject to damage by the elements, under cover in a weathertight enclosure above ground, with ventilation adequate to prevent condensation.
4. Store cementitious products and materials on elevated platforms.
5. Store foam plastic from exposure to sunlight, except to extent necessary for period of installation and concealment.
6. Comply with product manufacturer's written instructions for temperature, humidity, ventilation, and weather-protection requirements for storage.
7. Protect stored products from damage and liquids from freezing.

1.7 PRODUCT WARRANTIES

A. Warranties specified in other Sections shall be in addition to, and run concurrent with, other warranties required by the Contract Documents. Manufacturer's disclaimers and limitations on product warranties do not relieve Contractor of obligations under requirements of the Contract Documents.

1. Manufacturer's Warranty: Preprinted written warranty published by individual manufacturer for a particular product and specifically endorsed by manufacturer to Owner.
2. Special Warranty: Written warranty required by or incorporated into the Contract Documents, either to extend time limit provided by manufacturer's warranty or to provide more rights for Owner.

B. Special Warranties: Prepare a written document that contains appropriate terms and identification, ready for execution. Submit a draft for approval before final execution.

1. Manufacturer's Standard Form: Modified to include Project-specific information and properly executed.
2. Refer to Divisions 02 through 49 Sections for specific content requirements and particular requirements for submitting special warranties.

C. Submittal Time: Comply with requirements in Division 01 Section "Closeout Procedures."

PART 2 - PRODUCTS

2.1 PRODUCT SELECTION PROCEDURES

A. General Product Requirements: Provide products that comply with the Contract Documents, that are undamaged and, unless otherwise indicated, that are new at time of installation.

1. Provide products complete with accessories, trim, finish, fasteners, and other items needed for a complete installation and indicated use and effect.
2. Standard Products: If available, and unless custom products or nonstandard options are specified, provide standard products of types that have been produced and used successfully in similar situations on other projects.
3. Owner reserves the right to limit selection to products with warranties not in conflict with requirements of the Contract Documents.
4. Where products are accompanied by the term "as selected," Architect will make selection.
5. Where products are accompanied by the term "match sample," sample to be matched is Architect's.
6. Descriptive, performance, and reference standard requirements in the Specifications establish "salient characteristics" of products.

B. Product Selection Procedures:

1. Available Products: Where Specifications include a list of names of both products and manufacturers, provide one of the products listed, or an unnamed product, that complies with requirements. Comply with provisions in Part 2 "Comparable Products" Article for consideration of an unnamed product.
2. Comply with the State of Florida requirements for “buy Florida first.”
3. Pay special attention to the Florida Product Approval requirements for products used in the building exterior and envelope.
4. Available Manufacturers: Where Specifications include a list of manufacturers, provide a product by one of the manufacturers listed, or an unnamed manufacturer, that complies with requirements. Comply with provisions in Part 2 "Comparable Products" Article for consideration of an unnamed product.
5. Product Options: Where Specifications indicate that sizes, profiles, and dimensional requirements on Drawings are based on a specific product or system, provide the specified product or system. Comply with provisions in Part 2 "Product Substitutions" Article for consideration of an unnamed product or system.
6. Basis-of-Design Product: Where Specifications name a product and include a list of manufacturers, provide the specified product or a comparable product by one of the other named manufacturers. Drawings and Specifications indicate sizes, profiles, dimensions, and other characteristics that are based on the product named. Comply with provisions in Part 2 "Comparable Products" Article for consideration of an unnamed product by the other named manufacturers.

2.2 PRODUCT SUBSTITUTIONS/COMPARABLE PRODUCTS

A. Timing: Requests for substitution will not be accepted by the Architect after the bidding process and in accordance with Section 008200, Special Conditions (Article 15, Substitution of Materials and Equipment) unless the Architect agrees to consider afterwards. If the Architect agrees to consider requests for substitution after the bidding period, Architect must receive requests that are completely documented within 30 days after commencement of the Work. Requests received after that time may be considered or rejected at discretion of Architect.

B. Conditions: If the following conditions are not satisfied, Architect will return requests without action, except to record noncompliance with these requirements:

1. Requested substitution offers Owner a substantial advantage in cost, time, energy conservation, or other considerations, after deducting additional responsibilities Owner must assume. Owner's additional responsibilities may include compensation to Architect for redesign and evaluation services, increased cost of other construction by Owner, and similar considerations.
2. Requested substitution does not require revisions to the Contract Documents.
3. Requested substitution is consistent with the Contract Documents and will produce indicated results.
4. Substitution request is fully documented and properly submitted.
5. Requested substitution will not adversely affect Contractor's Construction Schedule.
6. Requested substitution has received necessary approvals of authorities having jurisdiction.
7. Requested substitution is compatible with other portions of the Work.
8. Requested substitution has been coordinated with other portions of the Work.
9. Requested substitution provides specified warranty.
10. Samples, if requested.

PART 3 - EXECUTION (Not Used)

END OF SECTION 016000

SECTION 017300 - EXECUTION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes general procedural requirements governing execution of the Work including, but not limited to, the following:

1. Construction layout.
2. Field engineering and surveying.
3. General installation of products.
4. Coordination of Owner-installed products.
5. Progress cleaning.
6. Starting and adjusting.
7. Protection of installed construction.
8. Correction of the Work.

B. Related Sections include the following:

1. Division 01 Section "Project Management and Coordination" for procedures for coordinating field engineering with other construction activities.
2. Division 01 Section "Submittal Procedures" for submitting surveys.
3. Division 01 Section "Cutting and Patching" for procedural requirements for cutting and patching necessary for the installation or performance of other components of the Work.
4. Division 01 Section "Closeout Procedures" for submitting final property survey with Project Record Documents, recording of Owner-accepted deviations from indicated lines and levels, and final cleaning.

1.3 SUBMITTALS

A. Qualification Data: For land surveyor.
B. Certificates: Submit certificate signed by land surveyor certifying that location and elevation of improvements comply with requirements.
C. Landfill Receipts: Submit copy of receipts issued by a landfill facility, licensed to accept hazardous materials, for hazardous waste disposal.
D. Certified Surveys: Submit two copies signed by land surveyor.

1.4 QUALITY ASSURANCE

A. Land Surveyor Qualifications: A professional land surveyor who is legally qualified to practice in jurisdiction where Project is located and who is experienced in providing land-surveying services of the kind indicated.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 EXAMINATION

A. Existing Utilities: The existence and location of underground and other utilities and construction indicated as existing are not guaranteed. Before beginning sitework, investigate and verify the existence and location of underground utilities and other construction affecting the Work.

1. Before construction, verify the location and invert elevation at points of connection of sanitary sewer, storm sewer, and water-service piping; and underground electrical services.
2. Furnish location data for work related to Project that must be performed by public utilities serving Project site.

B. Acceptance of Conditions: Examine substrates, areas, and conditions, with Installer or Applicator present where indicated, for compliance with requirements for installation tolerances and other conditions affecting performance. Record observations.

1. Written Report: Where a written report listing conditions detrimental to performance of the Work is required by other Sections, include the following:

a. Description of the Work.
b. List of detrimental conditions, including substrates.
c. List of unacceptable installation tolerances.
d. Recommended corrections.

2. Proceed with installation only after unsatisfactory conditions have been corrected. Proceeding with the Work indicates acceptance of surfaces and conditions.

3.2 PREPARATION

A. Existing Utility Information: Furnish information to Owner that is necessary to adjust, move, or relocate existing utility structures, utility poles, lines, services, or other utility appurtenances located in or affected by construction. Coordinate with authorities having jurisdiction.
B. Space Requirements: Verify space requirements and dimensions of items shown diagrammatically on Drawings.
C. Review of Contract Documents and Field Conditions: Immediately on discovery of the need for clarification of the Contract Documents, submit a request for information to Architect. Include a detailed description of problem encountered, together with recommendations for changing the Contract Documents.

3.3 CONSTRUCTION LAYOUT

A. Verification: Before proceeding to lay out the Work, verify layout information shown on Drawings, in relation to the property survey and existing benchmarks. If discrepancies are discovered, notify Architect promptly.
B. General: Engage a land surveyor to lay out the Work using accepted surveying practices.

1. Establish benchmarks and control points to set lines and levels at each story of construction and elsewhere as needed to locate each element of Project.
2. Establish dimensions within tolerances indicated. Do not scale Drawings to obtain required dimensions.
3. Inform installers of lines and levels to which they must comply.
4. Check the location, level and plumb, of every major element as the Work progresses.

5. Notify Architect when deviations from required lines and levels exceed allowable tolerances.
6. Close site surveys with an error of closure equal to or less than the standard established by authorities having jurisdiction.

C. Site Improvements: Locate and lay out site improvements, including pavements, grading, fill and topsoil placement, utility slopes, and invert elevations.

D. Building Lines and Levels: Locate and lay out control lines and levels for structures, building foundations, including those required for mechanical and electrical work. Transfer survey markings and elevations for use with control lines and levels. Level foundations and piers from two or more locations.

E. Record Log: Maintain a log of layout control work. Record deviations from required lines and levels. Include beginning and ending dates and times of surveys, weather conditions, name and duty of each survey party member, and types of instruments and tapes used. Make the log available for reference by Architect.

3.4 FIELD ENGINEERING

A. Reference Points: Locate existing permanent benchmarks, control points, and similar reference points before beginning the Work. Preserve and protect permanent benchmarks and control points during construction operations.

1. Do not change or relocate existing benchmarks or control points without prior written approval of Architect. Report lost or destroyed permanent benchmarks or control points promptly. Report the need to relocate permanent benchmarks or control points to Architect before proceeding.
2. Replace lost or destroyed permanent benchmarks and control points promptly. Base replacements on the original survey control points.

B. Benchmarks: Establish and maintain a minimum of two permanent benchmarks on Project site, referenced to data established by survey control points. Comply with authorities having jurisdiction for type and size of benchmark.

1. Record benchmark locations, with horizontal and vertical data, on Project Record Documents.
2. Where the actual location or elevation of layout points cannot be marked, provide temporary reference points sufficient to locate the Work.
3. Remove temporary reference points when no longer needed. Restore marked construction to its original condition.

C. Certified Survey: On completion of foundation walls, major site improvements, and other work requiring field-engineering services, prepare a certified survey showing dimensions, locations, angles, and elevations of construction and Sitework for each building within the project.

3.5 INSTALLATION

A. General: Locate the Work and components of the Work accurately, in correct alignment and elevation, as indicated.

1. Make vertical work plumb and make horizontal work level.
2. Where space is limited, install components to maximize space available for maintenance and ease of removal for replacement.
3. Conceal pipes, ducts, and wiring in finished areas, unless otherwise indicated.
4. Maintain minimum headroom clearance of 10 feet in spaces without a suspended ceiling.

B. Comply with manufacturer's written instructions and recommendations for installing products in applications indicated.
C. Install products at the time and under conditions that will ensure the best possible results. Maintain conditions required for product performance until Substantial Completion.
D. Conduct construction operations so no part of the Work is subjected to damaging operations or loading in excess of that expected during normal conditions of occupancy.
E. Tools and Equipment: Do not use tools or equipment that produce harmful noise levels.
F. Templates: Obtain and distribute to the parties involved templates for work specified to be factory prepared and field installed. Check Shop Drawings of other work to confirm that adequate provisions are made for locating and installing products to comply with indicated requirements.
G. Anchors and Fasteners: Provide anchors and fasteners as required to anchor each component securely in place, accurately located and aligned with other portions of the Work.

    1. Mounting Heights: Where mounting heights are not indicated, mount components at heights directed by Architect.
    2. Allow for thermal movement, including thermal expansion and contraction.
    3. Coordinate installation of anchorages. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors, that are to be embedded in concrete or masonry. Deliver such items to Project site in time for installation.

H. Joints: Make joints of uniform width. Where joint locations in exposed work are not indicated, arrange joints for the best visual effect. Fit exposed connections together to form hairline joints.
I. Hazardous Materials: Use products, cleaners, and installation materials that are not considered hazardous.

3.6 PROGRESS CLEANING

A. General: Clean Project site and work areas daily, including common areas. Coordinate progress cleaning for joint-use areas where more than one installer has worked. Enforce requirements strictly. Dispose of materials lawfully.

    1. Comply with requirements in NFPA 241 for removal of combustible waste materials and debris.
    2. Do not hold materials more than 7 days during normal weather or 3 days if the temperature is expected to rise above 80 deg F .
    3. Containerize hazardous and unsanitary waste materials separately from other waste. Mark containers appropriately and dispose of legally, according to regulations.

B. Site: Maintain Project site free of waste materials and debris.
C. Work Areas: Clean areas where work is in progress to the level of cleanliness necessary for proper execution of the Work.

    1. Remove liquid spills promptly.
    2. Where dust would impair proper execution of the Work, broom-clean or vacuum the entire work area, as appropriate.

D. Installed Work: Keep installed work clean. Clean installed surfaces according to written instructions of manufacturer or fabricator of product installed, using only cleaning materials specifically recommended. If specific cleaning materials are not recommended, use cleaning materials that are not hazardous to health or property and that will not damage exposed surfaces.
E. Concealed Spaces: Remove debris from concealed spaces before enclosing the space.
F. Exposed Surfaces in Finished Areas: Clean exposed surfaces and protect as necessary to ensure freedom from damage and deterioration at time of Substantial Completion.
G. Waste Disposal: Burying or burning waste materials on-site will not be permitted. Washing waste materials down sewers or into waterways will not be permitted.

H. During handling and installation, clean and protect construction in progress and adjoining materials already in place. Apply protective covering where required to ensure protection from damage or deterioration at Substantial Completion.
I. Clean and provide maintenance on completed construction as frequently as necessary through the remainder of the construction period. Adjust and lubricate operable components to ensure operability without damaging effects.
J. Limiting Exposures: Supervise construction operations to assure that no part of the construction, completed or in progress, is subject to harmful, dangerous, damaging, or otherwise deleterious exposure during the construction period.

3.7 STARTING AND ADJUSTING

A. Start equipment and operating components to confirm proper operation. Remove malfunctioning units, replace with new units, and retest.
B. Adjust operating components for proper operation without binding. Adjust equipment for proper operation.
C. Test each piece of equipment to verify proper operation. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.
D. Manufacturer's Field Service: If a factory-authorized service representative is required to inspect field-assembled components and equipment installation, comply with qualification requirements in Division 01 Section "Quality Requirements."

3.8 PROTECTION OF INSTALLED CONSTRUCTION

A. Provide final protection and maintain conditions that ensure installed Work is without damage or deterioration at time of Substantial Completion.

3.9 CORRECTION OF THE WORK

A. Repair or remove and replace defective construction. Restore damaged substrates and finishes. Comply with requirements in Division 01 Section "Cutting and Patching."

    1. Repairing includes replacing defective parts, refinishing damaged surfaces, touching up with matching materials, and properly adjusting operating equipment.

B. Restore permanent facilities used during construction to their specified condition.
C. Remove and replace damaged surfaces that are exposed to view if surfaces cannot be repaired without visible evidence of repair.
D. Repair components that do not operate properly. Remove and replace operating components that cannot be repaired.
E. Remove and replace chipped, scratched, and broken surfaces.

END OF SECTION 017300

SECTION 017700 - CLOSEOUT PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes administrative and procedural requirements for contract closeout, including, but not limited to, the following:

1. Inspection procedures.
2. Warranties.
3. Final cleaning.

B. Related Sections include the following:

1. Division 01 Section "Payment Procedures" for requirements for Applications for Payment for Substantial and Final Completion.
2. Division 01 Section "Execution" for progress cleaning of Project site.
3. Division 01 Section "Project Record Documents" for submitting Record Drawings, Record Specifications, and Record Product Data.
4. Division 01 Section "Operation and Maintenance Data" for operation and maintenance manual requirements.
5. Division 01 Section "Demonstration and Training" for requirements for instructing Owner's personnel.
6. Divisions 02 through 49 Sections for specific closeout and special cleaning requirements for the Work in those Sections.

1.3 SUBSTANTIAL COMPLETION

A. Preliminary Procedures: Before requesting inspection for determining date of Substantial Completion, complete the following. List items below that are incomplete in request.

1. Prepare a list of items to be completed and corrected (punch list), the value of items on the list, and reasons why the Work is not complete.
2. Advise Owner of pending insurance changeover requirements.
3. Submit specific warranties, workmanship bonds, maintenance service agreements, final certifications, and similar documents.
4. Obtain and submit releases permitting Owner unrestricted use of the Work and access to services and utilities. Include occupancy permits, operating certificates, and similar releases.
5. Prepare and submit Project Record Documents, operation and maintenance manuals, Final Completion construction photographs, damage or settlement surveys, property surveys, and similar final record information.
6. Deliver tools, spare parts, extra materials, and similar items to location designated by Owner. Label with manufacturer's name and model number where applicable.
7. Complete startup testing of systems.

8. Terminate and remove temporary facilities from Project site, along with mockups, construction tools, and similar elements.
9. Submit changeover information related to Owner's occupancy, use, operation, and maintenance.
10. Complete final cleaning requirements, including touchup painting.
11. Touch up and otherwise repair and restore marred exposed finishes to eliminate visual defects.

B. Inspection: Submit a written request for inspection for Substantial Completion. On receipt of request, Architect will either proceed with inspection or notify Contractor of unfulfilled requirements. Architect will prepare the Certificate of Substantial Completion after inspection or will notify Contractor of items, either on Contractor's list or additional items identified by Architect that must be completed or corrected before certificate will be issued.

1. Reinspection: Request reinspection when the Work identified in previous inspections as incomplete is completed or corrected.
2. Results of completed inspection will form the basis of requirements for Final Completion.

1.4 FINAL COMPLETION

A. Preliminary Procedures: Before requesting final inspection for determining date of Final Completion, complete the following:

1. Submit a final Application for Payment according to Division 01 Section "Payment Procedures."
2. Submit certified copy of Architect's Substantial Completion inspection list of items to be completed or corrected (punch list), endorsed and dated by Architect. The certified copy of the list shall state that each item has been completed or otherwise resolved for acceptance.
3. Submit evidence of final, continuing insurance coverage complying with insurance requirements.
4. Instruct Owner's personnel in operation, adjustment, and maintenance of products, equipment, and systems. Submit demonstration and training videotapes.

B. Inspection: Submit a written request for final inspection for acceptance. On receipt of request, Architect will either proceed with inspection or notify Contractor of unfulfilled requirements. Architect will prepare a final Certificate for Payment after inspection or will notify Contractor of construction that must be completed or corrected before certificate will be issued.

1. Reinspection: Request reinspection when the Work identified in previous inspections as incomplete is completed or corrected.

1.5 LIST OF INCOMPLETE ITEMS (PUNCH LIST)

A. Preparation: Submit three copies of list. Include name and identification of each space and area affected by construction operations for incomplete items and items needing correction including, if necessary, areas disturbed by Contractor that are outside the limits of construction.

1. Organize list of spaces in sequential order, starting with exterior areas first.
2. Organize items applying to each space by major element.
3. Include the following information at the top of each page:

    a. Project name.
    b. Date.
    c. Name of Architect.
    d. Name of Contractor.

e. Page number.

1.6 WARRANTIES

A. Submittal Time: Submit written warranties on request of Architect for designated portions of the Work where commencement of warranties other than date of Substantial Completion is indicated.
B. Partial Occupancy: Submit properly executed warranties within 15 days of completion of designated portions of the Work that are completed and occupied or used by Owner during construction period by separate agreement with Contractor.
C. Organize warranty documents into an orderly sequence based on the table of contents of the Project Manual.

1. Bind warranties and bonds in heavy-duty, 3-ring, vinyl-covered, loose-leaf binders, thickness as necessary to accommodate contents, and sized to receive 8-1/2-by-11-inch paper.
2. Provide heavy paper dividers with plastic-covered tabs for each separate warranty. Mark tab to identify the product or installation. Provide a typed description of the product or installation, including the name of the product and the name, address, and telephone number of Installer.
3. Identify each binder on the front and spine with the typed or printed title "WARRANTIES," Project name, and name of Contractor.

D. Provide additional copies of each warranty to include in operation and maintenance manuals.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Cleaning Agents: Use cleaning materials and agents recommended by manufacturer or fabricator of the surface to be cleaned. Do not use cleaning agents that are potentially hazardous to health or property or that might damage finished surfaces.

PART 3 - EXECUTION

3.1 FINAL CLEANING

A. General: Provide final cleaning. Conduct cleaning and waste-removal operations to comply with local laws and ordinances and Federal and local environmental and antipollution regulations.
B. Cleaning: Employ experienced workers or professional cleaners for final cleaning. Clean each surface or unit to condition expected in an average commercial building cleaning and maintenance program. Comply with manufacturer's written instructions.

1. Complete the following cleaning operations before requesting inspection for certification of Substantial Completion for entire Project or for a portion of Project:

a. Clean Project site, yard, and grounds, in areas disturbed by construction activities, including landscape development areas, of rubbish, waste material, litter, and other foreign substances.
b. Sweep paved areas broom clean. Remove petrochemical spills, stains, and other foreign deposits.

c. Rake grounds that are neither planted nor paved to a smooth, even-textured surface.
d. Remove tools, construction equipment, machinery, and surplus material from Project site.
e. Clean exposed exterior hard-surfaced finishes to a dirt-free condition, free of stains, films, and similar foreign substances. Avoid disturbing natural weathering of exterior surfaces. Restore reflective surfaces to their original condition.
f. Remove labels that are not permanent.
g. Touch up and otherwise repair and restore marred, exposed finishes and surfaces. Replace finishes and surfaces that cannot be satisfactorily repaired or restored or that already show evidence of repair or restoration.

    1) Do not paint over "UL" and similar labels, including mechanical and electrical nameplates.

h. Wipe surfaces of mechanical and electrical equipment, and similar equipment. Remove excess lubrication, paint and mortar droppings, and other foreign substances.
i. Clean light fixtures, lamps, globes, and reflectors to function with full efficiency. Replace burned-out bulbs, and those noticeably dimmed by hours of use, and defective and noisy starters in fluorescent and mercury vapor fixtures to comply with requirements for new fixtures.
j. Leave Project clean and ready for occupancy.

C. Comply with safety standards for cleaning. Do not burn waste materials. Do not bury debris or excess materials on Owner's property. Do not discharge volatile, harmful, or dangerous materials into drainage systems. Remove waste materials from Project site and dispose of lawfully.

END OF SECTION 017700

SECTION 017823 - OPERATION AND MAINTENANCE DATA

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes administrative and procedural requirements for preparing operation and maintenance manuals, including the following:

1. Operation and maintenance documentation directory.
2. Emergency manuals.
3. Operation manuals for systems, subsystems, and equipment.
4. Maintenance manuals for the care and maintenance of products, materials, finishes, systems and equipment.

B. Related Sections include the following:

1. Division 01 Section "Submittal Procedures" for submitting copies of submittals for operation and maintenance manuals.
2. Division 01 Section "Closeout Procedures" for submitting operation and maintenance manuals.
3. Division 01 Section "Project Record Documents" for preparing Record Drawings for operation and maintenance manuals.
4. Divisions 02 through 49 Sections for specific operation and maintenance manual requirements for the Work in those Sections.

1.3 DEFINITIONS

A. System: An organized collection of parts, equipment, or subsystems united by regular interaction.
B. Subsystem: A portion of a system with characteristics similar to a system.

1.4 SUBMITTALS

A. Initial Submittal: Submit 2 draft copies of each manual at least 7 days before requesting inspection for Substantial Completion. Include a complete operation and maintenance directory. Architect will return one copy of draft and mark whether general scope and content of manual are acceptable.
B. Final Submittal: Submit one (1) copies of each manual in final form at least 5 days before final inspection. Architect will return copy with comments within 7 days after final inspection.

1. Correct or modify each manual to comply with Architect's comments. Submit 3 copies of each corrected manual within 7 days of receipt of Architect's comments.

1.5 COORDINATION

A. Where operation and maintenance documentation includes information on installations by more than one factory-authorized service representative, assemble and coordinate information furnished by representatives and prepare manuals.

PART 2 - PRODUCTS

2.1 OPERATION AND MAINTENANCE DOCUMENTATION DIRECTORY

A. Organization: Include a section in the directory for each of the following:

1. List of documents.
2. List of systems.
3. List of equipment.
4. Table of contents.

B. List of Systems and Subsystems: List systems alphabetically. Include references to operation and maintenance manuals that contain information about each system.

C. List of Equipment: List equipment for each system, organized alphabetically by system. For pieces of equipment not part of system, list alphabetically in separate list.

D. Tables of Contents: Include a table of contents for each emergency, operation, and maintenance manual.

E. Identification: In the documentation directory and in each operation and maintenance manual, identify each system, subsystem, and piece of equipment with same designation used in the Contract Documents. If no designation exists, assign a designation according to ASHRAE Guideline 4, "Preparation of Operating and Maintenance Documentation for Building Systems."

2.2 MANUALS, GENERAL

A. Organization: Unless otherwise indicated, organize each manual into a separate section for each system and subsystem, and a separate section for each piece of equipment not part of a system. Each manual shall contain the following materials, in the order listed:

1. Title page.
2. Table of contents.
3. Manual contents.

B. Title Page: Enclose title page in transparent plastic sleeve. Include the following information:

1. Subject matter included in manual.
2. Name and address of Project.
3. Name and address of Owner.
4. Date of submittal.
5. Name, address, and telephone number of Contractor.
6. Name and address of Architect.
7. Cross-reference to related systems in other operation and maintenance manuals.

C. Table of Contents: List each product included in manual, identified by product name, indexed to the content of the volume, and cross-referenced to Specification Section number in Project Manual.

1. If operation or maintenance documentation requires more than one volume to accommodate data, include comprehensive table of contents for all volumes in each volume of the set.

D. Manual Contents: Organize into sets of manageable size. Arrange contents alphabetically by system, subsystem, and equipment. If possible, assemble instructions for subsystems, equipment, and components of one system into a single binder.

1. Binders: Heavy-duty, 3-ring, vinyl-covered, loose-leaf binders, in thickness necessary to accommodate contents, sized to hold 8-1/2-by-11-inch paper; with clear plastic sleeve on spine to hold label describing contents and with pockets inside covers to hold folded oversize sheets.

    a. Identify each binder on front and spine, with printed title "OPERATION AND MAINTENANCE MANUAL," Project title or name, and subject matter of contents. Indicate volume number for multiple-volume sets.

2. Dividers: Heavy-paper dividers with plastic-covered tabs for each section. Mark each tab to indicate contents. Include typed list of products and major components of equipment included in the section on each divider, cross-referenced to Specification Section number and title of Project Manual.
3. Protective Plastic Sleeves: Transparent plastic sleeves designed to enclose diagnostic software diskettes for computerized electronic equipment.
4. Supplementary Text: Prepared on 8-1/2-by-11-inch white bond paper.
5. Drawings: Attach reinforced, punched binder tabs on drawings and bind with text.

    a. If oversize drawings are necessary, fold drawings to same size as text pages and use as foldouts.
    b. If drawings are too large to be used as foldouts, fold and place drawings in labeled envelopes and bind envelopes in rear of manual. At appropriate locations in manual, insert typewritten pages indicating drawing titles, descriptions of contents, and drawing locations.

2.3 EMERGENCY MANUALS

A. Content: Organize manual into a separate section for each of the following:

1. Type of emergency.
2. Emergency instructions.
3. Emergency procedures.

B. Type of Emergency: Where applicable for each type of emergency indicated below, include instructions and procedures for each system, subsystem, piece of equipment, and component:

1. Flood.
2. Gas leak.
3. Water leak.
4. Power failure.
5. Water outage.
6. System, subsystem, or equipment failure.

C. Emergency Instructions: Describe and explain warnings, trouble indications, error messages, and similar codes and signals. Include responsibilities of Owner's operating personnel for notification of Installer, supplier, and manufacturer to maintain warranties.

D. Emergency Procedures: Include the following, as applicable:

1. Instructions on stopping.
2. Shutdown instructions for each type of emergency.
3. Operating instructions for conditions outside normal operating limits.
4. Required sequences for electric or electronic systems.
5. Special operating instructions and procedures.

2.4 OPERATION MANUALS

A. Content: In addition to requirements in this Section, include operation data required in individual Specification Sections and the following information:

1. System, subsystem, and equipment descriptions.
2. Performance and design criteria if Contractor is delegated design responsibility.
3. Operating standards.
4. Operating procedures.
5. Operating logs.
6. Wiring diagrams.
7. Control diagrams.
8. Piped system diagrams.
9. Precautions against improper use.
10. License requirements including inspection and renewal dates.

B. Descriptions: Include the following:

1. Product name and model number.
2. Manufacturer's name.
3. Equipment identification with serial number of each component.
4. Equipment function.
5. Operating characteristics.
6. Limiting conditions.
7. Performance curves.
8. Engineering data and tests.
9. Complete nomenclature and number of replacement parts.

C. Operating Procedures: Include the following, as applicable:

1. Startup procedures.
2. Equipment or system break-in procedures.
3. Routine and normal operating instructions.
4. Regulation and control procedures.
5. Instructions on stopping.
6. Normal shutdown instructions.
7. Seasonal and weekend operating instructions.
8. Required sequences for electric or electronic systems.
9. Special operating instructions and procedures.

D. Systems and Equipment Controls: Describe the sequence of operation, and diagram controls as installed.

E. Piped Systems: Diagram piping as installed, and identify color-coding where required for identification.

2.5 PRODUCT MAINTENANCE MANUAL

A. Content: Organize manual into a separate section for each product, material, and finish. Include source information, product information, maintenance procedures, repair materials and sources, and warranties and bonds, as described below.

B. Source Information: List each product included in manual identified by product name and arranged to match manual's table of contents. For each product, list name, address, and telephone number of Installer or supplier and maintenance service agent, and cross-reference Specification Section number and title in Project Manual.

C. Product Information: Include the following, as applicable:

1. Product name and model number.
2. Manufacturer's name.

3. Color, pattern, and texture.
4. Material and chemical composition.
5. Reordering information for specially manufactured products.

D. Maintenance Procedures: Include manufacturer's written recommendations and the following:

1. Inspection procedures.
2. Types of cleaning agents to be used and methods of cleaning.
3. List of cleaning agents and methods of cleaning detrimental to product.
4. Schedule for routine cleaning and maintenance.
5. Repair instructions.

E. Repair Materials and Sources: Include lists of materials and local sources of materials and related services.

F. Warranties and Bonds: Include copies of warranties and bonds and lists of circumstances and conditions that would affect validity of warranties or bonds.

1. Include procedures to follow and required notifications for warranty claims.

2.6 SYSTEMS AND EQUIPMENT MAINTENANCE MANUAL

A. Content: For each system, subsystem, and piece of equipment not part of a system, include source information, manufacturers' maintenance documentation, maintenance procedures, maintenance and service schedules, spare parts list and source information, maintenance service contracts, and warranty and bond information, as described below.

B. Source Information: List each system, subsystem, and piece of equipment included in manual, identified by product name and arranged to match manual's table of contents. For each product, list name, address, and telephone number of Installer or supplier and maintenance service agent, and cross-reference Specification Section number and title in Project Manual.

C. Manufacturers' Maintenance Documentation: Manufacturers' maintenance documentation including the following information for each component part or piece of equipment:

1. Standard printed maintenance instructions and bulletins.
2. Drawings, diagrams, and instructions required for maintenance, including disassembly and component removal, replacement, and assembly.
3. Identification and nomenclature of parts and components.
4. List of items recommended to be stocked as spare parts.

D. Maintenance Procedures: Include the following information and items that detail essential maintenance procedures:

1. Test and inspection instructions.
2. Troubleshooting guide.
3. Precautions against improper maintenance.
4. Disassembly; component removal, repair, and replacement; and reassembly instructions.
5. Aligning, adjusting, and checking instructions.
6. Demonstration and training videotape, if available.

E. Maintenance and Service Schedules: Include service and lubrication requirements, list of required lubricants for equipment, and separate schedules for preventive and routine maintenance and service with standard time allotment.

1. Scheduled Maintenance and Service: Tabulate actions for daily, weekly, monthly, quarterly, semiannual, and annual frequencies.
2. Maintenance and Service Record: Include manufacturers' forms for recording maintenance.

F. Spare Parts List and Source Information: Include lists of replacement and repair parts, with parts identified and cross-referenced to manufacturers' maintenance documentation and local sources of maintenance materials and related services.
G. Maintenance Service Contracts: Include copies of maintenance agreements with name and telephone number of service agent.
H. Warranties and Bonds: Include copies of warranties and bonds and lists of circumstances and conditions that would affect validity of warranties or bonds.

1. Include procedures to follow and required notifications for warranty claims.

PART 3 - EXECUTION

3.1 MANUAL PREPARATION

A. Operation and Maintenance Documentation Directory: Prepare a separate manual that provides an organized reference to emergency, operation, and maintenance manuals.
B. Emergency Manual: Assemble a complete set of emergency information indicating procedures for use by emergency personnel and by Owner's operating personnel for types of emergencies indicated.
C. Product Maintenance Manual: Assemble a complete set of maintenance data indicating care and maintenance of each product, material, and finish incorporated into the Work.
D. Operation and Maintenance Manuals: Assemble a complete set of operation and maintenance data indicating operation and maintenance of each system, subsystem, and piece of equipment not part of a system.

1. Engage a factory-authorized service representative to assemble and prepare information for each system, subsystem, and piece of equipment not part of a system.
2. Prepare a separate manual for each system and subsystem, in the form of an instructional manual for use by Owner's operating personnel.

E. Manufacturers' Data: Where manuals contain manufacturers' standard printed data, include only sheets pertinent to product or component installed. Mark each sheet to identify each product or component incorporated into the Work. If data include more than one item in a tabular format, identify each item using appropriate references from the Contract Documents. Identify data applicable to the Work and delete references to information not applicable.

1. Prepare supplementary text if manufacturers' standard printed data are not available and where the information is necessary for proper operation and maintenance of equipment or systems.

F. Drawings: Prepare drawings supplementing manufacturers' printed data to illustrate the relationship of component parts of equipment and systems and to illustrate control sequence and flow diagrams. Coordinate these drawings with information contained in Record Drawings to ensure correct illustration of completed installation.

1. Do not use original Project Record Documents as part of operation and maintenance manuals.
2. Comply with requirements of newly prepared Record Drawings in Division 01 Section "Project Record Documents."

G. Comply with Division 01 Section "Closeout Procedures" for schedule for submitting operation and maintenance documentation.

END OF SECTION 017823

SECTION 017839 - PROJECT RECORD DOCUMENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes administrative and procedural requirements for Project Record Documents, including the following:

1. Record Drawings.
2. Record Specifications.
3. Record Product Data.

B. Related Sections include the following:

1. Division 01 Section "Closeout Procedures" for general closeout procedures.
2. Division 01 Section "Operation and Maintenance Data" for operation and maintenance manual requirements.
3. Divisions 02 through 49 Sections for specific requirements for Project Record Documents of the Work in those Sections.

1.3 SUBMITTALS

A. Record Drawings: Comply with the following:

1. Number of Copies: Submit copies of Record Drawings as follows:

a. Initial Submittal: Submit one set(s) of plots from corrected Record CAD Drawings and one set(s) of marked-up Record Prints. Architect will initial and date each plot and mark whether general scope of changes, additional information recorded, and quality of drafting are acceptable. Architect will return plots and prints for organizing into sets, printing, binding, and final submittal.
b. Final Submittal: Submit one set(s) of marked-up Record Prints, one set(s) of Record CAD Drawing files, one set(s) of Record CAD Drawing plots, and three copies printed from record plots. Plot and print each Drawing, whether or not changes and additional information were recorded.

1) Electronic Media: CD-R or DVD.

B. Record Specifications: Submit one copy of Project's Specifications, including addenda and contract modifications.
C. Record Product Data: Submit one copy of each Product Data submittal.

1. Where Record Product Data is required as part of operation and maintenance manuals, submit marked-up Product Data as an insert in manual instead of submittal as Record Product Data.

PART 2 - PRODUCTS

2.1 RECORD DRAWINGS

A. Record Prints: Maintain one set of black-line white prints of the Contract Drawings and Shop Drawings.

1. Preparation: Mark Record Prints to show the actual installation where installation varies from that shown originally. Require individual or entity that obtained record data, whether individual or entity is Installer, subcontractor, or similar entity, to prepare the marked-up Record Prints.

a. Give particular attention to information on concealed elements that would be difficult to identify or measure and record later.
b. Accurately record information in an understandable drawing technique.
c. Record data as soon as possible after obtaining it. Record and check the markup before enclosing concealed installations.

2. Content: Types of items requiring marking include, but are not limited to, the following:

a. Dimensional changes to Drawings.
b. Revisions to details shown on Drawings.
c. Depths of foundations below first floor or grade.
d. Locations and depths of underground utilities.
e. Revisions to routing of piping and conduits.
f. Revisions to electrical circuitry.
g. Actual equipment locations.
h. Changes made by Change Order or Construction Change Directive.
i. Changes made following Architect's written orders.
j. Details not on the original Contract Drawings.
k. Field records for variable and concealed conditions.
l. Record information on the Work that is shown only schematically.

3. Mark the Contract Drawings or Shop Drawings, whichever is most capable of showing actual physical conditions, completely and accurately. If Shop Drawings are marked, show cross-reference on the Contract Drawings.
4. Mark record sets with erasable, red-colored pencil. Use other colors to distinguish between changes for different categories of the Work at same location.
5. Mark important additional information that was either shown schematically or omitted from original Drawings.
6. Note Construction Change Directive numbers, alternate numbers, Change Order numbers, and similar identification, where applicable.

B. Record CAD Drawings: Immediately before inspection for Certificate of Substantial Completion, review marked-up Record Prints with Architect. When authorized, prepare a full set of corrected CAD Drawings of the Contract Drawings, as follows:

1. Format: Same CAD program, version, and operating system as the original Contract Drawings.
2. Incorporate changes and additional information previously marked on Record Prints. Delete, redraw, and add details and notations where applicable.
3. Refer instances of uncertainty to Architect for resolution.
4. Architect will furnish Contractor one set of CAD Drawings of the Contract Drawings for use in recording information. Contractor to submit executed Digital File Release Form.

a. Architect makes no representations as to the accuracy or completeness of CAD Drawings as they relate to the Contract Drawings.

b. CAD Software Program: The Contract Drawings are available in Autodesk Architectural Desktop 2017.

C. Newly Prepared Record Drawings: Prepare new Drawings instead of preparing Record Drawings where Architect determines that neither the original Contract Drawings nor Shop Drawings are suitable to show actual installation.

1. New Drawings may be required when a Change Order is issued as a result of accepting an alternate, substitution, or other modification.
2. Consult Architect for proper scale and scope of detailing and notations required to record the actual physical installation and its relation to other construction. Integrate newly prepared Record Drawings into Record Drawing sets; comply with procedures for formatting, organizing, copying, binding, and submitting.

D. Format: Identify and date each Record Drawing; include the designation "PROJECT RECORD DRAWING" in a prominent location.

1. Record Prints: Organize Record Prints and newly prepared Record Drawings into manageable sets. Bind each set with durable paper cover sheets. Include identification on cover sheets.
2. Record CAD Drawings: Organize CAD information into separate electronic files that correspond to each sheet of the Contract Drawings. Name each file with the sheet identification. Include identification in each CAD file.
3. Identification: As follows:

a. Project name.
b. Date.
c. Designation "PROJECT RECORD DRAWINGS."
d. Name of Architect.
e. Name of Contractor.

2.2 RECORD SPECIFICATIONS

A. Preparation: Mark Specifications to indicate the actual product installation where installation varies from that indicated in Specifications, addenda, and contract modifications.

1. Give particular attention to information on concealed products and installations that cannot be readily identified and recorded later.
2. Mark copy with the proprietary name and model number of products, materials, and equipment furnished, including substitutions and product options selected.
3. Record the name of manufacturer, supplier, Installer, and other information necessary to provide a record of selections made.
4. For each principal product, indicate whether Record Product Data has been submitted in operation and maintenance manuals instead of submitted as Record Product Data.
5. Note related Change Orders, Record Product Data, and Record Drawings where applicable.

2.3 RECORD PRODUCT DATA

A. Preparation: Mark Product Data to indicate the actual product installation where installation varies substantially from that indicated in Product Data submittal.

1. Give particular attention to information on concealed products and installations that cannot be readily identified and recorded later.
2. Include significant changes in the product delivered to Project site and changes in manufacturer's written instructions for installation.

3. Note related Change Orders, Record Specifications, and Record Drawings where applicable.

2.4 MISCELLANEOUS RECORD SUBMITTALS

A. Assemble miscellaneous records required by other Specification Sections for miscellaneous record keeping and submittal in connection with actual performance of the Work. Bind or file miscellaneous records and identify each, ready for continued use and reference.

PART 3 - EXECUTION

3.1 RECORDING AND MAINTENANCE

A. Recording: Maintain one copy of each submittal during the construction period for Project Record Document purposes. Post changes and modifications to Project Record Documents as they occur; do not wait until the end of Project.
B. Maintenance of Record Documents and Samples: Store Record Documents and Samples in the field office apart from the Contract Documents used for construction. Do not use Project Record Documents for construction purposes. Maintain Record Documents in good order and in a clean, dry, legible condition, protected from deterioration and loss. Provide access to Project Record Documents for Architect's reference during normal working hours.

END OF SECTION 017839

SECTION 033000 - CAST-IN-PLACE CONCRETE

PART 1 - GENERAL

1.01 SUMMARY

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

B. Section Includes:

1. Formwork for cast-in-place concrete, with shoring, bracing, and anchorage.
2. Formwork accessories.
3. Form stripping.
4. Reinforcing steel for cast-in-place concrete.
5. Cast-in-place concrete, including concrete for the following:
   a. Foundations, footings.
   b. Slabs on grade.
   c. Equipment pads and bases.
   d. Columns and beams.
6. Concrete curing.

1.02 DEFINITIONS

A. Unexposed Finish: A general-use finish, with no appearance criteria, applicable to all formed concrete concealed from view after completion of construction.

B. Exposed Finish: A general-use finish applicable to all formed concrete exposed to view and including surfaces which may receive a paint coating (if any).

1.03 SUBMITTALS

A. Shop Drawings: Submit shop drawings for fabrication and placement of the following:
1. Reinforcement: Comply with ACI SP-66. Include bar schedules, diagrams of bent bars, arrangement of concrete reinforcement, and splices. Show construction joints.

B. Quality Control Submittals: Submit the following information related to quality assurance requirements specified: Design data: Submit proposed mix designs and test data before concrete operations begin. Identify for each mix submitted the method by which proportions have been selected.

1. For mix designs based on field experience, include individual strength test results, standard deviation, and required average compressive strength (f'c) calculations.
2. For mix designs based on trial mixtures, include trial mix proportions, test results, and graphical analysis and show required average compressive strength (f'c).
3. Indicate quantity of each ingredient per cubic yard of concrete.
4. Indicate type and quantity of admixtures proposed or required.
5. Test reports: Submit laboratory test reports for all testing specified.
6. Certifications: Submit affidavits from an independent testing agency certifying that all materials furnished under this section conform to specifications.
7. Certifications: Provide certification from manufacturers of concrete admixtures that chloride content complies with specified requirements.
8. Submit batch tickets complying with ASTM C 685 or delivery tickets complying with ASTM C 94, as applicable, for each load of concrete used in the work.

1.04 QUALITY ASSURANCE

A. Codes and Standards: Comply with the following documents, except where requirements of the contract documents or of governing authorities are more stringent:
   1. ACI 301.
   2. ACI 318.
   3. CRSI Manual of Standard Practice.

B. Testing Agency Services:
   1. Employ, at contractor's expense, an independent testing agency acceptable to the Architect to perform specified tests and other services required for quality assurance.
      a. Testing agency shall meet ASTM E 329 requirements.

C. Source of Materials: Obtain materials of each type from same source for the entire project.

1.05 DELIVERY, STORAGE, AND HANDLING

A. Deliver reinforcement to project site bundled and tagged with metal tags indicating bar size, lengths and other data corresponding to information shown on placement drawings.
   1. Store concrete reinforcement materials at the site to prevent damage and accumulation of dirt or rust.
   2. Store cementitious materials in a dry, weather tight location. Maintain accurate records of shipment and use.

B. Store aggregates to permit free drainage and to avoid contamination with deleterious matter or other aggregates. When stockpiled on ground, discard bottom 6 inches of pile.

C. Handle aggregates to avoid segregation.

PART 2 - PRODUCTS

2.01 FORM WORK

A. Facing Materials:
   1. Unexposed finish concrete: Any standard form materials that produce structurally sound concrete.
   2. Exposed finish concrete: Materials selected to offer optimum smooth, stain-free final appearance and minimum number of joints. Provide materials with sufficient strength to resist hydrostatic head without bow or deflection in excess of allowable tolerances, and as follows:
      a. Plywood: PS-I "B-B (Concrete Form) Plywood", Class I, Exterior Grade, mill-oiled and edge sealed.

B. Form Work Accessories:
   1. Form coating: Form release agent that will not adversely affect concrete surfaces or prevent subsequent application of concrete coatings.
   2. Metal ties: Commercially manufactured types; cone snap ties, taper removable bolt, or other type which will leave no metal closer than 1-1/2 inches from surface of concrete when forms are removed, leaving not more that a 1 inch diameter hole in concrete surface.
   3. Fillets: Wood or plastic fillets for chamfered corners, in maximum lengths possible.

2.02 REINFORCING MATERIALS

A. Reinforcing Bars: Provide deformed bars complying with the following, except where otherwise indicated: ASTM A 615, Grade 60.

B. Welded Wire Fabric: ASTM A 185, cold-drawn steel, plain.

C. Reinforcing Accessories:
1. Tie wire: Black annealed type, 16-1/2 gage or heavier.
2. Supports: Bar supports conforming to specifications of CRSI "Manual of Standard Practice". Class I (plastic protected) at all formed surfaces which will be exposed to weather. Class 1 (plastic protected) or Class 2 (stainless steel protected) at all formed surfaces which will be exposed to view but not to weather. Precast concrete blocks of strength equal to or greater than specified strength of concrete or Class 3 supports equipped with sand plates, where concrete will be cast against earth. Concrete masonry units will not be accepted.

2.03 CONCRETE MATERIALS

A. Portland Cement: ASTM C 150, and as follows:
1. Type I.
2. Fly Ash: Not to be used.
3. Water: Potable

B. Aggregates:
1. Normal weight concrete: ASTM C 33.
a. Gradation as specified below under mix design.
b. Lightweight Aggregate: ASTM C 330 1/2 nominal maximum aggregate size.

C. Admixtures - General: Admixtures which result in more than 0.1 percent of soluble chloride ions by weight of cement are prohibited.

D. Air-Entraining Admixture: ASTM C 260 and certified by manufacturer for compatibility with other mix components.

E. Water-Reducing Admixture: ASTM C 494, Type A

F. Lightweight concrete.

1. Minimum Compressive Strength: 4000 psi at 28 days.
2. Calculated Equilibrium Unit Weight: 110 lb/cu. ft., plus or minus 3 lb/cu. ft. as determined by ASTM C 567.
3. Slump Limit: 5 inches plus or minus 1 inch.
4. Air Content: 6 percent, plus or minus 2 percent at point of delivery for nominal maximum aggregate size greater than 3/8 inch.
5. Air Content: 7 percent, plus or minus 2 percent at point of delivery for nominal maximum aggregate size 3/8 inch or less.
6. Air Content: Do not allow air content of trowel-finished floors to exceed 3 percent.
7. Synthetic Micro-Fiber: Uniformly disperse in concrete mixture at manufacturer's recommended rate, but not less than a rate of 1.0 lb/cu. yd.

2.04 MISCELLANEOUS MATERIALS AND ACCESSORIES

A. Waterstops, General: Provide waterstops at construction joints and as otherwise indicated, sized and configured to suit joints.
1. Polyvinyl chloride waterstops: Corps of Engineers CRD-C 572.

B. Vapor Retarder: Membrane for installation beneath slabs on grade, resistant to decay when tested in accordance with ASTM E 154, and as follows:
1. 6 mil polyethylene.

C. Nonshrink Grout: ASTM C 1107.

1. Type: Provide nonmetallic type only.

D. Burlap: AASHTO M 182, Class 2 jute or kenaf cloth.

E. Moisture-Retaining Cover: ASTM C 171, and as follows:
1. Curing paper.
2. Polyethylene film.
3. White burlap-polyethylene sheeting.

F Liquid Curing Compounds:
1. Material - curing compounds: Comply with ASTM C 309, Type I.
   a. Non-yellowing formulation where subject to ultraviolet light.
   b. Curing and sealing compound: Where indicated, provide curing and sealing formulation with long-lasting finish that is resistant to chemicals, oil, grease, deicing salts, and abrasion.

G. Bonding Compound: Non-redispersable acrylic bonding admixture, ASTM C 1059, Type II.

H. Epoxy Bonding Systems: ASTM C 881; type, grade and class as required for project conditions.

2.05 CONCRETE MIX DESIGN

A. Review: Do not begin concrete operations until proposed mix has been reviewed by the Architect.

B. Proportioning of Normal Weight Concrete: Comply with recommendations of AC I 211.1.

C. Required Average Strength: Establish the required average strength f(cr) of the design mix on the basis of either field experience or trial mixtures as specified in ACI 301, and proportion mixes accordingly. If trial mixtures method is used, employ an independent testing agency acceptable to the Architect for preparing and reporting proposed mix design.

D. Admixtures:
1. Air-entraining admixture: Add at rate to achieve specified air content.
   a. Do not use in slabs-on-grade scheduled to receive topping, unless manufacturer of topping recommends use over air-entrained concrete.
2. Water-reducing admixture: Add as required for placement and workability.
3. Do not use admixtures not specified or approved.

E. Design mix to meet or exceed each requirement specified. Where more than one criterion is specified, the most stringent shall apply. For example, a minimum cement content or maximum water-cement ratio may be required in order to achieve the required strength.
1. Specified compressive strength (f' c) (ASTM C 39): 4000 psi at 28 days for columns and beams, 3000 psi for foundation elements and elevated slabs. Maximum water-cement ratio by weight: 0.46 maximum for air-entrained concrete. Maximum slump: 4" $\pm$ 1”
2. Maximum nominal size of coarse aggregate: As recommended in ACI 211. I.
3. Total air content (ASTM C 173 or ASTM C 231): 3 percent.

F. Mix adjustments: Provided that no additional expense to owner is involved, contractor may submit for Architect's approval requests for adjustment to approved concrete mixes when circumstances such as changed project conditions, weather or unfavorable test results occur. Include laboratory test data substantiating specified properties with mix adjustment requests.

2.07 CONTROL OF MIX IN THE FIELD

A. Slump: A tolerance of up to 1 inch above that specified will be permitted for I batch in 5 consecutive batches tested. Concrete of lower slump than that specified may be used, provided proper placing and consolidation is obtained.

1. No addition of water will be acceptable after initial batching of the concrete at the batching plant.

B. Do not use batches that exceed tolerances.

2.08 CONCRETE MIXING

A. On-Site Equipment: Mix concrete materials in appropriate drum type batch machine mixer, in compliance with ASTM C 685. Mix each batch minimum of 1-1/2 minutes and maximum of 5 minutes before discharging concrete. Clean thoroughly at end of day and before changing concrete type.

B. Transit Mixers: Mix concrete materials in transit mixers, complying with requirements of ASTM C 94.

PART 3 - EXECUTION

3.01 CONCRETE FORM PREPARATION

A. General: Comply with requirements of ACI 301 for form work, and as herein specified. The contractor is responsible for design, engineering, and construction of form work, and for its timely removal.

B. Earth Forms: Hand-trim bottoms and sides of earth forms to profiles indicated on the drawings. Remove loose dirt before placing concrete.

C. Design: Design and fabricate forms for easy removal, without impact, shock, or damage to concrete surfaces or other portions of the work. Design to support all applied loads until concrete is adequately cured, within allowable tolerances and deflection limits.

D. Construction: Construct and brace form work to accurately achieve end results required by contract documents, with all elements properly located and free of distortion. Provide for necessary openings, inserts, anchorages, and other features shown or otherwise required.
   1. Joints: Minimize form joints and make watertight to prevent leakage of concrete.
   2. Align joints symmetrically at exposed conditions.
   3. Chamfers: Provide chamfered edges and comers at exposed locations, unless specifically indicated otherwise on the drawings.
   4. Permanent openings: Provide openings to accommodate work of other trades, sized and located accurately. Securely support items built into forms; provide additional bracing at openings and discontinuities in form work.
   5. Temporary openings: Provide temporary openings for cleaning and inspection in most inconspicuous locations at base of forms, closed with tight-fitting panels designed to minimize appearance of joints in finished concrete work.

E. Tolerances for Formed Surfaces: Comply with minimum tolerances established in ACI 117, unless more stringent requirements are indicated on the drawings.

F. Release Agent: Provide either form materials with factory-applied nonabsorptive liner or field-applied form coating. If field-applied coating is employed, thoroughly clean and recondition form work and reapply coating before each use. Rust on form surfaces is unacceptable.

3.02 VAPOR RETARDER INSTALLATION

A. General: Place vapor retarder sheet over prepared base material, aligning longer dimension

parallel to direction of pour and lapped 6 inches. Seal joints with appropriate tape.

3.03 PLACING REINFORCEMENT

A. General: Comply with requirements of ACI 301 and as herein specified.

B. Preparation: Clean reinforcement of loose rust and mill scale, soil, and other materials which adversely affect bond with concrete.

C. Placement: Place reinforcement to achieve not less than minimum concrete coverages required for protection. Accurately position, support, and secure reinforcement against displacement. Provide Class C tension lap splices complying with ACI 318 unless otherwise indicated. Do not field-bend partially embedded bars unless otherwise indicated or approved.
1. Use approved bar supports and tie wire, as required. Set wire ties to avoid contact with or penetration of exposed concrete surfaces. Tack welding of reinforcing is not permitted.
2. Wire fabric: Install in maximum lengths possible, lapping adjoining pieces not less than one full mesh. Offset end laps to prevent continuous laps in either direction, and splice laps with tie wire.

3.04 JOINT CONSTRUCTION

A Construction Joints: Locate and install construction joints as indicated on drawings. If construction joints are not indicated, locate in manner which will not impair strength and will have least impact on appearance, as acceptable to the Architect. The surface of concrete construction joints shall be cleaned and laitance removed. Immediately before new concrete is placed, construction joints shall be wetted and standing water removed.

1. Keyways: Provide keyways not less than 1-1/2 inches deep.
2. Reinforcement: Continue reinforcement across and perpendicular to construction joints, unless details specifically indicate otherwise.
3. Waterstops: Provide waterstops as indicated, installing to form continuous, watertight dam, with field joints fabricated in strict accordance with manufacturer's instructions.

B. Control Joints: Construct contraction joints in slabs poured on grade to form panels of sizes indicated on drawings, but not more than 15 feet apart in either direction.
1. Saw cuts: Form control joints by means of saw cuts one-fourth the depth of the slab, performed within 12 hours after slab finishing without dislodging aggregate.

3.05 INSTALLATION OF EMBEDDED ITEMS

A. General: Set anchorage devices and other items required for other work connected to or supported by cast-in-place concrete, using templates, setting drawings, and instructions from suppliers of items to be embedded.
1. Edge Forms and Screeds: Set edge forms and intermediate screeds as necessary to achieve l elevations indicated for finished slab surfaces.

3.06 CONCRETE PLACEMENT

A. Inspection: Before beginning concrete placement, inspect form work, reinforcing steel, and items to be embedded, verifying that all such work has been completed.
1. Wood forms: Moisten immediately before placing concrete in locations where form coatings are not used.

B. Placement - General: Comply with requirements of ACI 304 and as follows:
1. Schedule continuous placement on concrete to prevent the formation of cold joints.
2. Provide construction joints if concrete for a particular element or component cannot be placed in continuous operation.

3. Deposit concrete as close as possible to its final location, to avoid segregation.

C. Placement in Forms: Limit horizontal layers to depths which can be properly consolidated, but in no event greater than 24 inches.
   1. Consolidate concrete by means of mechanical vibrators, inserted vertical in freshly placed concrete in a systematic pattern at close intervals. Penetrate previously placed concrete to ensure that separate concrete layers are knitted together.
   2. Vibrate concrete sufficiently to achieve consistent consolidation without segregation of coarse aggregates. Do not use vibrators to move concrete laterally.

D. Slab Placement: Schedule continuous placement and consolidation of concrete within planned construction joints. Thoroughly consolidate concrete without displacing reinforcement or embedded items, using internal vibrators, vibrating screeds, roller pipe screeds, or other means acceptable to Architect.
   1. Strike off and level concrete slab surfaces, using highway straightedges, darbies, or bull floats before bleed water can collect on surface. Do not work concrete further until finishing operations are commenced.

3.07 FINISHING FORMED SURFACES

A. Repairs - General: Repair surface defects, including tie holes, immediately after removing form work.
   1. Remove honeycombed areas and other defective concrete down to sound concrete, cutting perpendicular to surface or slightly undercutting. Dampen patch location and area immediately surrounding it prior to applying bonding compound or patching mortar.

   2. Before bonding compound has dried, apply patching mixture matching original concrete in materials and mix except for omission of coarse aggregate, and using a blend of white and normal portland cement as necessary to achieve color match. Consolidate thoroughly and strike off slightly higher than surrounding surface.

B. Unexposed Form Finish: Repair tie holes and patch defective areas. Rub down or chip off forms or other raised areas exceeding 1/4 inch height.

C. Exposed Form Finish: Repair and patch defective areas, with fins or other projections completely removed and smoothed.
   1. Smooth rubbed finish: Apply to surfaces indicated no later than 24 hours after form removal.
      a. Wet concrete surfaces to be finished and rub with Carborundum brick or other abrasive until uniform color and texture are achieved.
      b. Do not apply separate grout mixture.
   2. Contiguous unformed surfaces: Strike smooth and float to a similar texture tops of walls, horizontal offsets, and other unformed surfaces. Continue final finish of formed surfaces across unformed surfaces, unless otherwise specifically indicated.

3.08 FINISHING SLAB

A. Finishing Operations - General:
   1. Do not directly apply water to slab surface or dust with cement.
   2. Use hand or powered equipment only as recommended in ACI 302.1R.
   3. Screeding: Strike off to required grade and within surface tolerances indicated. Verify conformance to surface tolerances. Correct deficiencies while concrete is still plastic.
   4. Bull Floating: Immediately following screeding, bull float or darby before bleed water appears to eliminate ridges, fill in voids, and embed coarse aggregate. Recheck and correct surface tolerances.
   5. Do not perform subsequent finishing until excess moisture or bleed water has disappeared and concrete will support either foot pressure with less than 1/4 inch indentation or weight of power

floats without damaging flatness.

6. Final Floating: Float to embed coarse aggregate, to eliminate ridges, to compact concrete, to consolidate mortar at surface, and to achieve uniform, sandy texture. Recheck and correct surface tolerances.
7. Trowel Finish: All slabs that receive resilient floor coverings shall be trowel finished.

B. Coordinate appearance and texture of required final finishes with the Architect before application.
1. Apply final finishes in the locations indicated on the drawings.

C. Float Finish: As specified above.

D. Slab Surface Tolerances:
1. Achieve flat, level planes except where grades are indicated. Slope uniformly to drains.
2. Floated and trowel finishes: Depressions between high spots shall not exceed 1/8 inch under a 10 foot straightedge.

E. Repair of Slab Surfaces: Test slab surfaces for smoothness and to verify surface plane to tolerance specified.
1. Repair defects as follows:
a. High areas: Correct by grinding after concrete has cured for not less than 14 days.

b. Low areas: Immediately after completion of surface finishing operations, cut out low areas and replace with fresh concrete. Finish repaired areas to blend with adjacent concrete.

Proprietary patching compounds may be used when approved by the Architect.

2. Crazed or cracked areas: Cut out defective areas, except random cracks and single holes not exceeding 1 inch in diameter, by cutting out and replacing with fresh concrete. Remove defective areas with clean, square cuts. Dampen exposed concrete and apply bonding compound. Mix, place, compact and finish patching concrete to match adjacent concrete.

3. Isolated cracks and holes: Groove top of cracks and cut out holes not over 1 inch in diameter. Dampen cleaned concrete surfaces and apply bonding compound; place dry pack or proprietary repair compound acceptable to Architect while bonding compound is still active:
a. Dry-pack mix: one part portland cement to 2-1/2 parts fine aggregate and enough water as required for handling and placing.
b. Install patching mixture and consolidate thoroughly, striking off level with and matching surrounding surface. Do not allow patched areas to dry out prematurely.

3.09 CONCRETE CURING AND PROTECTION

A. General:
1. Prevent premature drying of freshly placed concrete, and protect from excessively cold or hot temperatures until concrete has cured.
2. Provide curing of concrete by one of the methods listed and as appropriate to service conditions and type of applied finish in each case.

B. Curing Period:
1. Not less than 7 days for standard cements and mixes.

C. Formed Surfaces: Cure formed concrete surfaces by moist curing with forms in place for full curing period or until forms are removed.
1. Keep wooden or metal forms moist when exposed to heat of the sun.
2. If forms are removed prior to completion of curing process, continue curing by one of the applicable methods specified.

D. Surfaces Not in Contact with Forms:
1. Start curing as soon as free water has disappeared, but before surface is dry. Place to protect adjacent concrete edges. Acceptable curing methods:
    a. Water ponding.
    b. Water-saturated sand.
    c. Water-fog spray.
    d. Saturated burlap: provide 4-inch minimum overlap at joints.
    e. Moisture-retaining cover: Lap not less than 3-inches at edges and ends, and seal with waterproof tape or adhesive. Repair holes or tears during curing period with same tape or adhesive. Maintain covering in intimate contact with concrete surface. Secure to avoid displacement.
        1. Extend covering past slab edges at least twice the thickness of the slab.

        2. Do not use plastic sheeting on surfaces which will be exposed to view when in service.

        3. Curing compound: Apply at rate stated by manufacturer to conform with moisture-retention requirements specified, using second, immediate application at right angles to first, if necessary, and reapply if damaged by rain.

        4. Curing and sealing compound: Apply at rate stated by manufacturer to conform with moisture-retention requirements specified, using second, immediate application at right angles to first, if necessary, and reapply if damaged by rain. Apply additional coat near substantial completion to act as sealer.

        5. Use curing compounds only in locations permitted or required. Do not apply to surfaces to receive other finishes, coating, or coverings.

E. Avoid rapid drying at end of curing period.

F. General: Comply with recommendations of ACI 347 for shoring and reshoring in multistory construction.

G. Low-Rise Construction: Extend shoring from ground to roof.

H. Reshoring: Remove shores and reshore in a planned sequence, to avoid damage to partly cured concrete. Locate and provide adequate reshoring to safely support work without excessive stress or deflection.

3.10 REMOVAL OF FORMS AND SUPPORTS

A. Non-Load-Bearing Form Work: Provided that concrete has hardened sufficiently that it will not be damaged, forms not actually supporting weight of concrete or weight of soffit forms may be removed after concrete has cured at not less than 50 degrees F for 24 hours. Maintain curing and protection operations after form removal.

B. Load-Bearing Form Work: Do not remove shoring and forms supporting weight of concrete, such as beam soffits, joists, slabs, and other structural elements, until concrete has attained 75 percent of specified compressive strength. In addition, the contractor shall have determined that the actual compressive strength attained is adequate to support the weight of the concrete and superimposed loads.

C. Keep reshores in place a minimum of 15 days after placing upper tier, and longer if required, until concrete has attained 100 percent of specified compressive strength. In addition, the contractor shall have determined that the actual compressive strength attained is adequate to support the weight of the concrete and superimposed loads.

D. Keep supports in place until heavy loads due to construction operations have been removed.

E. Test field-cured specimens to determine potential compressive strength of concrete for specific locations.

3.11 MISCELLANEOUS CONCRETE ITEMS

A. Fill-in: Fill in holes and openings left in concrete structures for passage of work by other trades after such work is in place. Place such fill-in concrete to blend with existing construction, using same mix and curing methods.

B. Equipment Bases and Foundations: Provide machine and equipment bases and foundations, as indicated on drawings. Set anchor bolts at correct elevations, complying with diagrams or templates of equipment

C. Manufacturer.
1. Grout base plates and foundations as indicated with nonshrink grout.
2. Use nonmetallic grout for exposed conditions, unless otherwise indicated.

3.12 CONCRETE REPAIRS

A. Perform cosmetic repairs of concrete surfaces as specified under concrete application.

B. Perform structural repairs with prior approval of the Architect for method and procedure, using epoxy bonding systems. The Architect's approval is required for repair methods using materials other than those specified.

3.13 QUALITY CONTROL TESTING DURING CONSTRUCTION

A. Concrete: Composite Sampling and Making and Curing of Specimens: ASTM C 172 and ASTM C 31.

1. Take samples at point of discharge.

2. For pumped concrete, perform sampling and testing at the frequencies specified herein at point of delivery to pump, and perform additional sampling and testing at the same frequency at discharge from line. Results obtained at discharge from line shall be used for acceptance of concrete.

B. Slump: ASTM C 143. One test per strength test and additional tests if concrete consistency changes. Modify sampling to comply with ASTM C 94.

C. Air Content of Normal Weight Concrete: ASTM C 173 or ASTM C 231. One test per strength test performed on air-entrained concrete.

D. Concrete Temperature:
Test each time a set of strength test specimens is made.

E. Compressive Strength Tests: ASTM C 39.
1. Compression test specimens: Mold and cure one set of 4 standard cylinders for each compressive strength required.
2. Testing for acceptance of potential strength of as-delivered concrete:
   a. Obtain samples on a statistically sound, random basis.
   b. Minimum frequency:
      1. One set per 100 cubic yards or fraction thereof for each day's pour of each concrete

class.
2. One set per 3500 square feet of slab or wall area or fraction thereof for each day's pour of each concrete class.
3. When the above testing frequency would provide fewer than 5 strength tests for a given class of concrete during the project, conduct testing from not less than 5 randomly selected batches, or from each batch if fewer than five.

3. Test one specimen per set at 7 days for information unless an earlier age is required.

4. Test 2 specimens per set for acceptance of strength potential; test at 28 days unless other age is specified. The test result shall be the average of the two specimens. If one specimen shows evidence of improper sampling, molding, or testing, the test result shall be the result of the remaining specimen; if both show such evidence, discard the test result and inform the Architect. Retain one specimen from each set for later testing, if required.

5. Strength potential of as-delivered concrete will be considered acceptable if all of the following criteria are met.
   a. No individual test result falls below specified compressive strength by more than 500 psi. Not more than 10 percent of individual test results fall below specified compressive strength (f'c).
   b. Average of any 3 consecutive strength test results equals or exceeds specified compressive strength (f'c).

6. Evaluate construction and curing procedures and implement corrective action when strength results for field-cured specimens are less than 85 percent of test values for companion laboratory-cured specimens.

J. Removal of forms or supports: Mold additional specimens and field-cure with concrete represented; test to determine strength of concrete at proposed time of form or support removal.

F. Test Results: Testing agency shall report test results in writing to Architect and contractor within 24 hours of test.
1. Test reports shall contain the following data:
   a. Project name, number, and other identification.
   b. Name of concrete testing agency.
   c. Date and time of sampling.
   d. Concrete type and class.
   e. Location of concrete batch in the completed work.
   f. All information required by respective ASTM test methods.

2. Nondestructive testing devices such as impact hammer or sonoscope may be used at Architect's option for assistance in determining probable concrete strength at various locations or for selecting areas to be cored, but such tests shall not be the sole basis for acceptance or rejection.

3. The testing agency shall make additional test of in-place concrete as directed by the Architect when test results indicate that specified strength and other concrete characteristics have not been attained.
   a. Testing agency may conduct tests of cored cylinders complying with ASTM C 42, or tests as directed.
   b. Cost of additional testing shall be borne by the contractor when unacceptable concrete has been verified.

G. Grout: Test grout compressive strength per ASTM C 1019 for each 2000 square feet of wall area or portion thereof.

END OF SECTION 033000

SECTION 042000 - UNIT MASONRY

PART 1 – GENERAL

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

1.01 APPLICABLE CODES AND STANDARDS

A. Florida Building Code - latest edition adopted in building area.
Building Code Requirements for Masonry Structures (ACI 530-05 / ASCE 5-99 / TMS 402-99).
Specification for Masonry Structures (ACI 530-02 / ASCE 6-99 / TMS 602-99).

PART 2 - PRODUCTS

2.01 CONCRETE MASONRY UNITS

A. STANDARD WEIGHT CONCRETE MASONRY UNITS

1. Conform to ASTM C90-01a, grade "N", Type II, 8" x 16" and 12” x 16” modular units, thickness as indicated on the drawings, minimum 1" face shells. Units 8" or more thick must have minimum 1 1/4" face shells. Aggregate is to be gravel, air-cooled blast furnace slag, or crushed stone. Units are to be acceptable visually, structurally, and free from undesirable defects resulting from either manufacturer or handling, as judged by ARCHITECT.
2. The design compressive strength of the masonry, f'm = 1500 psi minimum (1900 PSI on net area).
3. Units which have not been subjected to an approved method of steam curing must be stored for 30 days prior to use.
4. Sound transmission loss through 4" unpainted unplastered wall, must not measure less than 36 decibels.
5. Linear drying shrinkage must not be greater than 0.04% when tested as prescribed by National Bureau of Standards.
6. Moisture content at time of delivery must not exceed 75% of relative humidity, as measured by approved methods of Portland Cement Association.
7. Standard brick sized units are to be solid, but otherwise conform to these paragraphs.

B. ACCESSORY UNITS

1. 8" x 16" x 8" thick header block at locations indicated.
2. 8" x 16" knock out cut-lintel units, thickness as indicated.
3. Furnish regular corner, half, and half corner units; and all lintel and half block units as required by conditions shown on architectural and structural drawings.

2.02 GROUT MATERIALS

A. General and 033000/Cast-In-Place Concrete.

2.07 MORTAR PREPARATION

A. Conform to ASTM C270 for procedures. Proportion as Florida Building Code, Type N, for concrete masonry, use a one bag mix as follows:

3 bags high strength masonry cement
13.5 – 5 gallon buckets sand.

2.08 PRECAST LINTELS

A. High strength precast and pre-stressed concrete lintels designed to be used unfilled or filled to form a composite reinforced concrete beam using concrete masonry units equal to 'Cast-Crete'.

PART 3 - EXECUTION

3.01 GENERAL

A. Conform to referenced codes.

B. No wetting of concrete masonry units is permitted. All openings in walls to have concrete-filled reinforced lintels, unless otherwise indicated on drawings.

3.02 COURSING AND JOINTING

A. Concrete Masonry - Lay all units plumb and true to line, with uniform 3/8" joints, and in running bond. Joints wider than 3/8" will be rejected.
Lay to course out at 8 inch centers.

B. Strike all joints flush, after mortar has partially set, and sack or float walls head joints to give smooth uniform appearance and tool all horizontal joints concave where walls are to be left exposed. At stucco or hard tile locations delete tooling of joints.

3.03 LAYING MASONRY UNITS

A. For bonding masonry to concrete foundation or floor slabs, concrete to be clean with laitance removed and aggregate exposed.

B. Lay starting joint with full mortar coverage on the joint; except that areas where grout occurs are to be free of mortar so that grout will contact concrete.

C. Units shall be laid to preserve vertical continuity of cells to be filled. The vertical alignment shall be sufficient to maintain a clean, unobstructed flue measuring not less than 3"x3". Place no units or cut pieces of masonry less than 4" nominal.

D. In placing mortar in horizontal joints, completely cover the face shells of each unit with mortar. Solidly fill all head joints to the thickness of the face shell and shove units tightly in place. Solidly bed in mortar all head and cross web bed joints adjacent to cells to be grouted to prevent leakage of mortar.

E. Lay designated walls in two separate wythes, with insulated cavity as indicated.

F. Anchor and bond intersecting masonry walls with 50% masonry bond, except as noted otherwise on drawings.

G. Install precast and/or composite steel lintels over all openings. Set lintels in place with joints pointed to match adjacent work. Build in lintels, reinforce and fill with structural concrete grout as work progresses.

1. Steel lintels shall be provided with 3" minimum structural bearing each side of openings.
2. Pre-cast concrete lintels shall be provided with 8" minimum structural bearing each side of openings.
3. Typical steel and cut masonry lintels, even if not shown on structural or architectural drawings, shall be reinforced with a minimum of 1 #5 bar continuous (extend 12" minimum each end) and grouted

solid.

4. Concrete masonry work shall not proceed beyond the elevation of door and window headers until all vertical reinforced cells and reinforced horizontal lintels have been grouted.

H. At hard tile locations take extra care in laying units such that wall will be suitable for thinset tile installation directly to wall. Grind any unevenness judged unacceptable by ARCHITECT.

I. Install wall control/expansion joints at 20 ft. o.c. and/or as shown and detailed on architectural/engineering drawings. Refer to Sections 04000/Masonry, General and 07920/Sealants, Caulking and Seals for additional requirements.

3.04 CUTTING

A. Do all cutting of block with carborundum or equivalent saw. To facilitate proper coursing, half blocks may be used to reduce amount of cutting. No masonry will be permitted to be used if not cut properly. Masonry broken by "blows" will be replaced, even if found after the wall has been completed.

3.05 PLACING STEEL REINFORCEMENT

A. Reinforcing steel to be straight, except for bends around corners and as detailed otherwise on drawings. Lap reinforcing steel 48 bar diameters minimum. Place vertical bars in exact center of cells, or as otherwise indicated, and hold in position at top and bottom and at intervals not to exceed 96 bar diameters. Vertical cavity rebar to be run in maximum possible lengths, 5'-0" minimum, using low lift grouting procedures.

B. Completely embed joint reinforcement in mortar or grout. Lap splices 6 inches minimum at all locations.

C. Lap dowels in footings to vertical steel in masonry columns by placing in aligned cells, then grouting cells to obtain bonded lap between wall and footings.

D. Reinforce and grout all reinforced horizontal block courses, as wall is built-up.

3.06 DOUBLE WYTHE MASONRY CAVITY WALL INSULATION

A. Refer to Section 07210/Thermal and Sound Insulation.

3.07 PLACING GROUT

A. Insure all walls are cured minimum of three (3) days, and are solid, or braced against movement, during grouting. No one is to "walk" the walls. Notify ARCHITECT minimum of 24 hours or one full working day before start of each grouting operation.

B. CONTRACTOR is to use only low-lift grouting procedure unless otherwise authorized by ARCHITECT and OWNER.

1. Grout lifts that exceed 5'-0" must have prior approval of the OWNER. Contractor shall neatly saw-cut cleanout/inspection holes or provide manufacturered inspection blocks at the bottom of all reinforced vertical cells for grout lifts greater than 5'-0".

C. Grouting of reinforced vertical cells shall occur at intervals to allow grouting of all composite steel and/or precast lintels. Concrete masonry shall not be installed above lintels prior to grouting of all lintels.

D. Consolidate all grout at time of pouring by puddling or vibrating and then reconsolidate by again puddling later before plasticity is lost. Stop grout pour 1 1/2" below top unit to form construction joint for subsequent pours. Neatly sawcut and provide cleanout/inspection hole at the bottom of all cells to be filled with grout when pour, if authorized, exceeds 5'-0" in height.

E. CONTRACTOR has sole responsibility of completing masonry and grouting operations necessary to construct a sound load-bearing crack-free wall.

F. Properly cure grout placed in horizontal reinforced precast concrete lintels minimum seven (7) days.

G. All masonry walls, if not receiving a formed and poured concrete beam at top and even if not shown on structural or architectural drawings, are to receive, as a minimum, a top knockout lintel block course reinforced with 1 #5 bar continuous and filled with concrete grout.

3.08 WATERPROOFING

A. Refer to Division 7 for waterproof coating installed over concrete and masonry surfaces behind face veneer and elsewhere.

B. Masonry CONTRACTOR is responsible for providing a uniformly regular surface prior to application of coating, with full and tight joints between concrete block units and around all brick ties or other embedded items. Remove projecting mortar and fill all joints and voids.

END OF SECTION 042000

SECTION 051200 - STRUCTURAL STEEL FRAMING

1.01 RELATED DOCUMENTS:

A. Drawings and general provisions of Contract, including General and Supplementary Conditions, Special Conditions and technical specification sections, apply to work of this section.

1.02 SUMMARY:

A. Extent of structural steel work is shown on drawings.

B. Miscellaneous Metal Fabrications are specified elsewhere in Division 5.

C. Refer to Division 3 for anchor bolt installation in concrete; Division 4 for masonry.

D. Source Quality Control: Materials and fabrication procedures are subject to inspection and tests in mill, shop, and field, conducted by a qualified inspection agency. Such inspections and tests will not relieve Contractor of responsibility for providing materials and fabrication procedures in compliance with specified requirements.

1. Promptly remove and replace materials or fabricated components which do not comply.

1.03 PERFORMANCE REQUIREMENTS:

A. Structural Performance: Engineer structural steel connections required by the Contract Documents to be selected or completed by the fabricator to withstand design loadings and joint moments and shears indicated.

B. Engineering Responsibility: Engage a fabricator who utilizes a qualified professional engineer to prepare calculations, Shop Drawings, and other structural data for structural steel connections.

C. Design of Members: Details and members shown are typical; similar details apply to similar conditions, unless otherwise indicated. Verify all dimensions at the site prior to fabrication.

1.04 SUBMITTALS:

A. General: Submit each item in this Article according to the Conditions of the Contract and Division 1 Specification Sections.

B. Product Data for each type of product specified.

C. Shop Drawings detailing fabrication of structural steel components.

1. Include details of cuts, connections, splices, camber, holes, and other pertinent data.

2. Indicate welds by standard AWS symbols, distinguishing between shop and field welds, and show size, length, and type of each weld.

3. Indicate type, size, and length of bolts, distinguishing between shop and field bolts. Identify high-strength bolted slip-critical, direct-tension, or tensioned shear/bearing connections

4. Include Shop Drawings signed and sealed by a qualified professional engineer responsible for their design and preparation.

D. Qualification data for firms and persons specified in the "Quality Assurance" Article to demonstrate their capabilities and experience. Include lists of completed projects with project names and addresses, names and addresses of architects and owners, and other information specified.

1.05 QUALITY ASSURANCE:

A. Installer Qualifications: Engage an experienced installer who has completed structural steel work similar in material, design, and extent to that indicated for this Project and with a record of successful in-service performance.

B. Fabricator Qualifications: Engage a firm experienced in fabricating structural steel similar to that indicated for this Project and with a record of successful in-service performance, a well as sufficient production capacity to fabricate structural steel without delaying the Work.
   1. Fabricator must participate in the AISC Quality Certification Program and be designated an AISC-Certified Plant as follows:
      a. Category: Category I, conventional steel structures

      b. Fabricator shall be registered with and approved by authorities having jurisdiction.

C. Comply with applicable provisions of the following specifications and documents:
   1. AISC's "Specification for Structural Steel Buildings - Allowable Stress Design and Plastic Design".

   2. AISC's "Specification for Allowable Stress Design of Single-Angle Members".

   3. ASTM A6 "Specification for General Requirements for Rolled Steel Plates, Shapes, Sheet Piling, and Bars for Structural Use".

   4. Research Council on Structural Connections (RCSC) "Specification for Structural Joints Using ASTM A325 or A4490 Bolts".

D. Professional Engineer Qualifications: A professional engineer who is legally authorized to practice in the State of Florida jurisdiction where Project is located and who is experienced in providing engineering services of the kind indicated. Engineering services are defined as those performed for projects with structural steel framing that are similar to that indicated for this Project in material, design, and extent.

E. Welding Standards: Comply with applicable provisions of AWS D1.1 "Structural Welding Code - Steel".
   Present evidence that each welder has satisfactorily passed AWS qualification tests for welding processes involved and, if pertinent, has undergone recertification.

1.06 DELIVERY, STORAGE AND HANDLING:

A. Deliver materials to site at such intervals to insure uninterrupted progress of work.

B. Deliver anchor bolts and anchorage devices, which are to be embedded in cast-in-place concrete or masonry, in ample time to not to delay work.

C. Store materials to permit easy access for inspection and identification. Keep steel members off ground, using pallets, platforms, or other supports. Protect steel members and packaged materials from erosion and deterioration.

D. Do not store materials on structure in a manner that might cause distortion or damage to members or supporting structures. Repair or replace damaged materials or structures as directed.

PART 2 - PRODUCTS

2.01 MATERIALS:

A. Metal Surfaces, General: For fabrication of work which will be exposed to view, use only materials which are smooth and free of surface blemishes including pitting, rust and scale seam marks, roller marks, rolled trade names and roughness. Remove such blemishes by grinding, or by welding and grinding, prior to cleaning, treating and application of surface finishes.

B. Structural Steel Shapes, Plates and Bars: ASTM A 36. Cold-Formed Structural Steel Tubing: ASTM A 500, Grade B.

1. Formed Steel Tubing: ASTM A 501.
2. Steel Pipe: ASTM A 53, Type E or S, Grade B; or ASTM A 501. Finish: Black, except where indicated to be galvanized.
3. W-Shapes: ASTM A 572, Grade 50.
4. Channels, Angles, M, S Shapes: ASTM A 572, Grade 50.

C. Steel Castings: ASTM A 27, Grade *65-35,* medium-strength carbon steel.

D. Headed Stud-Type Shear Connectors: ASTM A 108, Grade 1015 or 1020, cold finished carbon steel; with dimensions complying with AISC Specifications.

E. Anchor Bolts: ASTM A 307, nonheaded type unless otherwise indicated.

F. Unfinished Threaded Fasteners: ASTM A 307, Grade A, regular low- carbon steel bolts and nuts.

1. Provide either hexagonal or square, heads or nuts, except use only hexagonal units for exposed connections.

G. High-Strength Threaded Fasteners: Heavy hexagon structural bolts, Heavy hexagon nuts, and hardened washers, as follows:

1. Quenched and tempered alloy steel bolts, nuts and washers, complying with ASTM A 490.

2. Direct tension indicator washers may be used at Contractor's option.

H. Electrodes for Welding: Comply with AWS Code.

I. Structural Steel Epoxy Paint: See list of acceptable products in following sections.

J. Non-metallic Shrinkage-Resistant Grout: Pre-mixed, non-metallic, non-corrosive, non-staining product containing selected silica sands, portland cement, shrinkage compensating agents, plasticizing and water reducing agents, complying with CE-CRD-C621.

2.02 FABRICATION:

A. Shop Fabrication and Assembly: Fabricate and assemble structural assemblies in shop to greatest extent possible. Fabricate items of structural steel in accordance with AISC Specifications and as indicated on final shop drawings. Provide camber in structural members where indicated.

B. Properly mark and match-mark materials for field assembly. Fabricate for delivery sequence which

will expedite erection and minimize field handling of materials.

C. Connections: Weld or bolt shop connections, as indicated. Use moment resisting connections at steel rigid frames. Connections shall be designed by the structural steel manufacturer's licensed Professional Engineer to develop the listed moment and shear capacity of the connected members.

D. Bolt field connections, except where welded connections or other connections are indicated.

1. Provide high-strength threaded fasteners for principal bolted connections, except where unfinished bolts are indicated.

E. High-Strength Bolted Construction: Install high-strength threaded fasteners in accordance with AISC "Specifications for Structural Joints using ASTM A 325 or A 490 Bolts" (RCRBSJ).

F. Welded Construction: Comply with AWS Code for procedures, appearance and quality of welds, and methods used in correcting welding work.

G. Assemble and weld built-up sections by methods which will produce tree alignment of axes without warp.

H. Holes for Other Work: Provide holes required for securing other work to structural steel framing, and for passage of other work through steel framing members, as shown on final shop drawings.

I. Provide threaded nuts welded to framing, and other specialty items as indicated to receive other work.

J. Cut, drill, or punch holes perpendicular to metal surfaces. Do not flame cut holes or enlarge holes by burning. Drill holes in bearing plates.

2.03 SHOP PAINTING:

A. General: Shop paint structural steel, except those members or portions of members to be embedded in concrete or mortar. Paint embedded steel which is partially exposed on exposed portions and initial 2" of embedded areas only.

1. Do not paint surfaces which are to be welded or high-strength bolted with friction-type connections.

2. Do not paint surfaces which are scheduled to receive sprayed-on fireproofing.

3. Do not apply paint to surfaces specified to receive high performance coatings (exterior exposed).

3. Apply 2 coats of paint to surfaces which are inaccessible after assembly or erection. Change color of second coat to distinguish it from first.

B. Surface Preparation: After inspection and before shipping, clean steelwork to be painted. Remove loose rust, loose mill scale, and spatter, slag or flux deposits. Clean steel in accordance with Steel Structures Painting Council (SSPC) as follows:

1. SP-6 "Commercial Blast Cleaning" for all steel in exterior walls.

2. SP-3 "Power Tool Cleaning" for all other steel.

C. Painting: Immediately after surface preparation, apply the following:

1. 1.5 mils DFT non-asphaltic primer complying with SSPC's "Painting System Guide No. 7.00".

D. Apply paint in accordance with manufacturer's instructions and at a rate to provide dry film thickness of not less than that specified. Use painting methods which result in full coverage of joints, comers, edges and exposed surfaces.

PART 3 - EXECUTION

3.01 ERECTION:

A. Surveys: Employ a registered professional engineer or land surveyor for accurate erection of structural steel. Check elevations of concrete and masonry bearing surfaces, and locations of anchor bolts and similar devices, before erection work proceeds, and report discrepancies to Architect. Do not proceed with erection until corrections have been made, or until compensating adjustments to structural steel work have been agreed upon with Architect.

B. Temporary Shoring and Bracing: Provide temporary shoring and bracing members with connections of sufficient strength to bear imposed loads. Remove temporary members and connections when permanent members are in place and final connections are made. Provide temporary guy lines to achieve proper alignment of structures as erection proceeds.

C. Setting Bases and Bearing Plates: Clean concrete and masonry bearing surfaces of bond-reducing materials and roughen to improve bond to surfaces. Clean bottom surface of base and bearing plates.

D. Set loose and attached base plates and bearing plates for structural members on wedges or other adjusting devices.

E. Tighten anchor bolts after supported members have been positioned and plumbed. Do not remove wedges or shims, but if protruding, cut off flush with edge of base or bearing plate prior to packing with grout.

F. Pack grout solidly between bearing surfaces and bases or plates to ensure that no voids remain. Finish exposed surfaces, protect installed materials, and allow to cure.

    1. For proprietary grout materials, comply with manufacturer's instructions.

G. Field Assembly: Set structural frames accurately to lines and elevations indicated. Align and adjust various members forming part of complete frame or structure before permanently fastening. Clean bearing surfaces and other surfaces which will be in permanent contact before assembly. Perform necessary adjustments to compensate for discrepancies in elevations and alignment.

H. Level and plumb individual members of structure within specified AISC tolerances.

I. Establish required leveling and plumbing measurements on mean operating temperature of structure. Make allowances for difference between temperature at time of erection and mean temperature at which structure will be when completed and in service.

J. Erection Bolts: On exposed welded construction, remove erection bolts, fill holes with plug welds and grind smooth at exposed surfaces.

K. Comply with AISC Specifications for bearing, adequacy of temporary connections, alignment, and removal of paint on surfaces adjacent to field welds.

L. Do not enlarge unfair holes in members by burning or by use of drift pins, except in secondary bracing members. Ream holes that must be enlarged to admit bolts.

M. Gas Cutting: Do not use gas cutting torches in field for correcting fabrication errors in primary structural framing. Cutting will be permitted only on secondary members which are not under stress, as acceptable to Architect. Finish gas-cut sections equal to a sheared appearance when permitted.

N. Touch-Up Painting: Immediately after erection, clean field welds, bolted connections, and abraded areas of shop paint. Apply paint to exposed areas using same material as used for shop painting.

O. Apply by brush to provide minimum dry film thickness of 8.0 mils.

3.02 QUALITY CONTROL:

A. Engage an independent testing and inspection agency to inspect high-strength bolted connections and welded connections and to perform tests and prepare test reports.

B. Testing agency shall conduct and interpret tests and state in each report whether test specimens comply with requirements, and specifically state any deviations there from.

C. Provide access for testing agency to places where structural steel work is being fabricated or produced so that required inspection and testing can be accomplished.

D. Testing agency may inspect structural steel at plant before shipment; however, Architect reserves right, at any time before final acceptance, to reject material not complying with specified requirements.

E. Correct deficiencies in structural steel work which inspections and laboratory test reports have indicated to be not in compliance with requirements. Perform additional tests, at Contractor's expense, as may be necessary to reconfirm any non-compliance of original work, and as may be necessary to show compliance of corrected work.

F. Shop Bolted Connections: Inspect or test in accordance with AISC specifications.

G. Shop Welding: Inspect and test during fabrication of structural steel assemblies, as follows:
Certify welders and conduct inspections and tests as required. Record types and locations of defects found in work. Record work required and performed to correct deficiencies.

1. Perform visual inspection of all welds.

H. Field Bolted Connections: Inspect in accordance with AISC specifications.

I. Field Welding: Inspect and test during erection of structural steel as follows:
1. Certify welders and conduct inspections and tests as required. Record types and locations of defects found in work. Record work required and performed to correct deficiencies.

2. Perform visual inspection of all welds.

END OF SECTION 051200

SECTION 054000 - COLD-FORMED METAL FRAMING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of Contract, including General and Supplementary Conditions, Special Conditions and technical specification sections, apply to work of this section.

1.2 SUMMARY

A. Section Includes:

1. Load-bearing wall framing.
2. Exterior non-load-bearing wall framing.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of cold-formed steel framing product and accessory.

B. Shop Drawings:

1. Include layout, spacings, sizes, thicknesses, and types of cold-formed steel framing; fabrication; and fastening and anchorage details, including mechanical fasteners.
2. Indicate reinforcing channels, opening framing, supplemental framing, strapping, bracing, bridging, splices, accessories, connection details, and attachment to adjoining work.

1.4 INFORMATIONAL SUBMITTALS

A. Qualification Data: For testing agency.

B. Welding certificates.

C. Product test reports.

D. Research reports.

1.5 QUALITY ASSURANCE

A. Product Tests: Mill certificates or data from a qualified independent testing agency.

B. Welding Qualifications: Qualify procedures and personnel according to AWS D1.3/D1.3M, "Structural Welding Code - Sheet Steel."

C. Comply with AISI S230 "Standard for Cold-Formed Steel Framing”.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

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

1. ClarkDietrich Building Systems.
2. Nuconsteel, A Nucor Company.
3. United Metal Products, Inc.

2.2 PERFORMANCE REQUIREMENTS

A. AISI Specifications and Standards: Unless more stringent requirements are indicated, comply with AISI S100 and AISI S200.

B. Fire-Resistance Ratings: Comply with ASTM E 119; testing by a qualified testing agency.

1. Indicate design designations from UL's "Fire Resistance Directory" or from the listings of another qualified testing agency.

2.3 COLD-FORMED STEEL FRAMING, GENERAL

A. Steel Sheet: ASTM A 1003/A 1003M, Structural Grade, Type H, metallic coated, of grade and coating weight as follows:

1. Grade: **ST50H** .
2. Coating: **G60**.

2.4 LOAD-BEARING WALL FRAMING

A. Steel Studs: Manufacturer's standard C-shaped steel studs, of web depths indicated, punched, with stiffened flanges, and as follows:

1. Minimum Base-Metal Thickness: **0.0538 inch.**
2. Flange Width: **1-5/8 inches**.

B. Steel Track: Manufacturer's standard U-shaped steel track, of web depths indicated, unpunched, with straight flanges, and matching minimum base-metal thickness of steel studs.

C. Steel Box or Back-to-Back Headers: Manufacturer's standard C-shapes used to form header beams, of web depths indicated, unpunched, with stiffened flanges, and as follows:

1. Minimum Base-Metal Thickness: **0.0538 inch.**
2. Flange Width: **1-5/8 inches.**

2.5 EXTERIOR NON-LOAD-BEARING WALL FRAMING

A. Steel Studs: Manufacturer's standard C-shaped steel studs, of web depths indicated, punched, with stiffened flanges, and as follows:

1. Minimum Base-Metal Thickness: **0.0428 inch.**
2. Flange Width: **1-3/8 inches.**

B. Steel Track: Manufacturer's standard U-shaped steel track, of web depths indicated, unpunched, with unstiffened flanges, and matching minimum base-metal thickness of steel studs.

C. Vertical Deflection Clips: Manufacturer's standard clips, capable of accommodating upward and downward vertical displacement of primary structure through positive mechanical attachment to stud web.

D. Single Deflection Track: Manufacturer's single, deep-leg, U-shaped steel track; unpunched, with unstiffened flanges, of web depth to contain studs while allowing free vertical movement, with flanges designed to support horizontal loads and transfer them to the primary structure.

E. Double Deflection Tracks: Manufacturer's double, deep-leg, U-shaped steel tracks, consisting of nested inner and outer tracks; unpunched, with unstiffened flanges.

F. Drift Clips: Manufacturer's standard bypass or head clips, capable of isolating wall stud from upward and downward vertical displacement and lateral drift of primary structure through positive mechanical attachment to stud web and structure.

2.6 FRAMING ACCESSORIES

A. Fabricate steel-framing accessories from steel sheet, ASTM A 1003/A 1003M, Structural Grade, Type H, metallic coated, of same grade and coating weight used for framing members.

B. Provide accessories of manufacturer's standard thickness and configuration.

2.7 ANCHORS, CLIPS, AND FASTENERS

A. Steel Shapes and Clips: ASTM A 36/A 36M, zinc coated by hot-dip process according to ASTM A 123/A 123M.

B. Anchor Bolts: ASTM F 1554, **Grade 36**, threaded carbon-steel hex-headed bolts and carbon-steel nuts; and flat, hardened-steel washers; zinc coated by hot-dip process according to ASTM A 153/A 153M, Class C.

C. Expansion Anchors: Fabricated from corrosion-resistant materials, with allowable load or strength design capacities calculated according to ICC-ES AC193 and ACI 318 greater than or equal to the design load, as determined by testing per ASTM E 488 conducted by a qualified testing agency.

D. Power-Actuated Anchors: Fastener system of type suitable for application indicated, fabricated from corrosion-resistant materials, with allowable load capacities calculated according to ICC-ES AC70, greater than or equal to the design load, as determined by testing per ASTM E 1190 conducted by a qualified testing agency.

E. Mechanical Fasteners: ASTM C 1513, corrosion-resistant-coated, self-drilling, self-tapping, steel drill screws.

1. Head Type: Low-profile head beneath sheathing, manufacturer's standard elsewhere.

2.8 MISCELLANEOUS MATERIALS

A. Galvanizing Repair Paint: SSPC-Paint 20 or MIL-P-21035B.

B. Cement Grout: Portland cement, ASTM C 150, Type I; and clean, natural sand, ASTM C 404. Mix at ratio of 1 part cement to 2-1/2 parts sand, by volume, with minimum water required for placement and hydration.

C. Nonmetallic, Nonshrink Grout: Premixed, nonmetallic, noncorrosive, nonstaining grout containing selected silica sands, portland cement, shrinkage-compensating agents, and plasticizing and water-reducing agents, complying with ASTM C 1107/C 1107M, with fluid consistency and 30-minute working time.

D. Shims: Load bearing, high-density multimonomer plastic, and nonleaching; or of cold-formed steel of same grade and coating as framing members supported by shims.

E. Sealer Gaskets: Closed-cell neoprene foam, 1/4 inch thick, selected from manufacturer's standard widths to match width of bottom track or rim track members.

PART 3 - EXECUTION

3.1 PREPARATION

A. Install load bearing shims or grout between the underside of load-bearing wall bottom track and the top of foundation wall or slab at locations with a gap larger than 1/4 inch to ensure a uniform bearing surface on supporting concrete or masonry construction.

B. Install sealer gaskets at the underside of wall bottom track or rim track and at the top of foundation wall or slab at stud or joist locations.

3.2 INSTALLATION, GENERAL

A. Cold-formed steel framing may be shop or field fabricated for installation, or it may be field assembled.

B. Install cold-formed steel framing according to AISI S200 and to manufacturer's written instructions unless more stringent requirements are indicated.

C. Install cold-formed steel framing and accessories plumb, square, and true to line, and with connections securely fastened.

D. Install framing members in one-piece lengths.

E. Install temporary bracing and supports to secure framing and support loads comparable in intensity to those for which structure was designed. Maintain braces and supports in place, undisturbed, until entire integrated supporting structure has been completed and permanent connections to framing are secured.

F. Do not bridge building expansion joints with cold-formed steel framing. Independently frame both sides of joints.

G. Install insulation, specified in Section 072100 "Thermal Insulation," in built-up exterior framing members, such as headers, sills, boxed joists, and multiple studs at openings, that are inaccessible on completion of framing work.

H. Fasten hole reinforcing plate over web penetrations that exceed size of manufacturer's approved or standard punched openings.

I. Erection Tolerances: Install cold-formed steel framing level, plumb, and true to line to a maximum allowable tolerance variation of 1/8 inch in 10 feet and as follows:

1. Space individual framing members no more than plus or minus 1/8 inch from plan location. Cumulative error shall not exceed minimum fastening requirements of sheathing or other finishing materials.

3.3 LOAD-BEARING WALL INSTALLATION

A. Install continuous top and bottom tracks sized to match studs. Align tracks accurately and securely anchor at corners and ends, and at spacings as follows:

1. Anchor Spacing: 32 inches.

B. Squarely seat studs against top and bottom tracks with gap not exceeding of 1/8 inch between the end of wall framing member and the web of track. Fasten both flanges of studs to top and bottom tracks. Space studs as follows:

1. Stud Spacing: As indicated on drawings.

C. Set studs plumb, except as needed for diagonal bracing or required for nonplumb walls or warped surfaces and similar configurations.

D. Align studs vertically where floor framing interrupts wall-framing continuity. Where studs cannot be aligned, continuously reinforce track to transfer loads.

E. Align floor and roof framing over studs. Where framing cannot be aligned, continuously reinforce track to transfer loads.

F. Anchor studs abutting structural columns or walls, including masonry walls, to supporting structure as indicated.

G. Install headers over wall openings wider than stud spacing. Locate headers above openings as indicated. Fabricate headers of compound shapes indicated or required to transfer load to supporting studs, complete with clip-angle connectors, web stiffeners, or gusset plates.

1. Frame wall openings with not less than a double stud at each jamb of frame as indicated on Shop Drawings. Fasten jamb members together to uniformly distribute loads.
2. Install runner tracks and jack studs above and below wall openings. Anchor tracks to jamb studs with clip angles or by welding, and space jack studs same as full-height wall studs.

H. Install supplementary framing, blocking, and bracing in stud framing indicated to support fixtures, equipment, services, casework, heavy trim, furnishings, and similar work requiring attachment to framing.

1. If type of supplementary support is not indicated, comply with stud manufacturer's written recommendations and industry standards in each case, considering weight or load resulting from item supported.

I. Install horizontal bridging in stud system, spaced vertically 48 inches. Fasten at each stud intersection.

1. Bridging: Cold-rolled steel channel, welded or mechanically fastened to webs of punched studs with a minimum of two screws into each flange of the clip angle for framing members up to 6 inches deep.
2. Bridging: Combination of flat, taut, steel sheet straps of width and thickness indicated and stud-track solid blocking of width and thickness to match studs. Fasten flat straps to stud flanges and secure solid blocking to stud webs or flanges.
3. Bridging: Proprietary bridging bars installed according to manufacturer's written instructions.

J. Install steel sheet diagonal bracing straps to both stud flanges, terminate at and fasten to reinforced top and bottom tracks. Fasten clip-angle connectors to multiple studs at ends of bracing and anchor to structure.

K. Install miscellaneous framing and connections, including supplementary framing, web stiffeners, clip angles, continuous angles, anchors, and fasteners, to provide a complete and stable wall-framing system.

3.4 EXTERIOR NON-LOAD-BEARING WALL INSTALLATION

A. Install continuous tracks sized to match studs. Align tracks accurately and securely anchor to supporting structure as indicated.

B. Fasten both flanges of studs to top and bottom track unless otherwise indicated. Space studs as follows:

1. Stud Spacing: As indicated on drawings.

C. Set studs plumb, except as needed for diagonal bracing or required for nonplumb walls or warped surfaces and similar requirements.

D. Isolate non-load-bearing steel framing from building structure to prevent transfer of vertical loads while providing lateral support.

1. Install single deep-leg deflection tracks and anchor to building structure.
2. Install double deep-leg deflection tracks and anchor outer track to building structure.
3. Connect vertical deflection clips to bypassing studs and anchor to building structure.
4. Connect drift clips to cold-formed metal framing and anchor to building structure.

E. Install horizontal bridging in wall studs, spaced vertically in rows indicated on Shop Drawings but not more than 48 inches apart. Fasten at each stud intersection.

1. Top Bridging for Single Deflection Track: Install row of horizontal bridging within 12 inches of single deflection track. Install a combination of bridging and stud or stud-track solid blocking of width and thickness matching studs, secured to stud webs or flanges.

a. Install solid blocking at 96-inches.

2. Bridging: Cold-rolled steel channel, welded or mechanically fastened to webs of punched studs.
3. Bridging: Combination of flat, taut, steel sheet straps of width and thickness indicated and stud-track solid blocking of width and thickness to match studs. Fasten flat straps to stud flanges and secure solid blocking to stud webs or flanges.
4. Bridging: Proprietary bridging bars installed according to manufacturer's written instructions.

F. Install miscellaneous framing and connections, including stud kickers, web stiffeners, clip angles, continuous angles, anchors, and fasteners, to provide a complete and stable wall-framing system.

3.5 FIELD QUALITY CONTROL

A. Testing: Owner will engage a qualified independent testing and inspecting agency to perform field tests and inspections and prepare test reports.

B. Field and shop welds will be subject to testing and inspecting.

C. Testing agency will report test results promptly and in writing to Contractor and Architect.

D. Remove and replace work where test results indicate that it does not comply with specified requirements.

E. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.

3.6 REPAIRS AND PROTECTION

A. Galvanizing Repairs: Prepare and repair damaged galvanized coatings on fabricated and installed cold-formed steel framing with galvanized repair paint according to ASTM A 780 and manufacturer's written instructions.

B. Provide final protection and maintain conditions, in a manner acceptable to manufacturer and Installer, that ensure that cold-formed steel framing is without damage or deterioration at time of Substantial Completion.

END OF SECTION 054000

SECTION 055000 - METAL FABRICATIONS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of Contract, including General and Supplementary Conditions, Special Conditions and technical specification sections, apply to work of this section.

1.2 SUMMARY

A. Section Includes:

1. Miscellaneous steel framing and supports.
2. Shelf angles.
3. Metal ladders.
4. Ladder safety cages.
5. Metal floor plate and supports**.**
6. Elevator pit sump covers.
7. Structural-steel door frames.
8. Miscellaneous steel trim.
9. Metal bollards.
10. Wire rope.
11. Pipe and Downspout guards.
12. Abrasive metal nosings, treads, and thresholds.
13. Loose bearing and leveling plates.

B. Products furnished, but not installed, under this Section include the following:

1. Loose steel lintels.
2. Anchor bolts, steel pipe sleeves, slotted-channel inserts, and wedge-type inserts indicated to be cast into concrete or built into unit masonry.
3. Steel weld plates and angles for casting into concrete for applications where they are not specified in other Sections.

1.3 ACTION SUBMITTALS

A. Product Data: For the following:

1. Metal nosings and treads.
2. Paint products.
3. Grout.

B. Shop Drawings: Show fabrication and installation details. Include plans, elevations, sections, and details of metal fabrications and their connections. Show anchorage and accessory items.

C. Samples for Verification: For each type and finish of extruded nosing and tread.

D. Delegated-Design Submittal: For ladders, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Delegated Design: Engage a qualified professional engineer, as defined in Section 014000 "Quality Requirements," to design specified structural elements.

B. Structural Performance of Aluminum Ladders: Aluminum ladders, including landings, shall withstand the effects of loads and stresses within limits and under conditions specified in ANSI A14.3.

C. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes acting on exterior metal fabrications by preventing buckling, opening of joints, overstressing of components, failure of connections, and other detrimental effects.

1. Temperature Change: 120 deg F, ambient.

2.2 METALS

A. Metal Surfaces, General: Provide materials with smooth, flat surfaces unless otherwise indicated. For metal fabrications exposed to view in the completed Work, provide materials without seam marks, roller marks, rolled trade names, or blemishes.

B. Steel Plates, Shapes, and Bars: ASTM A 36/A 36M.

C. Stainless-Steel Bars and Shapes: ASTM A 276, Type 316L.

D. Rolled-Steel Floor Plate: ASTM A 786/A 786M, rolled from plate complying with ASTM A 36/A 36M or ASTM A 283/A 283M, Grade C or D.

E. Rolled-Stainless-Steel Floor Plate: ASTM A 793.

F. Abrasive-Surface Floor Plate: Steel plate with abrasive granules rolled into surface or with abrasive material metallically bonded to steel].

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:

a. IKG Industries, a division of Harsco Corporation; Mebac.
b. SlipNOT Metal Safety Flooring; SlipNOT.

G. Steel Tubing: ASTM A 500/A 500M, cold-formed steel tubing.

H. Steel Pipe: ASTM A 53/A 53M, Standard Weight (Schedule 40) unless otherwise indicated.

I. Stainless Steel Wire Rope: ASTM A 316.

1. Wire-Rope Fittings: Stainless steel connectors with capability to sustain, without failure, a load equal to minimum breaking strength of wire rope with which they are used.

J. Slotted Channel Framing: Cold-formed metal box channels (struts) complying with MFMA-4.

1. Size of Channels: 1-5/8 by 1-5/8 inches.

2. Material: Galvanized steel, ASTM A 653/A 653M, with G90 coating
3. Material: Cold-rolled steel, ASTM A 1008/A 1008M, hot-dip galvanized after fabrication.

K. Cast Iron: Either gray iron, ASTM A 48/A 48M, or malleable iron, ASTM A 47/A 47M, unless otherwise indicated.

L. Aluminum Extrusions: ASTM B 221 , Alloy 6063-T6.

M. Aluminum-Alloy Rolled Tread Plate: ASTM B 632/B 632M, Alloy 6061-T6.

N. Aluminum Castings: ASTM B 26/B 26M, Alloy 443.0-F.

O. Bronze Extrusions: ASTM B 455, Alloy UNS No. C38500 (extruded architectural bronze).

P. Bronze Castings: ASTM B 584, Alloy UNS No. C83600 (leaded red brass) or No. C84400 (leaded semired brass).

Q. Nickel Silver Castings: ASTM B 584, Alloy UNS No. C97600 (20 percent leaded nickel bronze).

2.3 FASTENERS

A. General: Unless otherwise indicated, provide Type 316 stainless-steel fasteners for exterior use and zinc-plated fasteners with coating complying with ASTM B 633 or ASTM F 1941, Class Fe/Zn 5, at exterior walls. Select fasteners for type, grade, and class required.

1. Provide stainless-steel fasteners for fastening aluminum.
2. Provide stainless-steel fasteners for fastening stainless steel.
3. Provide stainless-steel fasteners for fastening nickel silver.
4. Provide bronze fasteners for fastening bronze.

B. Cast-in-Place Anchors in Concrete: Either threaded type or wedge type unless otherwise indicated; galvanized ferrous castings, either ASTM A 47/A 47M malleable iron or ASTM A 27/A 27M cast steel. Provide bolts, washers, and shims as needed, all hot-dip galvanized per ASTM F 2329.

C. Post-Installed Anchors: Torque-controlled expansion anchors or chemical anchors.

1. Material for Interior Locations: Carbon-steel components zinc plated to comply with ASTM B 633 or ASTM F 1941, Class Fe/Zn 5, unless otherwise indicated.
2. Material for Exterior Locations and Where Stainless Steel Is Indicated: Alloy Group 1 stainless-steel bolts and nuts.

D. Slotted-Channel Inserts: Cold-formed, hot-dip galvanized-steel box channels (struts) complying with MFMA-4, 1-5/8 by 7/8 inches by length indicated with anchor straps or studs not less than 3 inches long at not more than 8 inches o.c. Provide with temporary filler and tee-head bolts, complete with washers and nuts, all zinc-plated to comply with ASTM B 633, Class Fe/Zn 5, as needed for fastening to inserts.

2.4 MISCELLANEOUS MATERIALS

A. Shop Primers: Provide primers that comply with Section 099113 "Exterior Painting", Section 099123 Interior Painting", and Section 099600 "High-Performance Coatings."

B. Universal Shop Primer: Fast-curing, lead- and chromate-free, universal modified-alkyd primer complying with MPI#79 and compatible with topcoat.

1. Use primer containing pigments that make it easily distinguishable from zinc-rich primer.

C. Water-Based Primer: Emulsion type, anticorrosive primer for mildly corrosive environments that is resistant to flash rusting when applied to cleaned steel, complying with MPI#107 and compatible with topcoat.

D. Epoxy Zinc-Rich Primer: Complying with MPI#20 and compatible with topcoat.

E. Galvanizing Repair Paint: High-zinc-dust-content paint complying with SSPC-Paint 20 and compatible with paints specified to be used over it.

F. Bituminous Paint: Cold-applied asphalt emulsion complying with ASTM D 1187/D 1187M.

G. Nonshrink, Nonmetallic Grout: Factory-packaged, nonstaining, noncorrosive, nongaseous grout complying with ASTM C 1107/C 1107M. Provide grout specifically recommended by manufacturer for interior and exterior applications.

H. Concrete: Comply with requirements in Section 033000 "Cast-in-Place Concrete" for normal-weight, air-entrained, concrete with a minimum 28-day compressive strength of 4000 psi.

2.5 FABRICATION, GENERAL

A. Shop Assembly: Preassemble items in the shop to greatest extent possible. Use connections that maintain structural value of joined pieces.

B. Cut, drill, and punch metals cleanly and accurately. Remove burrs and ease edges. Remove sharp or rough areas on exposed surfaces.

C. Weld corners and seams continuously to comply with the following:

1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
2. Obtain fusion without undercut or overlap.
3. Remove welding flux immediately.
4. At exposed connections, finish exposed welds and surfaces smooth and blended.

D. Form exposed connections with hairline joints, flush and smooth, using concealed fasteners or welds where possible. Locate joints where least conspicuous.

E. Fabricate seams and other connections that are exposed to weather in a manner to exclude water. Provide weep holes where water may accumulate.

F. Where units are indicated to be cast into concrete or built into masonry, equip with integrally welded steel strap anchors not less than 8 inches from ends and corners of units and 24 inches o.c.

2.6 MISCELLANEOUS FRAMING AND SUPPORTS

A. General: Provide steel framing and supports not specified in other Sections as needed to complete the Work.

B. Fabricate units from steel shapes, plates, and bars of welded construction unless otherwise indicated. Fabricate to sizes, shapes, and profiles indicated and as necessary to receive adjacent construction.

2.7 SHELF ANGLES

A. Fabricate shelf angles from steel angles of sizes indicated and for attachment to concrete framing. Provide horizontally slotted holes to receive 3/4-inch bolts, spaced not more than 6 inches from ends and 24 inches o.c., unless otherwise indicated.

B. For cavity walls, provide vertical channel brackets to support angles from backup masonry and concrete.

C. Galvanize shelf angles located in exterior walls.

D. Prime shelf angles located in exterior walls with primer specified in Section 099600 "High-Performance Coatings."

E. Furnish wedge-type concrete inserts, complete with fasteners, to attach shelf angles to cast-in-place concrete.

2.8 METAL LADDERS

A. General:

1. Comply with ANSI A14.3, except for elevator pit ladders.
2. For elevator pit ladders, comply with ASME A17.1/CSA B44.

B. Steel Ladders:

1. Space siderails 16 inches apart unless otherwise indicated.
2. Siderails: Continuous, 3/8-by-2-1/2-inch steel flat bars, with eased edges.
3. Rungs: 3/4-inch square square steel bars.
4. Fit rungs in centerline of siderails; plug-weld and grind smooth on outer rail faces.
5. Provide nonslip surfaces on top of each rung.
6. Galvanize exterior ladders, including brackets.
7. Prime exterior ladders, including brackets and fasteners, with primer specified in Section 099600 "High-Performance Coatings."

C. Aluminum Ladders:

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

   a. ACL Industries, Inc.
   b. Alco-Lite Industrial Products.
   c. Halliday Products.
   d. O'Keeffe's Inc.
   e. Precision Ladders, LLC.
   f. Royalite Manufacturing, Inc.
   g. Thompson Fabricating, LLC.

2. Space siderails 16 inches apart unless otherwise indicated.

3. Siderails: Continuous extruded-aluminum channels or tubes, not less than 2-1/2 inches deep, 3/4 inch wide, and 1/8 inch thick.
4. Rungs: Extruded-aluminum tubes, not less than 3/4 inch deep and not less than 1/8 inch thick, with ribbed tread surfaces.

2.9 LADDER SAFETY CAGES

A. Fabricate ladder safety cages to comply with ANSI A14.3. Assemble by welding or with stainless-steel fasteners.

B. Provide primary hoops at tops and bottoms of cages and spaced not more than 20 feet o.c. Provide secondary intermediate hoops spaced not more than 48 inches o.c. between primary hoops.

C. Galvanize steel ladder safety cages, including brackets and fasteners.

D. Prime steel ladder safety cages, including brackets and fasteners, with primer specified in Section 099600 "High-Performance Coatings."

2.10 METAL FLOOR PLATE

A. Fabricate from rolled-steel floor or rolled-stainless-steel floor as indicated on drawings.

B. Provide steel or stainless-steel angle supports as indicated.

C. Provide flush stainless-steel bar drop handles for lifting removable sections, one at each end of each section.

2.11 ELEVATOR PIT SUMP COVERS

A. Fabricate from 1/8-inch rolled-steel floor plate with four 1-inch diameter holes for water drainage and for lifting.

2.12 STRUCTURAL-STEEL DOOR FRAMES

A. Fabricate structural-steel door frames from steel shapes, plates, and bars of size and to dimensions indicated, fully welded together, with 5/8-by-1-1/2-inch steel channel stops. Plug-weld built-up members and continuously weld exposed joints. Reinforce frames and drill and tap as necessary to accept finish hardware.

1. Provide with integrally welded steel strap anchors for securing door frames into adjoining concrete or masonry.

B. Prime exterior steel frames with primer specified in Section 099600 "High-Performance Coatings."

2.13 MISCELLANEOUS STEEL TRIM

A. Unless otherwise indicated, fabricate units from steel shapes, plates, and bars of profiles shown with continuously welded joints and smooth exposed edges. Miter corners and use concealed field splices where possible.

B. Provide cutouts, fittings, and anchorages as needed to coordinate assembly and installation with other work.

C. Prime exterior miscellaneous steel trim with primer specified in Section 099600 "High-Performance Coatings."

2.14 METAL BOLLARDS

A. Fabricate metal bollards from Schedule 40 steel pipe.

1. Cap bollards with 1/4-inch thick steel plate.

B. Fabricate sleeves for bollard anchorage from steel pipe thick steel plate welded to bottom of sleeve.

C. Prime bollards with primer specified in Section 099600 "High-Performance Coatings."

2.15 PIPE AND DOWNSPOUT GUARDS

A. Fabricate pipe and downspout guards from 3/8-inch thick by 12-inch wide steel plate, bent to fit flat against the wall or column at both ends and to fit around pipe with 2-inch clearance between pipe and pipe guard. Drill each end for two 3/4-inch anchor bolts.

B. Galvanize pipe and downspout guards.

2.16 ABRASIVE METAL NOSINGS, TREADS, AND THRESHOLDS

A. Cast-Metal Units: Cast iron with an integral-abrasive, as-cast finish consisting of aluminum oxide, silicon carbide, or a combination of both.

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

a. American Safety Tread Co., Inc.
b. Balco, Inc.
c. Barry Pattern & Foundry Co., Inc.
d. Granite State Casting Co.
e. Safe-T-Metal Company, Inc.
f. Wooster Products Inc.

B. Extruded Units: Aluminum, with abrasive filler consisting of aluminum oxide, silicon carbide, or a combination of both, in an epoxy-resin binder.

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

a. ACL Industries, Inc.
b. American Safety Tread Co., Inc.
c. Amstep Products.
d. Armstrong Products, Inc.
e. Balco, Inc.

f. Granite State Casting Co.
g. Wooster Products Inc.

2. Provide ribbed units, with abrasive filler strips projecting 1/16 inch above aluminum extrusion.
3. Provide solid-abrasive-type units without ribs.

C. Provide anchors for embedding units in concrete, either integral or applied to units, as standard with manufacturer.

D. Drill for mechanical anchors and countersink. Locate holes not more than 4 inches from ends and not more than 12 inches o.c.

E. Apply bituminous paint to concealed surfaces of cast-metal units.

F. Apply clear lacquer to concealed surfaces of extruded units.

2.17 LOOSE BEARING AND LEVELING PLATES

A. Provide loose bearing and leveling plates for steel items bearing on masonry or concrete construction. Drill plates to receive anchor bolts and for grouting.

2.18 LOOSE STEEL LINTELS

A. Fabricate loose steel lintels from steel angles and shapes of size indicated for openings and recesses in masonry walls and partitions at locations indicated.

B. Galvanize loose steel lintels located in exterior walls.

C. Prime loose steel lintels located in exterior walls with primer specified in Section 099600 "High-Performance Coatings."

2.19 STEEL WELD PLATES AND ANGLES

A. Provide steel weld plates and angles not specified in other Sections, for items supported from concrete construction as needed to complete the Work. Provide each unit with no fewer than two integrally welded steel strap anchors for embedding in concrete.

2.20 FINISHES, GENERAL

A. Finish metal fabrications after assembly.

2.21 STEEL AND IRON FINISHES

A. Galvanizing: Hot-dip galvanize items as indicated to comply with ASTM A 153/A 153M for steel and iron hardware and with ASTM A 123/A 123M for other steel and iron products.

B. Shop prime iron and steel items not indicated to be galvanized unless they are to be embedded in concrete, sprayed-on fireproofing, or masonry, or unless otherwise indicated.

1. Shop prime with primers specified in Section 099600 "High-Performance Coatings".

C. Preparation for Shop Priming: Prepare surfaces to comply with requirements indicated below:

1. Exterior Items: SSPC-SP 6/NACE No. 3, "Commercial Blast Cleaning."
2. Items Indicated to Receive Zinc-Rich Primer: SSPC-SP 6/NACE No. 3, "Commercial Blast Cleaning."
3. Items Indicated to Receive Primers Specified in Section 099600 "High-Performance Coatings": SSPC-SP 6/NACE No. 3, "Commercial Blast Cleaning."
4. Other Items: SSPC-SP 3, "Power Tool Cleaning."

D. Shop Priming: Apply shop primer to comply with SSPC-PA 1, "Paint Application Specification No. 1: Shop, Field, and Maintenance Painting of Steel," for shop painting.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

A. Cutting, Fitting, and Placement: Perform cutting, drilling, and fitting required for installing metal fabrications. Set metal fabrications accurately in location, alignment, and elevation; with edges and surfaces level, plumb, true, and free of rack; and measured from established lines and levels.

B. Fit exposed connections accurately together to form hairline joints. Weld connections that are not to be left as exposed joints but cannot be shop welded because of shipping size limitations. Do not weld, cut, or abrade surfaces of exterior units that have been hot-dip galvanized after fabrication and are for bolted or screwed field connections.

C. Field Welding: Comply with the following requirements:

1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
2. Obtain fusion without undercut or overlap.
3. Remove welding flux immediately.
4. At exposed connections, finish exposed welds and surfaces smooth and blended so no roughness shows after finishing and contour of welded surface matches that of adjacent surface.

D. Fastening to In-Place Construction: Provide anchorage devices and fasteners where metal fabrications are required to be fastened to in-place construction.

E. Provide temporary bracing or anchors in formwork for items that are to be built into concrete, masonry, or similar construction.

3.2 INSTALLING METAL BOLLARDS

A. Fill metal-capped bollards solidly with concrete and allow concrete to cure seven days before installing.

B. Anchor bollards in concrete with pipe sleeves preset and anchored into concrete in formed or core-drilled holes. Fill annular space around bollard solidly with nonshrink grout.

C. Fill bollards solidly with concrete, mounding top surface to shed water.

3.3 INSTALLING BEARING AND LEVELING PLATES

A. Clean concrete and masonry bearing surfaces of bond-reducing materials, and roughen to improve bond to surfaces. Clean bottom surface of plates.

B. Set bearing and leveling plates on wedges, shims, or leveling nuts. After bearing members have been positioned and plumbed, tighten anchor bolts. Do not remove wedges or shims but, if protruding, cut off flush with edge of bearing plate before packing with nonshrink grout. Pack grout solidly between bearing surfaces and plates to ensure that no voids remain.

3.4 ADJUSTING AND CLEANING

A. Touchup Painting: Immediately after erection, clean field welds, bolted connections, and abraded areas. Paint uncoated and abraded areas with the same material as used for shop painting to comply with SSPC-PA 1 for touching up shop-painted surfaces.

B. Galvanized Surfaces: Clean field welds, bolted connections, and abraded areas and repair galvanizing to comply with ASTM A 780/A 780M.

END OF SECTION 055000

SECTION 061000 - ROUGH CARPENTRY

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

1. Rooftop equipment bases and support curbs.
2. Wood blocking, cants, and nailers.
3. Wood furring and grounds.
4. Utility shelving.
5. Plywood backing panels.

B. Related Requirements:

1. Section 061600 "Sheathing."

1.3 DEFINITIONS

A. Dimension Lumber: Lumber of 2 inches nominal or greater but less than 5 inches nominal in least dimension.
B. Lumber grading agencies, and the abbreviations used to reference them, include the following:

1. NeLMA: Northeastern Lumber Manufacturers' Association.
2. NLGA: National Lumber Grades Authority.
3. SPIB: The Southern Pine Inspection Bureau.
4. WCLIB: West Coast Lumber Inspection Bureau.
5. WWPA: Western Wood Products Association.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of process and factory-fabricated product. Indicate component materials and dimensions and include construction and application details.

1. Include data for wood-preservative treatment from chemical treatment manufacturer and certification by treating plant that treated materials comply with requirements. Indicate type of preservative used and net amount of preservative retained.
2. For products receiving a waterborne treatment, include statement that moisture content of treated materials was reduced to levels specified before shipment to Project site.
3. Include copies of warranties from chemical treatment manufacturers for each type of treatment.

1.5 INFORMATIONAL SUBMITTALS

A. Material Certificates: For dimension lumber specified to comply with minimum allowable unit stresses. Indicate species and grade selected for each use and design values approved by the ALSC Board of Review.
B. Evaluation Reports: For the following, from ICC-ES:

1. Wood-preservative-treated wood.
2. Power-driven fasteners.
3. Powder-actuated fasteners.
4. Expansion anchors.

1.6 QUALITY ASSURANCE

A. Testing Agency Qualifications: For testing agency providing classification marking for fire-retardant treated material, an inspection agency acceptable to authorities having jurisdiction that periodically performs inspections to verify that the material bearing the classification marking is representative of the material tested.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Stack lumber flat with spacers beneath and between each bundle to provide air circulation. Protect lumber from weather by covering with waterproof sheeting, securely anchored. Provide for air circulation around stacks and under coverings.

PART 2 - PRODUCTS

2.1 WOOD PRODUCTS, GENERAL

A. Certified Wood: Materials shall be produced from wood obtained from forests certified by an FSC-accredited certification body to comply with FSC STD-01-001, "FSC Principles and Criteria for Forest Stewardship"for the following:

1. Miscellaneous lumber.

B. Lumber: DOC PS 20 and applicable rules of grading agencies indicated. If no grading agency is indicated, provide lumber that complies with the applicable rules of any rules-writing agency certified by the ALSC Board of Review. Provide lumber graded by an agency certified by the ALSC Board of Review to inspect and grade lumber under the rules indicated.

1. Factory mark each piece of lumber with grade stamp of grading agency.
2. Where nominal sizes are indicated, provide actual sizes required by DOC PS 20 for moisture content specified. Where actual sizes are indicated, they are minimum dressed sizes for dry lumber.
3. Provide dressed lumber, S4S, unless otherwise indicated.

C. Maximum Moisture Content of Lumber: 19 percent for 2-inch nominal thickness or less, no limit for more than 2-inch nominal thickness unless otherwise indicated.

2.2 WOOD-PRESERVATIVE-TREATED LUMBER

A. Preservative Treatment by Pressure Process: AWPA U1; Use Category UC2 for interior construction not in contact with the ground, Use Category UC3b for exterior construction not in contact with the ground, and Use Category UC4a for items in contact with the ground.

1. Preservative Chemicals: Acceptable to authorities having jurisdiction and containing no arsenic or chromium.

B. Kiln-dry lumber after treatment to a maximum moisture content of 19 percent. Do not use material that is warped or that does not comply with requirements for untreated material.
C. Mark lumber with treatment quality mark of an inspection agency approved by the ALSC Board of Review.
D. Application: Treat items indicated on Drawings, and the following:

1. Wood cants, nailers, curbs, equipment support bases, blocking, stripping, and similar members in connection with roofing, flashing, vapor barriers, and waterproofing.
2. Wood sills, sleepers, blocking, furring, stripping, and similar concealed members in contact with masonry or concrete.
3. Wood floor plates that are installed over concrete slabs-on-grade.

2.3 MISCELLANEOUS LUMBER

A. General: Provide miscellaneous lumber indicated and lumber for support or attachment of other construction, including the following:

1. Blocking.
2. Nailers.
3. Rooftop equipment bases and support curbs.
4. Cants.
5. Furring.
6. Grounds.
7. Utility shelving.

B. For items of dimension lumber size, provide Construction or No. 2 grade lumber.
C. For utility shelving, provide lumber with 19 percent maximum moisture content and any of the following species and grades:

1. Eastern white pine, Idaho white, lodgepole, ponderosa, or sugar pine; Premium or No. 2 Common (Sterling) grade; NeLMA, NLGA, WCLIB, or WWPA.
2. Mixed southern pine; No. 1 grade; SPIB.
3. Spruce-pine-fir (south) or spruce-pine-fir; Select Merchantable or No. 1 Common grade; NeLMA, NLGA, WCLIB, or WWPA.

D. For concealed boards, provide lumber with 19 percent maximum moisture content and any of the following species and grades:

1. Mixed southern pine; No. 2 grade; SPIB.
2. Spruce-pine-fir (south) or spruce-pine-fir; Construction or No. 2 Common grade; NeLMA, NLGA, WCLIB, or WWPA.
3. Eastern softwoods; No. 2 Common grade; NeLMA.

E. For blocking not used for attachment of other construction, Utility, Stud, or No. 3 grade lumber of any species may be used provided that it is cut and selected to eliminate defects that will interfere with its attachment and purpose.
F. For blocking and nailers used for attachment of other construction, select and cut lumber to eliminate knots and other defects that will interfere with attachment of other work.
G. For furring strips for installing plywood or hardboard paneling, select boards with no knots capable of producing bent-over nails and damage to paneling.

2.4 PLYWOOD BACKING PANELS

A. Equipment Backing Panels: DOC PS 1, Exterior, AC, in thickness indicated or, if not indicated, not less than 3/4-inch nominal thickness.

2.5 FASTENERS

A. General: Provide fasteners of size and type indicated that comply with requirements specified in this article for material and manufacture.

1. Where rough carpentry is exposed to weather, in ground contact, pressure-preservative treated, or in area of high relative humidity, provide fasteners of Type 304 stainless steel.

B. Nails, Brads, and Staples: ASTM F 1667.
C. Power-Driven Fasteners: NES NER-272.
D. Wood Screws: ASME B18.6.1.
E. Lag Bolts: ASME B18.2.1 .
F. Bolts: Steel bolts complying with ASTM A 307, Grade A ; with ASTM A 563 hex nuts and, where indicated, flat washers.
G. Expansion Anchors: Anchor bolt and sleeve assembly of material indicated below with capability to sustain, without failure, a load equal to six times the load imposed when installed in unit masonry assemblies and equal to four times the load imposed when installed in concrete as determined by testing per ASTM E 488 conducted by a qualified independent testing and inspecting agency.

1. Material: Stainless steel with bolts and nuts complying with ASTM F 593 and ASTM F 594, Alloy Group 1 or 2 .

2.6 MISCELLANEOUS MATERIALS

A. Sill-Sealer Gaskets: Closed-cell neoprene foam, 1/4 inch thick, selected from manufacturer's standard widths to suit width of sill members indicated.
B. Water-Repellent Preservative: NWWDA-tested and -accepted formulation containing 3-iodo-2-propynyl butyl carbamate, combined with an insecticide containing chloropyrifos as its active ingredient.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

A. Set rough carpentry to required levels and lines, with members plumb, true to line, cut, and fitted. Fit rough carpentry to other construction; scribe and cope as needed for accurate fit. Locate furring, nailers, blocking, grounds, and similar supports to comply with requirements for attaching other construction.
B. Framing Standard: Comply with AF&PA's WCD 1, "Details for Conventional Wood Frame Construction," unless otherwise indicated.
C. Install sill sealer gasket to form continuous seal between sill plates and foundation walls.
D. Do not splice structural members between supports unless otherwise indicated.
E. Provide blocking and framing as indicated and as required to support facing materials, fixtures, specialty items, and trim.

1. Provide metal clips for fastening gypsum board or lath at corners and intersections where framing or blocking does not provide a surface for fastening edges of panels. Space clips not more than 16 inches o.c.

F. Provide fire blocking in furred spaces, stud spaces, and other concealed cavities as indicated and as follows:

1. Fire block furred spaces of walls, at each floor level, at ceiling, and at not more than 96 inches o.c. with solid wood blocking or noncombustible materials accurately fitted to close furred spaces.
2. Fire block concealed spaces of wood-framed walls and partitions at each floor level, at ceiling line of top story, and at not more than 96 inches o.c. Where fire blocking is not inherent in framing system used, provide closely fitted solid wood blocks of same width as framing members and 2-inch nominal- thickness.
3. Fire block concealed spaces between floor sleepers with same material as sleepers to limit concealed spaces to not more than 100 sq. ft. and to solidly fill space below partitions.
4. Fire block concealed spaces behind combustible cornices and exterior trim at not more than 20 feet o.c.

G. Sort and select lumber so that natural characteristics will not interfere with installation or with fastening other materials to lumber. Do not use materials with defects that interfere with function of member or pieces that are too small to use with minimum number of joints or optimum joint arrangement.

H. Comply with AWPA M4 for applying field treatment to cut surfaces of preservative-treated lumber.

1. Use inorganic boron for items that are continuously protected from liquid water.
2. Use copper naphthenate for items not continuously protected from liquid water.

I. Securely attach rough carpentry work to substrate by anchoring and fastening as indicated, complying with the following:

1. NES NER-272 for power-driven fasteners.
2. "Fastening Schedule," in Florida Building Code.

J. Use steel common nails unless otherwise indicated. Select fasteners of size that will not fully penetrate members where opposite side will be exposed to view or will receive finish materials. Make tight connections between members. Install fasteners without splitting wood. Drive nails snug but do not countersink nail heads unless otherwise indicated.

3.2 WOOD GROUND, BLOCKING, AND NAILER INSTALLATION

A. Install where indicated and where required for screeding or attaching other work. Form to shapes indicated and cut as required for true line and level of attached work. Coordinate locations with other work involved.

B. Attach items to substrates to support applied loading. Recess bolts and nuts flush with surfaces unless otherwise indicated.

C. Where wood-preservative-treated lumber is installed adjacent to metal decking, install continuous flexible flashing separator between wood and metal decking.

D. Provide permanent grounds of dressed, pressure-preservative-treated, key-beveled lumber not less than 1-1/2 inches wide and of thickness required to bring face of ground to exact thickness of finish material. Remove temporary grounds when no longer required.

3.3 WOOD FURRING INSTALLATION

A. Install level and plumb with closure strips at edges and openings. Shim with wood as required for tolerance of finish work.

3.4 PROTECTION

A. Protect wood that has been treated with inorganic boron (SBX) from weather. If, despite protection, inorganic boron-treated wood becomes wet, apply EPA-registered borate treatment. Apply borate solution by spraying to comply with EPA-registered label.
B. Protect rough carpentry from weather. If, despite protection, rough carpentry becomes sufficiently wet that moisture content exceeds that specified, apply EPA-registered borate treatment. Apply borate solution by spraying to comply with EPA-registered label.

END OF SECTION 061000

SECTION 072713-SELF-ADHERED SHEET MEMBRANE AIR BARRIER

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. All of the Contract Documents, including General and Supplementary Conditions and Division 1 General Requirements, apply to the work of this section.

1.2 SUMMARY

A. The work of this section includes, but is not limited to, the following:

1. Materials and installation methods for applied air and vapor barrier membrane system to exterior face of sheathing of metal stud walls and masonry walls, prior to application of metal panel system or brick veneer.
2. Materials and installation methods for applied air and vapor barrier membrane system located in the non-accessible part of the wall.
3. Materials and installation methods to bridge and seal air leakage pathways in other penetrations through the wall assembly.
4. May also be referred to as “Peel and Stick Waterproof Membrane” on the drawings.

B. Related Sections: Other specification sections that directly relate to the works of this section include, but are not limited to, the following:

1. Section 07600 – Flashing and Sheet Metal
2. Section 07900 – Joint Sealers

1.3 PERFORMANCE REQUIREMENTS

A. Provide an air and vapor barrier system to perform as a continuous barrier to air infiltration/exfiltration and water vapor transmission and to act as a liquid water drainage plane flashed to discharge any incidental condensation or water penetration.
B. Air barrier penetrations:

1. All penetrations of the air barrier and paths of air infiltration/exfiltration shall be made airtight.

1.4 REFERENCES

A. The following standards and publications are applicable to the extent referenced in the text. The most recent version of these standards is implied unless otherwise stated.
B. American Society for Testing and Materials (ASTM)

1. E96 Test Methods for Water Vapor Transmission of Materials
2. D570 Test Method for Water Absorption of Plastics
3. E154 Test Method for Water Vapor Retarders used in contact with Earth Under Concrete Slabs, on Walls or as Ground Cover
4. D1004 Test Method for Initial Tear Resistance of Plastic Film and Sheeting
5. D1938 Test Method for Tear Propagation Resistance of Plastic Film and Thin Sheeting by a Single-Tear Method

6. D1876 Test Method for Peel Resistance of Adhesives
7. D1970 Standard Specifications for Self-Adhering Polymer Modified Bituminous Sheet Materials Used as Steep Roofing Underlayment for Ice Dam Protection
8. D412 Test Methods for Vulcanized Rubber & Thermoplastic Rubbers and Thermoplastic Elastomers – Tension
9. E2178 Standard Test Method for Air Permeance of Building Materials
10. E2357 Standard Test Method for Determining Air Leakage of Air Barrier Assemblies

1.5 SUBMITTALS

A. Product Data: Submit manufacturer's product data, installation instructions, use limitations and substrate preparation recommendations.
B. Shop drawings showing locations and extent of air and vapor barrier system including details for terminations flashings, penetrations, window and door openings and treatment of substrate joints and cracks.
C. Written documentation demonstrating installers qualifications under the "Quality Assurance" article including reference projects of a similar scope.
D. Samples: Submit representative samples of the following for approval:

1. Self-Adhered Air Barrier Membrane
2. Self-Adhered Transition Membrane

E. Warranty: Submit a sample warranty identifying the terms and conditions stated in Section 1.09.

1.6 QUALITY ASSURANCE

A. Manufacturer: Air and vapor barrier systems shall be manufactured and marketed by a firm with a minimum of 20 years experience in the production and sales of waterproofing and air barrier products. Manufacturers proposed for use, but not named in these specifications shall submit evidence of ability to meet all requirements specified, and include a list of projects of similar design and complexity completed within the past five years.
B. Installer: The installer shall demonstrate qualifications to perform the work of this Section by submitting the following:
C. List of at least three (3) projects contracted within the past five (5) years of similar scope and complexity to this project carried out by the firm and site supervisor.
D. Installer must show evidence of adequate equipment and trained field personnel to successfully complete the project in a timely manner.
E. Materials: Self-adhered air and vapor barrier material shall be 40 mil; comprising 36 mil rubberized asphalt integrally bonded to 4 mil cross-laminated polyethylene film. For each type of material required for the work of this section, provide primary materials that are the products of one manufacturer. Provide foil faced material according to manufacturer's recommendation if schedule requires exposure to elements longer than allowed by manufacturer.
F. Pre-Installation Conference: A pre-installation conference shall be held prior to commencement of field operations to establish procedures to maintain optimum working conditions and to coordinate this work with related and adjacent work. Agenda for meeting shall include but not be limited to the following:

1. Review of submittals.
2. Review of surface preparation, minimum curing period and installation procedures.
3. Review of special details and flashings.
4. Sequence of construction, responsibilities and schedule for subsequent operations.
5. Review of mock-up requirements.
6. Review of inspection, testing, protection and repair procedures.

G. Mock-up:

1. Prior to installation of the air and vapor barrier system a field-constructed mock-up shall be provided under the provisions of Section 01340 – Shop Drawings, Product Data, Samples and Mock-ups to verify details and tie-ins and to demonstrate the required quality of materials and installation.
2. Construct a typical exterior wall section, 8 feet long and 8 feet wide, incorporating back-up wall, cladding, flashing and any other critical junction.
3. Allow 24 hours for inspection and testing of mock-up before proceeding with air and vapor barrier work.
4. Mock-up may remain as part of the work.

H. Inspection and Testing: Cooperate and coordinate with the Owner's inspection and testing agency. Do not cover any installed air and vapor barrier membrane until it has been inspected, tested and approved.

1.7 DELIVERY, STORAGE AND HANDLING

A. Deliver materials and products in labeled packages. Store and handle in strict compliance with manufacturer's instructions, recommendations and material safety data sheets. Protect from damage from sunlight, weather, excessive temperatures and construction operations. Remove damaged material from the site and dispose of in accordance with applicable regulations.
B. Do not double-stack pallets of fluid applied membrane components on the job site. Provide cover on top and all sides, allowing for adequate ventilation.
C. Protect fluid-applied membrane components from freezing and extreme heat.
D. Sequence deliveries to avoid delays, but minimize on-site storage.

1.8 PROJECT CONDITIONS

A. Perform work only when existing and forecasted weather conditions are within the limits established by the manufacturer of the materials used. Proceed with installation only when the substrate construction and preparation work is complete and in condition to receive the air and vapor barrier membrane.

1.9 WARRANTY

A. Submit manufacturer's warranty that air and vapor barrier and accessories are free of defects at time of delivery and are manufactured to meet manufacturer's published physical properties and material specifications.

PART 2 - PRODUCTS

2.1 GENERAL

A. For each type of material required for the work of this section, provide primary materials that are the products of one manufacturer.

2.2 SELF-ADHERED AIR BARRIER MEMBRANE

A. Description: Min. 1 mm thick membrane comprised of 0.9 mm of self-adhesive rubberized asphalt integrally bonded to 0.1 mm of cross-laminated, high-density polyethylene film. Membrane shall be interleaved with disposable silicone-coated release paper until installed.
B. Performance Requirements:

Property	Test Method	Typical Value
Thickness	ASTM D 3767 Method A	1.0 mm (0.040 in.) nominal
Air Permeance at 75Pa (0.3 in. water) Differential Pressure	ASTM E 2178	<0.001 L/(s.m^2) (<0.0002 cfm/ft^2)
Assembly Air Permeance at 75Pa (0.3 in. water) Differential Pressure	ASTM E 2357	<0.004 L/s*m^2 (<0.0008 cfm/ft^2)
Water Vapor Permeance	ASTM E 96, Method B	Less than 2.9 ng/Pa.s.m^2 (0.05 Perms)
Water Absorption: -	ASTM D 570	Max. 0.1% by weight
Puncture Resistance	ASTM E 154	178 N (40 lbs.)
Tear Resistance	Initiation - ASTM D 1004 Propagation - ASTM D1938	Min. 58 N (7.0 lbs.) M.D. Min. 40 N (4.0 lbs.) M.D.
Lap Adhesion at –4°C (25°F)	ASTM D 1876	880 N/m (5.0 lbs./in.) of width
Low Temperature Flexibility	ASTM D 1970	Unaffected to –43°C (-45°F)
Tensile Strength	ASTM D 412, Die C Modified	Min. 2.7 MPa (400 psi)
Elongation, Ultimate Failure of Rubberized Asphalt	ASTM D 412 - Die C	Min. 200%

C. Materials:

1. Perm-A-Barrier® Wall Membrane from Grace Construction Products, 62 Whittemore Avenue, Cambridge, MA.

2.3 TRANSITION MEMBRANE

A. Description: Min. 1 mm (.040 in) thick membrane comprised of 0.9 mm (0.036 in) of self-adhesive rubberized asphalt integrally bonded to 0.1 mm (.004 in) of cross-laminated, high-density polyethylene film. Membrane shall be interleaved with disposable silicone-coated release paper until installed.

B. Performance Requirements:

1. Water Vapor Transmission: ASTM E 96, Method B: 2.9 ng/m2sPa (0.05 perms) max.
2. Air Permeance at 75Pa (0.3 in. water) pressure difference: 0.0006 L/(s.m^2) (0.00012 cfm/ft^2) max.
3. Puncture Resistance: ASTM E 154: 178 N (40 lbs.) min.
4. Lap Adhesion at –4°C (25°F), ASTM D 1876: 880 N/m (5.0 lbs./in.) of width min.
5. Low Temperature Flexibility, ASTM D 1970: Unaffected to –43°C (-45°F).
6. Tensile Strength, ASTM D 412, Die C Modified: min. 2.7 MPa (400 psi)
7. Elongation, Ultimate Failure of Rubberized Asphalt, ASTM D 412 Die C: min. 200%

C. Materials:

1. Perm-A-Barrier Detail Membrane manufactured by Grace Construction Products.

2.4 AIR & VAPOR BARRIER ACCESSORIES

A. Primer: Water-based primer which imparts an aggressive, high tack finish on the treated substrate

1. Flash Point: No flash to boiling point
2. Solvent Type: Water
3. VOC Content: Not to exceed 10 g/l
4. Application Temperature: -4°C (25°F) and above
5. Freezing point (as packaged): -7°C (21°F)
6. Product: Perm-A-Barrier WB Primer manufactured by Grace Construction Products.

B. Sealant: Two-part, elastomeric, trowel grade material designed for use with self-adhered membranes and tapes. 10 g/l max. VOC Content.

1. Product: Bituthene® Liquid Membrane manufactured by Grace Construction Products.

C. Optional Primers:

1. Description: High tack water based primer. 10 g/l max. VOC content.

a. Product: Perm-A-Barrier Liquid Part B manufactured by Grace Construction Products.

2. Description: High tack low VOC solvent based primer. <200 g/l max. VOC content.

a. Product: Bituthene Primer B2 LVC manufactured by Grace Construction Products.

3. Description: High tack solvent based primer. 440 g/l max. VOC content.

a. Product: Bituthene Primer B2 manufactured by Grace Construction Products.

PART 3 - EXECUTION

3.1 EXAMINATION

A. The installer shall examine conditions of substrates and other conditions under which this work is to be performed and notify the contractor, in writing, of circumstances detrimental to the proper completion of the work. Do not proceed with work until unsatisfactory conditions are corrected.

3.2 PREPARATION

A. Refer to manufacturer’s literature for requirements for preparation of substrates. Surfaces shall be sound and free of voids, spalled areas, loose aggregate and sharp protrusions. Remove contaminants such as grease, oil and wax from exposed surfaces. Remove dust, dirt, loose stone and debris. Use repair materials and methods that are acceptable to manufacturer of the fluid-applied waterproofing.

B. Exterior sheathing panels: Ensure that the boards are sufficiently stabilized with corners and edges fastened with appropriate screws in accordance with exterior sheathing manufactures written instructions.
C. Masonry Substrates: Apply air and vapor barrier over concrete block and brick with smooth and flush mortar joints. Fill all voids and holes, particularly in the mortar joints, with a lean mortar mix, non-shrinking grout or parge coat.
D. Related Materials: Treat construction joints and install flashing as recommended by air barrier manufacturer.

3.3 INSTALLATION

A. Refer to manufacturer's literature for recommendations on installation
B. Apply air barrier membrane to achieve a continuous air barrier according to air barrier manufacturer's written instructions.
C. Application of Self-Adhered Air Barrier Membrane

1. Install air & vapor barrier to dry surfaces at air and surface temperatures of –4°C (25°F) and above in accordance with manufacturer's recommendations, at locations indicated on Construction Documents.
2. Prime substrate to receive air barrier membrane as required per manufacturers written instructions.
3. Precut pieces of air & vapor barrier into easily handled lengths.
4. Remove silicone-coated release paper and position membrane carefully before placing length horizontally against the surface.
5. Begin installation at the base of the wall placing top edge of membrane immediately below any masonry reinforcement or ties protruding from substrate.
6. When properly positioned, place against surface by pressing firmly into place. Roll membrane with extension-handled countertop roller immediately after placement.
7. Overlap horizontally adjacent pieces 50 mm (2 in.) and roll seams.
8. Subsequent sheets of membrane applied above shall be positioned immediately below masonry reinforcement or ties. Bottom edge shall be slit to fit around reinforcing wires or ties, and membrane shall overlap the membrane sheet below by 50 mm (2 in.). Roll firmly into place.
9. Seal around masonry reinforcing or ties and all penetrations with termination mastic.
10. Continue the membrane into all openings in the wall, such as doors, windows, etc., and terminate at points that will prevent visibility from interior.
11. Coordinate the installation of air & vapor barrier with roof installer to ensure continuity of membrane with rooftop air & vapor membrane.
12. At end of each working day seal top edge of air & vapor barrier to substrate with termination mastic.
13. Do not allow the rubberized asphalt surface of the air & vapor barrier membrane to come in contact with polysulfide sealants, creosote, uncured coal tar products or EPDM.
14. Do not expose air & vapor barrier membrane to sunlight for more than thirty days prior to enclosure.
15. Inspect installation prior to enclosing and repair punctures, damaged areas and inadequately lapped seams with a patch of the membrane sized to extend 150 mm (6 in.) in all directions from the perimeter of the affected area.

D. Application of Transition Membrane

1. Prime substrate to receive transition membrane as required per manufacturers written instructions.
2. Apply transition membrane with a minimum overlap of 75mm (3 in.) onto each surface at all beams, columns and joints as indicated in detail drawings.
3. Tie in to window and door frames, spandrel panels, roof and floor intersections and changes in substrate.

4. Use pre-cut, easily handled lengths for each location.
5. Remove silicone-coated release paper and position membrane flashing carefully before placing it against the surface.
6. When properly positioned, place against surface by pressing firmly into place by hand roller.
7. Overlap adjacent pieces 50 mm (2 in.) and roll all seams with a hand roller.
8. Seal top edge of flashing with termination mastic.
9. When transition flashing is pre-installed prior to application of Fluid Applied Membrane, apply transition flashing as above. Spray or trowel a continuous uniform film of Fluid Membrane at min. 60 mils (1.5 mm or .060 in.) dry film thickness using multiple, overlapping passes, with a minimum overlap of 75 mm (3 in.) onto transition flashing. For sill condition, spray or trowel Fluid Membrane onto pre-installed sill flashing and onto horizontal section of sill.

3.4 PROTECTION AND CLEANING

A. Remove any masking materials after installation. Clean any stains on materials that would be exposed in the completed work using procedures as recommended by manufacturer.
B. Perm-A-Barrier Wall Membrane is not suitable for permanent exposure and should be protected from the effects of sunlight.
C. Schedule work to ensure that the Perm-A-Barrier Wall Membrane system is covered as soon as possible after installation. Protect Perm-A-Barrier Wall Membrane system from damage during subsequent operations. If the Perm-A-Barrier Wall Membrane system cannot be covered within 30 days after installation, apply temporary UV protection such as dark plastic sheet or tarpaulins.

END OF SECTION 072713

SECTION 074213 – STEEL CLAD INSULATED BUILDING PANELS

GENERAL

A. RELATED DOCUMENTS:

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

B. SUMMARY:

Section Includes:
The extent of panel system work is indicated on the drawings and in these specifications.
Panel system requirements include the following components for the Home Side Locker Building AND (2) Dugout roof decks:
Insulated Heavy Embossed Flat Profile panels with mounting system for walls and Dugout roofs, and flat panels for concealed Locker Building roof decks. Panel mounting system including anchorages, furring, fasteners, gaskets and sealants, related flashing adapters and masking for a complete installation over a pre-engineered steel building frame system.
All flashing metal required shall be provided by the panel manufacturer.
System to be fabricated and installed per Florida Building Code requirements with particular attention directed to Chapter 14 and Chapter 16.
ALL PANELS ARE TO BE FULL LENGTH – NO SPLICING ALLOWED.

A. RELATED WORK SPECIFIED ELSEWHERE:

1. Section 051200: Structural steel.
2. Section 061600: Sheathing.
3. Section 072100: Insulation
4. Section 076200: Sheet Metal Flashing and Trim
5. Section 079200: Sealants
6. Section 072713: Self Adhered Sheet Membrane Air Barriers

QUALITY ASSURANCE:

A. Insulated Panel manufacturer shall have a minimum of 15 years' architectural experience in the manufacture of this product and be located within the continental USA.
B. It is recommended that fabrication and installation of panels shall be from a single source. If not single source, both panel fabricator and the installer must show proof of past successful collaboration.
C. Fabricator shall be acceptable to composite panel manufacturer.
D. Fabricator and installer shall have a minimum 5 years' experience in architectural metal panel work similar in scope and size to this project.
E. Coordinate fabrication schedule with construction progress as directed by the contractor to avoid delay of work.
F. Shop drawings shall show the preferred joint details providing a watertight and structurally sound wall panel system that allows no uncontrolled water penetration, on the inside face of the panel system as determined by ASTM E331.
G. Maximum deviation from vertical and horizontal alignment of erected panels: 1/4" in 20' non-accumulative.

H. Panel fabricator and installer shall assume undivided responsibility for all components of the exterior panel system, including but not limited to, attachment to sub-construction, panel-to-panel joinery, panel-to-dissimilar-material joinery and joint seal associated with the panel system.

REFERENCES:

A. American Institute of Steel Construction (AISC):
   1. AISC Specification for Structural Steel Buildings.
   2. AISC Serviceability Design Considerations for Low-Rise Buildings

B. American Iron and Steel Institute (AISI):
   1. AISI North American Specification for the Design of Cold-Formed Steel Structural Members

C. American Welding Society (AWS):
   1. AWS D1.1 / D1.1M – Structural Welding Code – Steel.
   2. AWS D1.3 / D1.3M – Structural Welding Code – Sheet Steel

D. Association for Iron & Steel Technology (AISE):
   1. AISE 13 – Specifications for Design and Construction of Mill Buildings.

E. ASTM International (ASTM):
   1. ASTM A 36 – Standard Specification for Carbon Structural Steel
   2. ASTM A 48 – Specification for Gray Iron Castings
   3. ASTM A 123 – Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products
   4. ASTM A 307 – Specification for Carbon Steel Bolts and Studs, 60 000 psi Tensile Strength
   5. ASTM A 325 – Standard Specification for Structural Bolts, Steel, Heat Treated, 120/105 ksi Minimum Tensile Strength.
   6. ASTM A 354 – Standard Specification for Quenched and Tempered Alloy Steel Bolts, Studs, and Other Externally Threaded Fasteners
   7. ASTM A 475 – Specification for Zinc-Coated Steel Wire Strand
   8. ASTM A 490 – Specification for Structural Bolts, Alloy Steel, Heat Treated, 150 ksi Minimum Tensile Strength
   9. ASTM A 500 – Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes
   10. ASTM A 529 – Standard Specification for High-Strength Carbon-Manganese Steel of Structural Quality.
   11. ASTM A 563 – Specification for Carbon and Alloy Steel Nuts
   12. ASTM A 572 – Standard Specification for High-Strength Low-Alloy Columbium-Vanadium Structural Steel.
   13. ASTM A 653 / A 653M – Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process
   14. ASTM A 792 / A 792M – Standard Specification for Steel Sheet, 55 % Aluminum-Zinc Alloy-Coated by the Hot-Dip Process
   15. ASTM A 992 – Standard Specification for Structural Steel Shapes.
   16. ASTM A 1011 – Standard Specification for Steel, Sheet and Strip, Hot-Rolled, Carbon, Structural, High- Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, and Ultra-High Strength.
   17. ASTM A 1039 – Specification for Steel, Sheet, Hot Rolled, Carbon, Commercial, Structural, and High- Strength Low-Alloy, Produced by Twin-Roll Casting Process
   18. ASTM E 96 / E 96M – Standard Test Methods for Water Vapor Transmission of Materials.

19. ASTM E 108—Spread-of Flame Testing: Class 1A Rating.
20. ASTM E 283 – Standard Test Method for Determining the Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen.
21. ASTM E 331 – Standard Test Method for Water Penetration of Exterior Windows, Skylights, Doors, and Curtain Walls by Uniform Static Air Pressure Difference.
22. ASTM E 1592 – Test Method for Structural Performance of Sheet Metal Roof and Siding Systems by Uniform Static Air Pressure Difference
23. ASTM E 1646 – Test Method for Water Penetration of Exterior Metal Roof Panel Systems by Uniform Static Air Pressure Difference
24. ASTM E 1680 – Test Method for Rate of Air Leakage Through Exterior Metal Roof Panel Systems
25. ASTM E 2140 – Test Method for Water Penetration of Metal Roof Panel Systems by Static Water Pressure Head
26. ASTM F 436 – Specification for Hardened Steel Washers
27. ASTM F 1145 – Specification for Turnbuckles, Swaged, Welded, Forged
28. ASTM F 1554 – Specification for Anchor Bolts, Steel, 36, 55, and 105-ksi Yield Strength

F. LGSI – Light Gauge Steel Institute

G. SJI – Steel Joist Institute

H. Florida Product Approval:
1. American Buildings Company Roof Deck approved under file number FL704 & FL6961
2. American Buildings Company Metal Roofing approved under file number FL 4813
3. American Buildings Company Siding approved under file number FL 705

I. Metal Building Manufacturers Association (MBMA):
1. MBMA Metal Building Systems Manual

J. Underwriters Laboratories (UL):
1. UL 580 – Standard for Tests for Uplift Resistance of Roof Assemblies

PART 4 - SUBMITTALS:

A. Submittals shall be in conformance with Section 013300.

B. Samples:

1. Panel assembly: Two samples of each type of assembly, 12” x 12” minimum.
2. Two samples of each color or finish selected, 3" x 4" minimum.

C. Shop Drawings: Submit shop drawings showing project layout and elevations; fastening and anchoring methods; detail and location of joints, sealants and gaskets, including joints necessary to accommodate thermal movement; trim; flashing; and accessories.

1. Shop Drawings shall be signed and sealed by an engineer registered to practice in the State of Florida.
2. Manufacturer’s literature shall certify that material meets specifications.
3. Fabrication Tickets: Submit fabrication drawings showing location and type of aluminum-extruded stiffeners at typical panels and at corner panels.

D. WARRANTY:

1. The fabricator and installer will warrant the wall system for a period of 1 year that the fabrication and installation workmanship will be free from defects.
2. The composite material manufacturer shall warrant for a period of 30 years against Max 5 fade based on ASTM D2244 and Max 8 chalk based on ASTM D4212 and delamination of the paint finish.

PACKAGING, SHIPPING AND HANDLING:

2 Follow manufacturer's recommendations.
3 Store material in accordance with panel manufacturer's recommendations.

PART 5 – PRODUCTS:

1. FULL LENGTH (NO SPLICING ALLOWED) Composite Panels:

2. Wall Panels shall be American's 3-inch thick (R24) Insulated Heavy Embossed Flat Profile with "ADOBE TEXTURE™ multitextured surface and finish.
3. Roof Panels shall be American's 4-inch thick (R32) Insulated Heavy Embossed Flat Profile with polyester finish for field applied coatings.
4. Installed panels shall be supplied by:

American Buildings Company
1150 State Docks Road
Eufaula, Alabama 36027
Phone: (334) 687-2032
www.americanbuildings.com

Other manufacturers are acceptable as long as they meet the same criteria as American Buildings in thickness, panel weight, bond integrity, fire rating, paint color, texture and finish. ACM must be manufactured in the USA.

5. Fire Resistant Core (FR)

a. Fire Performance

ASTM E84 – Passed Class A. In compliance with Chapter 14 of Florida Building Code.

PART 6- PANEL DESCRIPTION:

1. Flat profile wall panels provide 40" of coverage.

2. Basic Use:

a. Wall Panels: 3-inch (R24) Insulated Heavy Embossed Flat Profile panels, a steel clad factory insulated wall covering system, installed with related accessories and trims, create an air and water tight wall system. Adobe Texture™ multi-texture finish.
b. Roof Panels: 4-inch (R32) Insulated Flat Profile panels with polyester finish for field applied coatings.

3. Materials:

a. The exterior metal substrate is a flat heavy emboss 26 gage, G90 zinc-coated (galvanized) steel.

b. Pre- painted exterior wall panels have American Buildings Company 30 year Adobe Texture™ multitextured surface finish with a 30 year exterior finish.

c. The continuously foamed in place panel core is Class 1 rigid polyisocyanurate (polyurethane) foam meeting the physical properties listed under section 4 G.

4. Sealants:

   a. Tape mastic shall be non-staining, non-corrosive, non-toxic and non-volatile, Sika Sika-TapeTC-95 or equal. Composition is 100% solid isobutylene tripolymer tape with a service temperature of -60°F to +212°F required as indicated on the erection drawings.

   b. Butyl caulk sealant shall be Schnee-Morehead 5430 or equivalent with a service temperature of -60°F to +200°F.

5. Fasteners:

   a. All wall fasteners shall be per the following:

   b. Unexposed self-drilling screws attaching through the cut panel to secondary support material at corners, jambs and header type connections shall be carbon steel No. 14 hex head TEK fasteners, required length will vary with panel thickness. These fasteners will be covered by the appropriate flashings.

   c. Unexposed fasteners connecting secondary to secondary material that will lie between the panel and secondary members shall be No. 10 x 1” self-drilling pan head screws zinc plated. These electro zinc plated fasteners shall be clear or yellow chromate coated

d. Unexposed self-drilling screws with washer clip attaching at panel side joint through to the secondary support members shall be carbon steel No. 14 hex head TEK fasteners with washers, required length will vary with panel thickness.

e. Exposed standard wall fasteners for panel to trim attachment shall be No. 14 x 3/4" self-drilling carbon steel screws. Standard wall fasteners shall have a corrosive resistant coating over zinc plating.

END OF SECTION 074213

SECTION 076100 - SHEET METAL ROOFING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

1. Standing-seam metal roofing, on-site, roll formed.

B. Related Sections:

1. Section 074213 "Insulated Core Metal Panels" for roof insulation
2. Section 072713 “Self Adhered Sheet Membrane Air Barriers” for self-adhering underlayments.
3. Section 076200 "Sheet Metal Flashing and Trim" for gutters, downspouts, fasciae, copings, and flashings that are not part of sheet metal roofing.
4. Section 077200 "Roof Accessories" for manufactured roof accessories.
5. Section 079200 "Joint Sealants" for field-applied sealants adjoining sheet metal roofing.

1.3 PERFORMANCE REQUIREMENTS

A. General Performance: Sheet metal roofing system including, but not limited to, metal roof panels, cleats, clips, anchors and fasteners, sheet metal flashing integral with sheet metal roofing, fascia panels, trim, underlayment, and accessories shall comply with requirements indicated without failure due to defective manufacture, fabrication, installation, or other defects in construction. Sheet metal roofing shall remain watertight.

B. Thermal Movements: Provide sheet metal roofing that allows for thermal movements from ambient and surface temperature changes. Base calculations on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.

1. Temperature Change (Range): 120 deg F, ambient; 180 deg F, material surfaces.

C. Solar Reflectance Index: Not less than 29 when calculated according to ASTM E 1980 based on testing identical products by a qualified testing agency.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product indicated. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for each manufactured product and accessory.

B. Shop Drawings: Show fabrication and installation layouts of sheet metal roofing, including plans, elevations, expansion joint locations, and keyed details. Distinguish between shop- and field-assembled work. Include the following:

1. Details for forming sheet metal roofing, including seams and dimensions.
2. Details for joining and securing sheet metal roofing, including layout of fasteners, cleats, clips, and other attachments. Include pattern of seams.
3. Details of termination points and assemblies, including fixed points.
4. Details of expansion joints, including showing direction of expansion and contraction.
5. Details of roof penetrations.
6. Details of edge conditions, including eaves, ridges, valleys, rakes, crickets, and counterflashings.
7. Details of special conditions.
8. Details of connections to adjoining work.
9. Detail the following accessory items, at a scale of not less than 1-1/2 inches per 12 inches:
    a. Flashing and trim.
    b. Gutters and downspouts as they relate to adjacent sheet metal roofing.
    c. Roof curbs.

C. Roofing System Design: Provide metal roofing systems that have been successfully tested by a qualified testing and inspecting agency to resist uplift pressure calculated according to ASCE/SEI 7.
1. Uplift Pressures: As indicated on the drawings.

D. Delegated Design: Engage a qualified professional engineer, as defined in Section 014000 "Quality Requirements," to design sheet metal roofing system and attachments.
1. Delegated-Design Submittal: For metal roofing systems indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

E. Samples for Initial Selection: For each type of sheet metal roofing indicated, with factory-applied color finishes.
1. Include similar Samples of trim and accessories involving color selection.

F. Samples for Verification: For each type of exposed finish required, prepared on Samples of size indicated below:
1. Sheet Metal Roofing: 12 inches long by actual width of unit, including finished seam and in required profile. Include fasteners, clips, and other attachments.
2. Trim and Metal Closures: 12 inches long and in required profile. Include fasteners and other exposed accessories.
3. Other Accessories: 12-inch- long Samples for each type of other accessory.

1.5 INFORMATIONAL SUBMITTALS

A. Coordination Drawings: Roof plans drawn to scale with coordinated details for penetrations and roof-mounted items. Show the following:
1. Sheet metal roofing and attachments.
2. Roof-mounted items including roof hatches, equipment supports, pipe supports and penetrations, lighting fixtures, and items mounted on roof curbs.

B. Portable Roll-Forming Equipment Certificate: Issued by UL for equipment manufacturer's portable roll-forming equipment capable of producing panels that comply with UL requirements. Show expiration date no earlier than two months after scheduled completion of sheet metal roofing.

1. Submit certificates indicating recertification of equipment whose certification has expired during the construction period.

C. Qualification Data: For qualified Installer and fabricator.

D. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, for each product.

E. Warranties: Sample of special warranties.

1.6 CLOSEOUT SUBMITTALS

A. Maintenance Data: For roofing sheet metals and accessories to include in maintenance manuals.

1.7 QUALITY ASSURANCE

A. Roll-Formed Sheet Metal Roofing Fabricator Qualifications: Fabricator authorized by portable roll-forming equipment manufacturer to fabricate and install sheet metal roofing units required for this Project, and who maintains current UL certification of its portable roll-forming equipment.

B. UL-Certified, Portable Roll-Forming Equipment: UL-certified, portable roll-forming equipment capable of producing roofing panels for sheet metal roofing assemblies that comply with UL 580 for Class 90 wind-uplift resistance. Maintain UL certification of portable roll-forming equipment for duration of sheet metal roofing work.

C. Sheet Metal Roofing Standard: Comply with SMACNA's "Architectural Sheet Metal Manual" unless more stringent requirements are specified or shown on Drawings.

D. Mockups: Build mockups to verify selections made under sample submittals and to demonstrate aesthetic effects and set quality standards for fabrication and installation.

1. Build mockup of typical roof area and eave, including fascia, as shown on Drawings; approximately 48 inches square by full thickness, including attachments, underlayment, and accessories.

2. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.

3. Approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

E. Preliminary Roofing Conference: Before starting roof deck and sheathing construction, conduct conference at Project site. Comply with requirements for preinstallation conferences in Section 013100 "Project Management and Coordination."

1. Review methods and procedures related to roof deck and sheathing construction and sheet metal roofing including, but not limited to, items listed for the Preinstallation Conference.

F. Preinstallation Conference: Conduct conference at Project site.

1. Meet with Owner, Architect, Owner's insurer if applicable, sheet metal roofing Installer, portable roll-forming equipment manufacturer's representative for sheet metal roofing, and metal deck and sheathing Installer, and installers whose work interfaces with or affects sheet metal roofing including installers of roof accessories and roof-mounted equipment.
2. Review and finalize construction schedule and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
3. Review methods and procedures related to sheet metal roofing installation, including portable roll-forming equipment manufacturer's written instructions.
4. Examine metal deck and sheathing conditions for compliance with requirements, including flatness and attachment to structural members.
5. Review structural loading limitations of metal deck and sheathing during and after roofing installation.
6. Review flashings, special roofing details, roof drainage, roof penetrations, equipment curbs, and condition of other construction that will affect sheet metal roofing.
7. Review governing regulations and requirements for insurance, certificates, and testing and inspecting if applicable.
8. Review temporary protection requirements for sheet metal roofing during and after roofing installation.
9. Review roof observation and repair procedures after sheet metal roofing installation.
10. Document proceedings, including corrective measures and actions required, and furnish copy of record to each participant.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Do not store sheet metal roofing materials in contact with other materials that might cause staining, denting, or other surface damage. Store sheet metal roofing materials away from uncured concrete and masonry.

B. Protect strippable protective covering on sheet metal roofing from exposure to sunlight and high humidity, except to the extent necessary for the period of sheet metal roofing installation.

1.9 COORDINATION

A. Coordinate installation of roof curbs, equipment supports, and roof penetrations, which are specified in other Sections.

B. Coordinate sheet metal roofing with rain drainage work, flashing, trim, and construction of metal decks, and sheathing, parapets, walls, and other adjoining work to provide a leakproof, secure, and noncorrosive installation.

1.10 WARRANTY

A. Special Warranty: Warranty form at the end of this Section in which Installer agrees to repair or replace components of sheet metal roofing that fail in materials or workmanship within specified warranty period.

1. Failures include, but are not limited to, the following:
    a. Structural failures, including but not limited to rupturing, cracking, or puncturing.
    b. Wrinkling or buckling.

c. Loose parts.
d. Failure to remain weathertight, including uncontrolled water leakage.
e. Deterioration of metals, metal finishes, and other materials beyond normal weathering, including non-uniformity of color or finish.
f. Galvanic action between sheet metal roofing and dissimilar materials.

2. Warranty Period: Two years from date of Substantial Completion.

B. Special Warranty on Finishes: Manufacturer's standard form in which manufacturer agrees to repair finish or replace sheet metal roofing that shows evidence of deterioration of factory-applied finishes within specified warranty period.

1. Exposed Panel Finish: Deterioration includes, but is not limited to, the following:

a. Color fading more than 5 Hunter units when tested according to ASTM D 2244.
b. Chalking in excess of a No. 8 rating when tested according to ASTM D 4214.
c. Cracking, checking, peeling, or failure of paint to adhere to bare metal.

2. Finish Warranty Period: 20 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 ROOFING SHEET METALS

A. General: Protect mechanical and other finishes on exposed surfaces from damage by applying a strippable, temporary protective film before shipping.

B. Aluminum Sheet: ASTM B 209, alloy as standard with manufacturer for finish required, with temper as required to suit forming operations and performance required.

1. Thickness: 0.032 inch unless otherwise indicated.

2. Surface: Smooth, flat.

3. Exposed Coil-Coated Finish:

a. Three-Coat Fluoropolymer: AAMA 620. Fluoropolymer finish containing not less than 70 percent PVDF resin by weight in both color coat and clear topcoat. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.

4. Color: As selected by Architect from manufacturer's full range including silver metalic.

5. Concealed Finish: Pretreat with manufacturer's standard white or light-colored acrylic or polyester-backer finish, consisting of prime coat and wash coat with a minimum total dry film thickness of 0.5 mil.

2.2 STANDING SEAM METAL ROOF PANELS

A. General: Provide factory-formed metal roof panel assembly designed to be installed by covering vertical side edges of adjacent panels with standing seams and mechanically attaching panels to supports using concealed clips. Include seams and accessories required for weathertight installation.

B. Standing Seam Metal Roof Panels: Symmetrical, non-interlocking metal panels, formed with vertical ribs at panel edges and a flat pan between ribs; designed for independent installation by mechanically attaching panels to supports using concealed clips located between panels, engaging the opposite edge of adjacent panels, and installing snap-on standing seams (or field seamed Zip-Rib©) over panel joints.

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

   a. Berridge Manufacturing Company.
   b. IMETCO (Basis of Design).
   c. Merchant & Evans.
   d. Petersen Aluminum Corporation.
   e. Boss Metals (Panama City)

2.3 UNDERLAYMENT MATERIALS

A. Self-Adhering, High-Temperature Sheet: Minimum 40 mils thick, consisting of slip-resisting polyethylene-film top surface laminated to layer of butyl or SBS-modified asphalt adhesive, with release-paper backing; cold applied. Provide primer when recommended by underlayment manufacturer.

1. Thermal Stability: ASTM D 1970; stable after testing at 240 deg F.
2. Low-Temperature Flexibility: ASTM D 1970; passes after testing at minus 20 deg F.
3. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:

   a. Grace Construction Products, a unit of W. R. Grace & Co.; Ice & Water Shield HT.
   b. Or approved equal.

2.4 MISCELLANEOUS MATERIALS

A. General: Provide materials and types of fasteners, solder, welding rods, protective coatings, separators, sealants, and other miscellaneous items as required for a complete roofing system and as recommended by primary sheet metal or portable roll-forming equipment manufacturer unless otherwise indicated.

B. Snap-On Seams: Provide snap-on seams integrated with panel-edge profile as recommended by portable roll-forming equipment manufacturer to produce sheet metal roofing assemblies that comply with UL 580 for wind-uplift resistance classification specified in "Quality Assurance" Article.

C. Concealed Roof Fasteners: annular-threaded nails, self-tapping screws, self-locking rivets and bolts, and other suitable fasteners designed to withstand design loads.

1. Fasteners for Flashing and Trim: Blind fasteners or self-drilling screws, gasketed, with hex-washer head.
2. Blind Fasteners: High-strength aluminum or stainless-steel screws or rivets suitable for metal being fastened.
3. Fasteners for Aluminum Sheet: Aluminum or Series 300 stainless steel.

D. Exposed Trim Fasteners:

1. General:

   a. Exposed Fasteners: Heads matching color of sheet metal roofing using plastic caps or factory-applied coating.
   b. Fasteners for Flashing and Trim: Blind fasteners or self-drilling screws, gasketed, with hex-washer head.

E. Sealant Tape: Pressure-sensitive, 100 percent solids, gray polyisobutylene compound sealant tape with release-paper backing. Provide permanently elastic, nonsag, nontoxic, nonstaining tape 1/2 inch wide and 1/8 inch thick.

F. Elastomeric Sealant: ASTM C 920, elastomeric silicone polymer sealant as recommended by portable roll-forming equipment manufacturer for installation indicated; low modulus; of type, grade, class, and use classifications required to seal joints in sheet metal roofing and remain watertight.

G. Butyl Sealant: ASTM C 1311, single-component, solvent-release butyl rubber sealant; polyisobutylene plasticized; heavy bodied for hooked-type expansion joints with limited movement.

H. Bituminous Coating: Cold-applied asphalt emulsion complying with ASTM D 1187.

2.5 ACCESSORIES

A. Sheet Metal Accessories: Provide components required for a complete sheet metal roofing assembly including trim, copings, fasciae, corner units, clips, flashings, sealants, gaskets, fillers, metal closures, closure strips, and similar items. Match material and finish of sheet metal roofing unless otherwise indicated.

1. Provide accessories as recommended by portable roll-forming equipment manufacturer to produce sheet metal roofing assemblies that comply with UL 580 for wind-uplift resistance classification specified in "Quality Assurance" Article.
2. Clips: Minimum 0.062-inch- thick, stainless-steel panel clips designed to withstand negative-load requirements.
3. Backing Plates: Plates at roofing splices, fabricated from material recommended by SMACNA.
4. Closure Strips: Closed-cell, expanded, cellular, rubber or crosslinked, polyolefin foam or closed-cell laminated polyethylene; minimum 1-inch- thick, flexible-closure strips; cut or premolded to match sheet metal roofing profile. Provide closure strips where indicated or necessary to ensure weathertight construction.
5. Flashing and Trim: Formed from same material and with same finish as sheet metal roofing, minimum thickness matching the sheet metal roofing.

B. Pipe Flashing: Premolded, EPDM pipe collar with flexible aluminum ring bonded to base.

C. Roof Curbs: Fabricated from same material and finish as sheet metal roofing, minimum thickness matching the sheet metal roofing; with bottom of skirt profiled to match roof panel profiles; with weatherproof top box and integral full-length cricket. Fabricate curb subframing of nominal 0.062-inch- thick, angle-, C-, or Z-shaped galvanized steel or stainless-steel sheet. Fabricate curb and subframing to withstand indicated loads of size and height indicated. Coordinate dimensions with rough-in information or Shop Drawings of equipment to be supported.

1. Insulate curbs with 1-inch- thick, rigid insulation.
2. Install wood nailers at tops of curbs.

2.6 FABRICATION

A. General: Fabricate roll-formed sheet metal roofing panels with UL-certified, portable roll-forming equipment capable of producing roofing panels for sheet metal roofing assemblies that comply with UL 580 for wind-uplift resistance classification specified in "Quality Assurance"

Article. Fabricate roll-formed sheet metal according to equipment manufacturer's written instructions and to comply with details shown.

B. Fabrication Tolerances: Fabricate sheet metal roofing that is capable of installation to a tolerance of 1/4 inch in 20 feet on slope and location lines as indicated and within 1/8-inch offset of adjoining faces and of alignment of matching profiles.

C. Form exposed sheet metal work to fit substrates without excessive oil canning, buckling, and tool marks; true to line and levels indicated; and with exposed edges folded back to form hems.

1. Lay out sheet metal roofing so transverse seams, if required, are made in direction of flow with higher panels overlapping lower panels.
2. Offset transverse seams from each other 12 inches minimum.
3. Fold and cleat eaves and transverse seams in the shop.
4. Form and fabricate sheets, seams, strips, cleats, valleys, ridges, edge treatments, integral flashings, and other components of metal roofing to profiles, patterns, and drainage arrangements shown on Drawings and as required for leakproof construction.

D. Expansion Provisions: Fabricate sheet metal roofing to allow for expansion in running work sufficient to prevent leakage, damage, and deterioration of the Work. Where lapped expansion provisions cannot be used, form expansion joints of intermeshing hooked flanges, not less than 1 inch deep, filled with butyl sealant concealed within joints.

E. Sealant Joints: Where movable, nonexpansion-type joints are indicated or required to produce weathertight seams, form metal to provide for proper installation of elastomeric sealant in compliance with SMACNA standards.

F. Metal Protection: Where dissimilar metals will contact each other, protect against galvanic action by painting contact surfaces with bituminous coating, by applying self-adhering sheet underlayment to each contact surface, or by other permanent separation as recommended by fabricator of sheet metal roofing or manufacturers of the metals in contact.

G. Sheet Metal Accessories: Custom fabricate flashings and trim to comply with recommendations in SMACNA's "Architectural Sheet Metal Manual" that apply to design, dimensions, metal, and other characteristics of item indicated. Obtain field measurements for accurate fit before shop fabrication.

1. Form exposed sheet metal accessories without excessive oil canning, buckling, and tool marks and true to line and levels indicated, with exposed edges folded back to form hems.
2. Seams: Fabricate nonmoving seams with flat-lock seams. Form seams and seal with elastomeric sealant unless otherwise recommended by sealant manufacturer for intended use. Rivet joints where necessary for strength.
3. Sealed Joints: Form nonexpansion but movable joints in metal to accommodate elastomeric sealant.
4. Conceal fasteners and expansion provisions where possible. Exposed fasteners are not allowed on faces of accessories exposed to view.
5. Fabricate cleats and attachment devices of sizes as recommended by SMACNA's "Architectural Sheet Metal Manual" for application, but not less than thickness of metal being secured.

H. Do not use graphite pencils to mark metal surfaces.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances, substrate, and other conditions affecting performance of the Work.

1. Examine solid roof sheathing to verify that sheathing joints are supported by framing or blocking, that tops of fasteners are flush with surface, and that installation is within flatness tolerances required for finished roofing installation.

2. Verify that substrate is sound, dry, smooth, clean, sloped for drainage, and completely anchored, and that provision has been made for drainage, flashings, and penetrations through sheet metal roofing.

B. For the record, prepare written report, endorsed by Installer, listing conditions detrimental to performance of the Work.

C. Examine roughing-in for components and systems penetrating sheet metal roofing to verify actual locations of penetrations relative to seam locations of sheet metal roofing before installation.

D. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 UNDERLAYMENT INSTALLATION

A. Self-Adhering Sheet Underlayment: Install self-adhering sheet underlayment, wrinkle free, on roof sheathing under sheet metal roofing. Apply primer if required by underlayment manufacturer. Comply with temperature restrictions of underlayment manufacturer for installation; use primer rather than nails for installing underlayment at low temperatures. Apply over entire roof, in shingle fashion to shed water, with end laps of not less than 6 inches staggered 24 inches between courses. Overlap side edges not less than 3-1/2 inches. Roll laps with roller. Cover underlayment within 14 days.

B. Install flashings to cover underlayment to comply with requirements in Section 076200 "Sheet Metal Flashing and Trim."

3.3 INSTALLATION, GENERAL

A. General: Anchor sheet metal roofing and other components of the Work securely in place, with provisions for thermal and structural movement. Install fasteners, solder, welding rods, protective coatings, separators, sealants, and other miscellaneous items as required for a complete roofing system and as recommended by fabricator for sheet metal roofing.

1. Field cutting of sheet metal roofing by torch is not permitted.

2. Provide metal closures at peaks rake edges rake walls eaves and each side of ridge caps.

3. Flash and seal sheet metal roofing with closure strips at eaves, rakes, and perimeter of all openings. Fasten with self-tapping screws.

4. Locate and space fastenings in uniform vertical and horizontal alignment. Predrill panels for fasteners.

5. Install ridge caps as sheet metal roofing work proceeds.

6. Locate roofing splices over, but not attached to, structural supports. Stagger roofing splices and end laps to avoid a four-panel lap splice condition. Install backing plates at roofing splices.

7. Install sealant tape where indicated.
8. Lap metal flashing over sheet metal roofing to allow moisture to run over and off the material.
9. Do not use graphite pencils to mark metal surfaces.

B. Thermal Movement. Rigidly fasten metal roof panels to structure at only one location for each panel. Allow remainder of panel to move freely for thermal expansion and contraction.

1. Point of Fixity: Fasten each panel along a single line of fixing located at ridge.
2. Avoid attaching accessories through roof panels in a manner that will inhibit thermal movement.

C. Fasteners: Use fasteners of sizes that will penetrate metal decking not less than recommended by fastener manufacturer to achieve maximum pull-out resistance.

D. Metal Protection: Where dissimilar metals will contact each other or corrosive substrates, protect against galvanic action by painting contact surfaces with bituminous coating, by applying self-adhering sheet underlayment to each contact surface, or by other permanent separation as recommended by SMACNA.

1. Coat back side of uncoated aluminum sheet metal roofing with bituminous coating where roofing will contact wood, ferrous metal, or cementitious construction.

E. Conceal fasteners and expansion provisions where possible in exposed work and locate to minimize possibility of leakage. Cover and seal fasteners and anchors as required for a tight installation.

F. Fasciae: Align bottom of sheet metal roofing and fasten with blind rivets, bolts, or self-tapping screws. Flash and seal sheet metal roofing with closure strips where fasciae meet soffits, along lower panel edges, and at perimeter of all openings.

3.4 ON-SITE, ROLL-FORMED SHEET METAL ROOFING INSTALLATION

A. General: Install on-site, roll-formed sheet metal roofing fabricated from UL-certified equipment to comply with equipment manufacturer's written instructions for UL wind-uplift resistance class indicated. Provide sheet metal roofing of full length from eave to ridge unless otherwise restricted by on-site or shipping limitations.

B. Standing-Seam Sheet Metal Roofing: Fasten sheet metal roofing to supports with concealed clips at each standing-seam joint at location, at spacing, and with fasteners recommended by manufacturer of portable roll-forming equipment.

1. Install clips to substrate with self-tapping fasteners.
2. Install pressure plates at locations indicated in equipment manufacturer's written installation instructions.
3. Before panels are joined, apply continuous bead of sealant to top of flange of lower panel.
4. Snap-On Seam: Nest standing seams and fasten together by interlocking and completely engaging field-applied sealant.
5. Seamed Joint: Crimp standing seams with manufacturer-approved motorized seamer tool so cleat, sheet metal roofing, and field-applied sealant are completely engaged.

C. Seal joints as shown and as required for watertight construction. For roofing with 3:12 slopes or less, use cleats at transverse seams.

1. Where sealant-filled joints are used, embed hooked flanges of joint members not less than 1 inch into sealant. Form joints to completely conceal sealant. When ambient temperature at time of installation is moderate, between 40 and 70 deg F , set joint members for 50 percent movement either way. Adjust setting proportionately for installation at higher ambient temperatures. Do not install sealant-type joints at temperatures below 40 deg F .
2. Prepare joints and apply sealants to comply with requirements in Section 079200 "Joint Sealants."

3.5 ACCESSORY INSTALLATION

A. General: Install accessories with positive anchorage to building and weathertight mounting and provide for thermal expansion. Coordinate installation with flashings and other components.

1. Install components required for a complete sheet metal roofing assembly including trim, copings, seam covers, flashings, sealants, gaskets, fillers, metal closures, closure strips, and similar items.
2. Install accessories integral to sheet metal roofing that are specified in Section 076200 "Sheet Metal Flashing and Trim" to comply with that Section's requirements.

B. Flashing and Trim: Comply with performance requirements, manufacturer's written installation instructions, and SMACNA's "Architectural Sheet Metal Manual." Provide concealed fasteners where possible, and set units true to line and level as indicated. Install work with laps, joints, and seams that will be permanently watertight and weather resistant.

1. Install flashing and trim as required to seal against weather and to provide finished appearance. Locations include, but are not limited to, eaves, rakes, corners, bases, framed openings, ridges, fasciae, and fillers.
2. Install continuous strip of self-adhering underlayment at edge of continuous flashing overlapping self-adhering underlayment, where "continuous seal strip" is indicated in SMACNA's "Architectural Sheet Metal Manual," and where indicated on Drawings.
3. Install exposed flashing and trim without excessive oil canning, buckling, and tool marks and true to line and levels indicated, with exposed edges folded back to form hems. Install sheet metal flashing and trim to fit substrates and to result in waterproof and weather-resistant performance.
4. Expansion Provisions: Provide for thermal expansion of exposed flashing and trim. Space movement joints at a maximum of 10 feet with no joints allowed within 24 inches of corner or intersection. Where lapped expansion provisions cannot be used or would not be sufficiently weather resistant and waterproof, form expansion joints of intermeshing hooked flanges, not less than 1 inch deep, and filled with butyl sealant concealed within joints.

C. Pipe Flashing: Form flashing around pipe penetration and sheet metal roofing. Fasten and seal to sheet metal roofing as recommended by SMACNA.

D. Roof Curbs: Install curbs at locations indicated on Drawings. Install flashing around bases where they meet sheet metal roofing.

3.6 ERECTION TOLERANCES

A. Installation Tolerances: Shim and align sheet metal roofing within installed tolerance of 1/4 inch in 20 feet on slope and location lines as indicated and within 1/8-inch offset of adjoining faces and of alignment of matching profiles.

B. Installation Tolerances: Shim and align sheet metal roofing within installed tolerances specified in MCA's "Guide Specification for Residential Metal Roofing."

3.7 CLEANING AND PROTECTION

A. Clean off excess sealants.

B. Remove temporary protective coverings and strippable films as sheet metal roofing is installed unless otherwise indicated in manufacturer's written installation instructions. On completion of sheet metal roofing installation, clean finished surfaces as recommended by sheet metal roofing manufacturer. Maintain sheet metal roofing in a clean condition during construction.

C. Replace sheet metal roofing components that have been damaged or have deteriorated beyond successful repair by finish touchup or similar minor repair procedures.

3.8 ROOFING INSTALLER'S WARRANTY

A. WHEREAS <**Insert name**> of <**Insert address**>, herein called the "Roofing Installer," has performed roofing and associated work ("work") on the following project:

1. Owner: <Insert name of Owner>.
2. Address: <Insert address>.
3. Building Name/Type: <**Insert information**>.
4. Address: <Insert address>.
5. Area of Work: <**Insert information**>.
6. Acceptance Date: <**Insert date**>.
7. Warranty Period: <**Insert time**>.
8. Expiration Date: <**Insert date**>.

B. AND WHEREAS Roofing Installer has contracted (either directly with Owner or indirectly as a subcontractor) to warrant said work against leaks and faulty or defective materials and workmanship for designated Warranty Period,

C. NOW THEREFORE Roofing Installer hereby warrants, subject to terms and conditions herein set forth, that during Warranty Period he will, at his own cost and expense, make or cause to be made such repairs to or replacements of said work as are necessary to correct faulty and defective work and as are necessary to maintain said work in a watertight condition.

D. This Warranty is made subject to the following terms and conditions:

1. Specifically excluded from this Warranty are damages to work and other parts of the building, and to building contents, caused by:

a. Lightning;
b. Peak gust wind speed exceeding 130 mph;
c. Fire;
d. Failure of roofing system substrate, including cracking, settlement, excessive deflection, deterioration, and decomposition;
e. Faulty construction of parapet walls, copings, chimneys, skylights, vents, equipment supports, and other edge conditions and penetrations of the work;
f. Vapor condensation on bottom of roofing; and
g. Activity on roofing by others, including construction contractors, maintenance personnel, other persons, and animals, whether authorized or unauthorized by Owner.

2. When work has been damaged by any of foregoing causes, Warranty shall be null and void until such damage has been repaired by Roofing Installer and until cost and expense thereof have been paid by Owner or by another responsible party so designated.

3. Roofing Installer is responsible for damage to work covered by this Warranty but is not liable for consequential damages to building or building contents resulting from leaks or faults or defects of work.

4. During Warranty Period, if Owner allows alteration of work by anyone other than Roofing Installer, including cutting, patching, and maintenance in connection with penetrations, attachment of other work, and positioning of anything on roof, this Warranty shall become null and void on date of said alterations, but only to the extent said alterations affect work covered by this Warranty. If Owner engages Roofing Installer to perform said alterations, Warranty shall not become null and void unless Roofing Installer, before starting said work, shall have notified Owner in writing, showing reasonable cause for claim, that said alterations would likely damage or deteriorate work, thereby reasonably justifying a limitation or termination of this Warranty.

5. During Warranty Period, if original use of roof is changed and it becomes used for, but was not originally specified for, a promenade, work deck, spray-cooled surface, flooded basin, or other use or service more severe than originally specified, this Warranty shall become null and void on date of said change, but only to the extent said change affects work covered by this Warranty.

6. Owner shall promptly notify Roofing Installer of observed, known, or suspected leaks, defects, or deterioration and shall afford reasonable opportunity for Roofing Installer to inspect work and to examine evidence of such leaks, defects, or deterioration.

7. This Warranty is recognized to be the only warranty of Roofing Installer on said work and shall not operate to restrict or cut off Owner from other remedies and resources lawfully available to Owner in cases of roofing failure. Specifically, this Warranty shall not operate to relieve Roofing Installer of responsibility for performance of original work according to requirements of the Contract Documents, regardless of whether Contract was a contract directly with Owner or a subcontract with Owner's General Contractor.

E. IN WITNESS THEREOF, this instrument has been duly executed this <**Insert day**> day of <**Insert month**>, <**Insert year**>.

1. Authorized Signature: <**Insert signature**>.

2. Name: <Insert name>.

3. Title: <Insert title>.

END OF SECTION 076100

SECTION 076200 - SHEET METAL FLASHING AND TRIM

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

1. Manufactured Products: Products shall be manufactured by, or approved for installation with, the metal roofing system and/or the membrane roofing system. Products provided for the metal roofing system shall match the material and color of the selected roofing system. Products provided for sheet metal flashing and trim shall match the material and color of the metal roofing system unless specifically noted to be stainless steel..

   a. Manufactured through-wall flashing and counterflashing.
   b. Manufactured reglets and counterflashing.

2. Formed Products: Products shall be formed by, or approved for installation with, the metal roofing system and/or the membrane roofing system. Products provided for the metal roofing system shall match the material and color of the selected roofing system.

   a. Formed roof drainage sheet metal fabrications.
   b. Formed low-slope roof sheet metal fabrications.
   c. Formed equipment support flashing.

B. Related Sections:

1. Division 06 Section "Rough Carpentry" for wood nailers, curbs, and blocking.
2. Division 07 Section “Membrane Roofing" for installing sheet metal flashing and trim integral with membrane roofing.
3. Division 07 Section "Metal Wall Panels" for sheet metal flashing and trim integral with metal wall panels.
4. Division 07 Section "Sheet Metal Roofing" for custom-formed sheet metal flashing and trim integral with sheet metal roofing.
5. Division 07 Section "Roof Specialties" for manufactured roof specialties not part of sheet metal flashing and trim.
6. Division 07 Section "Roof Accessories" for set-on-type curbs, equipment supports, roof hatches, vents, and other manufactured roof accessory units.

1.3 PERFORMANCE REQUIREMENTS

A. General: Sheet metal flashing and trim assemblies as indicated shall withstand wind loads, structural movement, thermally induced movement, and exposure to weather without failure due to defective manufacture, fabrication, installation, or other defects in construction. Completed sheet metal flashing and trim shall not rattle, leak, or loosen, and shall remain watertight.
B. Thermal Movements: Provide sheet metal flashing and trim that allows for thermal movements from ambient and surface temperature changes.

1. Temperature Change (Range): 120 deg F, ambient; 180 deg F, material surfaces.

1.4 SUBMITTALS

A. Product Data: For each type of product indicated. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for each manufactured product and accessory.
B. Shop Drawings: Show fabrication and installation layouts of sheet metal flashing and trim, including plans, elevations, expansion-joint locations, and keyed details. Distinguish between shop- and field-assembled work. Include the following:

1. Identification of material, thickness, weight, and finish for each item and location in Project.
2. Details for forming sheet metal flashing and trim, including profiles, shapes, seams, and dimensions.
3. Details for joining, supporting, and securing sheet metal flashing and trim, including layout of fasteners, cleats, clips, and other attachments. Include pattern of seams.
4. Details of termination points and assemblies, including fixed points.
5. Details of expansion joints and expansion-joint covers, including showing direction of expansion and contraction.
6. Details of edge conditions, including eaves, ridges, valleys, rakes, crickets, and counterflashings as applicable.
7. Details of special conditions.
8. Details of connections to adjoining work.
9. Detail formed flashing and trim at a scale of not less than 3 inches per 12 inches.

C. Samples for Initial Selection: For each type of sheet metal flashing, trim, and accessory indicated with factory-applied color finishes involving color selection.
D. Samples for Verification: For each type of exposed finish required, prepared on Samples of size indicated below:

1. Sheet Metal Flashing: 12 inches long by actual width of unit, including finished seam and in required profile. Include fasteners, cleats, clips, closures, and other attachments.
2. Trim, Metal Closures, Expansion Joints, Joint Intersections, and Miscellaneous Fabrications: 12 inches long and in required profile. Include fasteners and other exposed accessories.
3. Accessories and Miscellaneous Materials: Full-size Sample.

E. Qualification Data: For qualified fabricator.
F. Maintenance Data: For sheet metal flashing, trim, and accessories to include in maintenance manuals.

1.5 QUALITY ASSURANCE

A. Fabricator Qualifications: Shop that employs skilled workers who custom fabricate sheet metal flashing and trim similar to that required for this Project and whose products have a record of successful in-service performance.
B. Sheet Metal Flashing and Trim Standard: Comply with SMACNA's "Architectural Sheet Metal Manual" unless more stringent requirements are specified or shown on Drawings.
C. Mockups: Build mockups to verify selections made under sample submittals and to demonstrate aesthetic effects and set quality standards for fabrication and installation.

1. Build mockup of typical roof eave, including fascia and fascia trim, approximately 10 feet long, including supporting construction cleats, seams, attachments and accessories.

2. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
3. Approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

D. Preinstallation Conference: Conduct conference at Project site.

1. Meet with Owner, Architect, Owner's insurer if applicable, Installer, and installers whose work interfaces with or affects sheet metal flashing and trim including installers of roofing materials, roof accessories, unit skylights, and roof-mounted equipment.
2. Review methods and procedures related to sheet metal flashing and trim.
3. Examine substrate conditions for compliance with requirements, including flatness and attachment to structural members.
4. Review special roof details, roof drainage, roof penetrations, equipment curbs, and condition of other construction that will affect sheet metal flashing.
5. Document proceedings, including corrective measures and actions required, and furnish copy of record to each participant.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Do not store sheet metal flashing and trim materials in contact with other materials that might cause staining, denting, or other surface damage. Store sheet metal flashing and trim materials away from uncured concrete and masonry.
B. Protect strippable protective covering on sheet metal flashing and trim from exposure to sunlight and high humidity, except to the extent necessary for the period of sheet metal flashing and trim installation.

PART 2 - PRODUCTS

2.1 SHEET METALS

A. General: Protect mechanical and other finishes on exposed surfaces from damage by applying a strippable, temporary protective film before shipping.
B. Stainless-Steel Sheet: ASTM A 240/A 240M or ASTM A 666, Type 304, dead soft, fully annealed.

1. Finish: 3 (coarse, polished directional satin).
2. Surface: Smooth, flat.

2.2 MISCELLANEOUS MATERIALS

A. General: Provide materials and types of fasteners, solder, welding rods, protective coatings, separators, sealants, and other miscellaneous items as required for complete sheet metal flashing and trim installation and recommended by manufacturer of primary sheet metal or manufactured item unless otherwise indicated.
B. Fasteners: Wood screws, annular threaded nails, self-tapping screws, self-locking rivets and bolts, and other suitable fasteners designed to withstand design loads and recommended by manufacturer of primary sheet metal or manufactured item.

1. General: Blind fasteners or self-drilling stainless steel screws, gasketed, with hex-washer head.

a. Blind Fasteners: High-strength stainless-steel rivets suitable for metal being fastened.

2. Fasteners for Stainless-Steel Sheet: Series 300 stainless steel.

C. Solder:

1. For Stainless Steel: ASTM B 32, Grade Sn60, with an acid flux of type recommended by stainless-steel sheet manufacturer.

D. Elastomeric Sealant: ASTM C 920, elastomeric silicone polymer sealant; low modulus; of type, grade, class, and use classifications required to seal joints in sheet metal flashing and trim and remain watertight.
E. Bituminous Coating: Cold-applied asphalt emulsion complying with ASTM D 1187.
F. Asphalt Roofing Cement: ASTM D 4586, asbestos free, of consistency required for application.

2.3 MANUFACTURED SHEET METAL FLASHING AND TRIM

A. Reglets: Units of type, material, and profile indicated, formed to provide secure interlocking of separate reglet and counterflashing pieces, and compatible with flashing indicated with factory-mitered and -welded corners and junctions and with interlocking counterflashing on exterior face, of same metal as reglet.

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

a. Cheney Flashing Company.
b. Fry Reglet Corporation.
c. Heckmann Building Products Inc.
d. Hickman, W. P. Company.
e. Hohmann & Barnard, Inc.; STF Sawtooth Flashing.
f. Keystone Flashing Company, Inc.
g. National Sheet Metal Systems, Inc.
h. Sandell Manufacturing Company, Inc.

2. Material: Stainless steel, 0.019 inch thick.
3. Surface-Mounted Type: Provide with slotted holes for fastening to substrate, with neoprene or other suitable weatherproofing washers, and with channel for sealant at top edge.
4. Concrete Type: Provide temporary closure tape to keep reglet free of concrete materials, special fasteners for attaching reglet to concrete forms, and guides to ensure alignment of reglet section ends.
5. Masonry Type: Provide with offset top flange for embedment in masonry mortar joint.
6. Accessories:

a. Flexible-Flashing Retainer: Provide resilient plastic or rubber accessory to secure flexible flashing in reglet where clearance does not permit use of standard metal counterflashing or where Drawings show reglet without metal counterflashing.
b. Counterflashing Wind-Restraint Clips: Provide clips to be installed before counterflashing to prevent wind uplift of counterflashing lower edge.

7. Finish: With manufacturer's standard color coating.

2.4 FABRICATION, GENERAL

A. General: Custom fabricate sheet metal flashing and trim to comply with recommendations in SMACNA's "Architectural Sheet Metal Manual" that apply to design, dimensions, geometry, metal thickness, and other characteristics of item indicated. Fabricate items at the shop to greatest extent possible.

1. Fabricate sheet metal flashing and trim in thickness or weight needed to comply with performance requirements, but not less than that specified for each application and metal.
2. Obtain field measurements for accurate fit before shop fabrication.
3. Form sheet metal flashing and trim without excessive oil canning, buckling, and tool marks and true to line and levels indicated, with exposed edges folded back to form hems.
4. Conceal fasteners and expansion provisions where possible. Exposed fasteners are not allowed on faces exposed to view.

B. Fabrication Tolerances: Fabricate sheet metal flashing and trim that is capable of installation to a tolerance of 1/4 inch in 20 feet on slope and location lines as indicated and within 1/8-inch offset of adjoining faces and of alignment of matching profiles.

C. Sealed Joints: Form nonexpansion but movable joints in metal to accommodate elastomeric sealant.

D. Expansion Provisions: Where lapped expansion provisions cannot be used, form expansion joints of intermeshing hooked flanges, not less than 1 inch deep, filled with butyl sealant concealed within joints.

E. Fabricate cleats and attachment devices of sizes as recommended by SMACNA's "Architectural Sheet Metal Manual" for application, but not less than thickness of metal being secured.

F. Seams: Fabricate nonmoving seams with flat-lock seams. Form seams and seal with elastomeric sealant unless otherwise recommended by sealant manufacturer for intended use. Rivet joints where necessary for strength.

G. Do not use graphite pencils to mark metal surfaces.

2.5 ROOF DRAINAGE SHEET METAL FABRICATIONS

A. Hanging Gutters: Fabricate to cross section indicated, complete with end pieces, outlet tubes, and other accessories as required. Fabricate in minimum 96-inch- long sections. Furnish flat-stock gutter spacers and gutter brackets fabricated from same metal as gutters, of size recommended by SMACNA but not less than twice the gutter thickness. Fabricate expansion joints, expansion-joint covers, gutter bead reinforcing bars, and gutter accessories from same metal as gutters.

1. Gutter Style: SMACNA designation A, D, G or J as indicated on drawings.
2. Expansion Joints: Butt type with cover plate.
3. Gutters with Girth 31 to 35 Inches : Fabricate from the following materials:

    a. Aluminum-Zinc Alloy-Coated Steel: 0.052 inch thick.

B. Downspouts: Fabricate rectangular downspouts complete with mitered elbows. Furnish with metal hangers, from same material as downspouts, and anchors.

1. Fabricated Hanger Style: SMACNA figure designation 1-35B or 1-35H.
2. Fabricate from the following materials:

    a. Aluminum-Zinc Alloy-Coated Steel: 0.022 inch thick.

C. Parapet Scuppers: Fabricate scuppers of dimensions required with closure flange trim to exterior, 4-inch- wide wall flanges to interior, and base extending 4 inches beyond cant or tapered strip into field of roof. Fabricate from the following materials:

1. Aluminum-Zinc Alloy-Coated Steel: 0.028 inch thick.

D. Conductor Heads: Fabricate conductor heads with flanged back and stiffened top edge and of dimensions and shape indicated complete with outlet tubes, exterior flange trim, and built-in overflows. Fabricate from the following materials:

1. Aluminum-Zinc Alloy-Coated Steel: 0.028 inch thick.

E. Splash Pans: Fabricate from the following materials:

1. Stainless Steel: 0.019 inch thick.

2.6 LOW-SLOPE ROOF SHEET METAL FABRICATIONS

A. Roof-Edge Flashing (Gravel Stop) and Fascia Cap: Fabricate in minimum 96-inch- long, but not exceeding 10-foot- long, sections. Furnish with 6-inch- wide, joint cover plates.

1. Joint Style: Butt, with 12-inch- wide, concealed backup plate and 6-inch- wide, exposed cover plates.
2. Fabricate with scuppers spaced 10 feet apart, of dimensions required with 4-inch- wide flanges and base extending 4 inches beyond cant or tapered strip into field of roof. Fasten gravel guard angles to base of scupper.
3. Fabricate from the following materials:

a. Stainless Steel: 0.019 inch thick.

B. Copings: Fabricate in minimum 96-inch- long, but not exceeding 10-foot- long, sections. Fabricate joint plates of same thickness as copings. Furnish with continuous cleats to support edge of external leg and drill elongated holes for fasteners on interior leg. Miter corners, seal, and solder or weld watertight.

1. Coping Profile: SMACNA figure designation 3-4A, 3-4D, 3-4G.
2. Joint Style: Butt, with 12-inch- wide, concealed backup plate and 6-inch- wide, exposed cover plates.
3. Fabricate from the following materials:

a. Stainless Steel: 0.025 inch thick.

C. Roof to Wall Transition Expansion-Joint Cover: Fabricate from the following materials:

1. Stainless Steel: 0.025 inch thick.

D. Base Flashing: Fabricate from the following materials:

1. Stainless Steel: 0.019 inch thick.

E. Counterflashing: Fabricate from the following materials:

1. Stainless Steel: 0.019 inch thick.

F. Flashing Receivers: Fabricate from the following materials:

1. Stainless Steel: 0.016 inch thick.

G. Roof-Penetration Flashing: Fabricate from the following materials:

1. Stainless Steel: 0.019 inch thick.

H. Roof-Drain Flashing: Fabricate from the following materials:

1. Stainless Steel: 0.016 inch thick.

2.7 MISCELLANEOUS SHEET METAL FABRICATIONS

A. Equipment Support Flashing: Fabricate from the following materials:

1. Stainless Steel: 0.019 inch thick.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, to verify actual locations, dimensions and other conditions affecting performance of the Work.

1. Verify compliance with requirements for installation tolerances of substrates.
2. Verify that substrate is sound, dry, smooth, clean, sloped for drainage, and securely anchored.

B. For the record, prepare written report, endorsed by Installer, listing conditions detrimental to performance of the Work.
C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION, GENERAL

A. General: Anchor sheet metal flashing and trim and other components of the Work securely in place, with provisions for thermal and structural movement. Use fasteners, solder, welding rods, protective coatings, separators, sealants, and other miscellaneous items as required to complete sheet metal flashing and trim system.

1. Install sheet metal flashing and trim true to line and levels indicated. Provide uniform, neat seams with minimum exposure of solder, welds, and sealant.
2. Install sheet metal flashing and trim to fit substrates and to result in watertight performance. Verify shapes and dimensions of surfaces to be covered before fabricating sheet metal.
3. Space cleats not more than 12 inches apart. Anchor each cleat with two fasteners. Bend tabs over fasteners.
4. Install exposed sheet metal flashing and trim without excessive oil canning, buckling, and tool marks.
5. Install sealant tape where indicated.
6. Torch cutting of sheet metal flashing and trim is not permitted.
7. Do not use graphite pencils to mark metal surfaces.

B. Metal Protection: Where dissimilar metals will contact each other or corrosive substrates, protect against galvanic action by painting contact surfaces with bituminous coating or by other permanent separation as recommended by SMACNA.

1. Coat back side of stainless-steel sheet metal flashing and trim with bituminous coating where flashing and trim will contact wood, ferrous metal, or cementitious construction.

C. Expansion Provisions: Provide for thermal expansion of exposed flashing and trim. Space movement joints at a maximum of 10 feet with no joints allowed within 24 inches of corner or intersection. Where lapped expansion provisions cannot be used or would not be sufficiently watertight, form expansion joints of intermeshing hooked flanges, not less than 1 inch deep, filled with sealant concealed within joints.

D. Fastener Sizes: Use fasteners of sizes that will penetrate metal decking not less than recommended by fastener manufacturer to achieve maximum pull-out resistance.

E. Seal joints as shown and as required for watertight construction.

1. Where sealant-filled joints are used, embed hooked flanges of joint members not less than 1 inch into sealant. Form joints to completely conceal sealant. When ambient temperature at time of installation is moderate, between 40 and 70 deg F , set joint members for 50 percent movement each way. Adjust setting proportionately for installation at higher ambient temperatures. Do not install sealant-type joints at temperatures below 40 deg F.
2. Prepare joints and apply sealants to comply with requirements in Division 07 Section "Joint Sealants."

F. Soldered Joints: Clean surfaces to be soldered, removing oils and foreign matter. Pre-tin edges of sheets to be soldered to a width of 1-1/2 inches , except reduce pre-tinning where pre-tinned surface would show in completed Work.

1. Do not solder metallic-coated steel sheet.
2. Do not use torches for soldering. Heat surfaces to receive solder and flow solder into joint. Fill joint completely. Completely remove flux and spatter from exposed surfaces.
3. Stainless-Steel Soldering: Tin edges of uncoated sheets using solder recommended for stainless steel and acid flux. Promptly remove acid flux residue from metal after tinning and soldering. Comply with solder manufacturer's recommended methods for cleaning and neutralization.

3.3 ROOF DRAINAGE SYSTEM INSTALLATION

A. General: Install sheet metal roof drainage items to produce complete roof drainage system according to SMACNA recommendations and as indicated. Coordinate installation of roof perimeter flashing with installation of roof drainage system.

B. Hanging Gutters: Join sections with riveted and soldered joints or with lapped joints sealed with sealant. Provide for thermal expansion. Attach gutters at eave or fascia to firmly anchored gutter brackets or straps spaced not more than 30 inches apart. Provide end closures and seal watertight with sealant. Slope to downspouts.

1. Fasten gutter spacers to front and back of gutter.
2. Loosely lock straps to front gutter bead and anchor to roof deck.
3. Anchor back of gutter that extends onto roof deck with cleats spaced not more than 24 inches apart.
4. Install gutter with expansion joints at locations indicated, but not exceeding, 50 feet apart. Install expansion-joint caps.

C. Downspouts: Join sections with 1-1/2-inch telescoping joints.

1. Provide hangers with fasteners designed to hold downspouts securely to walls. Locate hangers at top and bottom and at approximately 60 inches o.c. in between.
2. Connect downspouts to underground drainage system indicated.

D. Splash Pans: Install where downspouts discharge on low-slope roofs. Set in elastomeric sealant compatible with surface of roof where splash pan is located.

E. Scuppers: Install scuppers where indicated through parapet. Continuously support scupper, set to correct elevation, and seal flanges to interior wall face, over cants or tapered edge strips, and under roofing membrane.

1. Anchor scupper closure trim flange to exterior wall and solder or seal with elastomeric sealant to scupper.
2. Loosely lock front edge of scupper with conductor head.

F. Expansion-Joint Covers: Install expansion-joint covers at locations and of configuration indicated. Lap joints a minimum of 4 inches in direction of water flow.

3.4 ROOF FLASHING INSTALLATION

A. General: Install sheet metal flashing and trim to comply with performance requirements, sheet metal manufacturer's written installation instructions, and SMACNA's "Architectural Sheet Metal Manual." Provide concealed fasteners where possible, set units true to line, and level as indicated. Install work with laps, joints, and seams that will be permanently watertight and weather resistant.
B. Roof Edge Flashing: Anchor to resist uplift and outward forces according to recommendations in SMACNA's "Architectural Sheet Metal Manual" and as required by design wind loads if not indicated on drawings. Interlock bottom edge of roof edge flashing with continuous cleat anchored to substrate at staggered 3-inch centers.
C. Roof Edge Flashing: Anchor to resist uplift and outward forces according to recommendations in FMG Loss Prevention Data Sheet 1-49 for specified wind zone and as indicated. Interlock bottom edge of roof edge flashing with continuous cleat anchored to substrate at intervals as calculated by engineer that is to provide roofing and flashing shop drawings.
D. Copings: Anchor to resist uplift and outward forces according to recommendations in FMG Loss Prevention Data Sheet 1-49 for specified wind zone and as noted above.
E. Pipe or Post Counterflashing: Install counterflashing umbrella with close-fitting collar with top edge flared for elastomeric sealant, extending a minimum of 4 inches over base flashing. Install stainless-steel draw band and tighten.
F. Counterflashing: Coordinate installation of counterflashing with installation of base flashing. Insert counterflashing in reglets or receivers and fit tightly to base flashing. Extend counterflashing 4 inches over base flashing. Lap counterflashing joints a minimum of 4 inches and bed with sealant. Secure in a waterproof manner by means of snap-in installation and sealant or lead wedges and sealant.
G. Roof-Penetration Flashing: Coordinate installation of roof-penetration flashing with installation of roofing and other items penetrating roof. Seal with elastomeric sealant and clamp flashing to pipes that penetrate roof.

3.5 MISCELLANEOUS FLASHING INSTALLATION

A. Equipment Support Flashing: Coordinate installation of equipment support flashing with installation of roofing and equipment. Weld or seal flashing with elastomeric sealant to equipment support member.

3.6 ERECTION TOLERANCES

A. Installation Tolerances: Shim and align sheet metal flashing and trim within installed tolerance of 1/4 inch in 20 feet on slope and location lines as indicated and within 1/8-inch offset of adjoining faces and of alignment of matching profiles.

3.7 CLEANING AND PROTECTION

A. Clean exposed metal surfaces of substances that interfere with uniform oxidation and weathering.
B. Clean off excess sealants.
C. Remove temporary protective coverings and strippable films as sheet metal flashing and trim are installed unless otherwise indicated in manufacturer's written installation instructions. On completion of installation, remove unused materials and clean finished surfaces. Maintain in a clean condition during construction.
D. Replace sheet metal flashing and trim that have been damaged or that have deteriorated beyond successful repair by finish touchup or similar minor repair procedures.

END OF SECTION 076200

SECTION 077200 - ROOF ACCESSORIES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

1. Roof curbs.
2. Equipment supports.
3. Roof hatches.
4. Pipe supports.
5. Preformed flashing sleeves.

B. Related Sections:

1. Division 05 Section "Metal Fabrications" for metal vertical ladders, ships' ladders, and stairs for access to roof hatches.
2. Division 05 Section "Pipe and Tube Railings" for safety railing systems not attached to roof-hatch curbs.
3. Division 07 Section "Sheet Metal Flashing and Trim" for shop- and field-formed metal flashing, roof-drainage systems, roof expansion-joint covers, and miscellaneous sheet metal trim and accessories.
4. Division 07 Section "Roof Specialties" for manufactured fasciae, copings, gravel stops, gutters and downspouts, and counterflashing.

1.3 PERFORMANCE REQUIREMENTS

A. General Performance: Roof accessories shall withstand exposure to weather and resist thermally induced movement without failure, rattling, leaking, or fastener disengagement due to defective manufacture, fabrication, installation, or other defects in construction.

1.4 SUBMITTALS

A. Product Data: For each type of roof accessory indicated. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes.
B. Shop Drawings: For roof accessories. Include plans, elevations, keyed details, and attachments to other work. Indicate dimensions, loadings, and special conditions. Distinguish between plant- and field-assembled work.
C. Samples: For each exposed product and for each color and texture specified, prepared on Samples of size to adequately show color.
D. Coordination Drawings: Roof plans, drawn to scale, and coordinating penetrations and roof-mounted items. Show the following:

1. Size and location of roof accessories specified in this Section.
2. Size and location of safety tie-off system at metal roof.

a. Provide continuous pipe rail at 8 inches above roof along ridge line of vaulted roof and at each side of clerestory.

3. Method of attaching roof accessories to roof or building structure.
4. Other roof-mounted items including mechanical and electrical equipment, ductwork, piping, and conduit.
5. Required clearances.
6. All calculations for safety and support systems shall be signed and sealed by a Florida Registered Engineer.

E. Operation and Maintenance Data: For roof accessories to include in operation and maintenance manuals.

1.5 COORDINATION

A. Coordinate layout and installation of roof accessories with roofing membrane and base flashing and interfacing and adjoining construction to provide a leakproof, weathertight, secure, and noncorrosive installation.
B. Coordinate dimensions with rough-in information or Shop Drawings of equipment to be supported.

PART 2 - PRODUCTS

2.1 METAL MATERIALS

A. Aluminum Sheet: ASTM B 209 , manufacturer's standard alloy for finish required, with temper to suit forming operations and performance required.

1. Clear Anodic Finish: AAMA 611, AA-M12C22A41, Class I, 0.018 mm or thicker.

B. Aluminum Extrusions and Tubes: ASTM B 221, manufacturer's standard alloy and temper for type of use, finished to match assembly where used, otherwise mill finished.
C. Stainless-Steel Sheet and Shapes: ASTM A 240/A 240M or ASTM A 666, Type 304.

2.2 MISCELLANEOUS MATERIALS

A. General: Provide materials and types of fasteners, protective coatings, sealants, and other miscellaneous items required by manufacturer for a complete installation.
B. Polyisocyanurate Board Insulation: ASTM C 1289, thickness as indicated.
C. Wood Nailers: Softwood lumber, pressure treated with waterborne preservatives for aboveground use, acceptable to authorities having jurisdiction, containing no arsenic or chromium, and complying with AWPA C2; not less than 1-1/2 inches thick.
D. Bituminous Coating: Cold-applied asphalt emulsion complying with ASTM D 1187.
E. Underlayment: Self-Adhering, High-Temperature Sheet: Minimum 30 to 40 mils thick, consisting of slip-resisting polyethylene-film top surface laminated to layer of butyl or SBS-modified asphalt adhesive, with release-paper backing; cold applied. Provide primer when recommended by underlayment manufacturer.

1. Thermal Stability: ASTM D 1970; stable after testing at 240 deg F .
2. Low-Temperature Flexibility: ASTM D 1970; passes after testing at minus 20 deg F .
3. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:

a. Carlisle Coatings & Waterproofing; CCW WIP 300HT.
b. Grace Construction Products, a unit of W. R. Grace & Co.; Ultra.
c. Metal-Fab Manufacturing, LLC; MetShield.
d. Owens Corning; WeatherLock Metal High Temperature Underlayment.

4. Polyethylene Sheet: 6-mil- thick polyethylene sheet complying with ASTM D 4397.
5. Slip Sheet: Building paper, 3-lb/100 sq. ft. minimum, rosin sized.

F. Fasteners: Roof accessory manufacturer's recommended fasteners suitable for application and metals being fastened. Match finish of exposed fasteners with finish of material being fastened. Provide nonremovable fastener heads to exterior exposed fasteners. Furnish the following unless otherwise indicated:

1. Fasteners for Zinc-Coated or Aluminum-Zinc Alloy-Coated Steel: Series 300 stainless steel or hot-dip zinc-coated steel according to ASTM A 153/A 153M or ASTM F 2329.
2. Fasteners for Aluminum Sheet: Aluminum or Series 300 stainless steel.

G. Gaskets: Manufacturer's standard tubular or fingered design of neoprene, EPDM, PVC, or silicone or a flat design of foam rubber, sponge neoprene, or cork.
H. Elastomeric Sealant: ASTM C 920, elastomeric silicone polymer sealant as recommended by roof accessory manufacturer for installation indicated; low modulus; of type, grade, class, and use classifications required to seal joints and remain watertight.
I. Asphalt Roofing Cement: ASTM D 4586, asbestos free, of consistency required for application.

2.3 ROOF CURBS

A. Roof Curbs: Internally reinforced roof-curb units with integral spring-type vibration isolators and capable of supporting superimposed live and dead loads, including equipment loads and other construction indicated on Drawings; with welded or mechanically fastened and sealed corner joints, stepped integral metal cant raised the thickness of roof insulation, and integrally formed deck-mounting flange at perimeter bottom.

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

a. AES Industries, Inc.
b. Curbs Plus, Inc.
c. Custom Solution Roof and Metal Products.
d. Greenheck Fan Corporation.
e. LM Curbs.
f. Metallic Products Corp.
g. Milcor Inc.; Commercial Products Group of Hart & Cooley, Inc.
h. Pate Company (The).
i. Roof Products, Inc.
j. Safe Air of Illinois.
k. Thybar Corporation.
l. Vent Products Co., Inc.

B. Size: Coordinate dimensions with roughing-in information or Shop Drawings of equipment to be supported.
C. Loads: See roof loading requirements on structural drawings.
D. Material: Aluminum sheet, 0.090 inch thick.

1. Finish: Clear anodic.

E. Construction:

1. Liner: Same material as curb, of manufacturer's standard thickness and finish.
2. Factory-installed wood nailer at top of curb, continuous around curb perimeter.
3. On ribbed or fluted metal roofs, form deck-mounting flange at perimeter bottom to conform to roof profile.
4. Fabricate curbs to minimum height of 12 inches unless otherwise indicated.
5. Top Surface: Level around perimeter with roof slope accommodated by sloping the deck-mounting flange.

2.4 EQUIPMENT SUPPORTS

A. Equipment Supports: Internally reinforced metal equipment supports capable of supporting superimposed live and dead loads, including equipment loads and other construction indicated on Drawings; with welded or mechanically fastened and sealed corner joints, stepped integral metal cant raised the thickness of roof insulation, and integrally formed deck-mounting flange at perimeter bottom.

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

    a. AES Industries, Inc.
    b. Curbs Plus, Inc.
    c. Custom Solution Roof and Metal Products.
    d. Greenheck Fan Corporation.
    e. LM Curbs.
    f. Milcor Inc.; Commercial Products Group of Hart & Cooley, Inc.
    g. Pate Company (The).
    h. Roof Products, Inc.
    i. Thybar Corporation.
    j. Vent Products Co., Inc.

B. Size: Coordinate dimensions with roughing-in information or Shop Drawings of equipment to be supported.
C. Loads: See roof loading requirements on structural drawings.
D. Material: Aluminum sheet, 0.090 inch thick.

1. Finish: Clear anodic.

E. Construction:

1. Liner: Same material as equipment support, of manufacturer's standard thickness and finish.
2. Factory-installed continuous wood nailers 3-1/2 inches wide at tops of equipment supports.
3. Metal Counterflashing: Manufacturer's standard, removable, fabricated of same metal and finish as equipment support.
4. On ribbed or fluted metal roofs, form deck-mounting flange at perimeter bottom to conform to roof profile.
5. Fabricate equipment supports to minimum height of 12 inches unless otherwise indicated.

2.5 PREFORMED FLASHING SLEEVES

A. Exhaust Vent Flashing: Double-walled metal flashing sleeve or boot, insulation filled, with integral deck flange, 12 inches high, with removable metal hood and slotted or perforated metal collar.

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

    a. Custom Solution Roof and Metal Products.
    b. Thaler Metal USA Inc.

2. Metal: Aluminum sheet, 0.063 inch thick.
3. Diameter: As required for vent size as indicated on plumbing drawings.
4. Finish: Manufacturer's standard.

B. Vent Stack Flashing: Metal flashing sleeve, uninsulated, with integral deck flange.

1. Equipment support and safety tie –off system that use pipe supports tied back to structure can utilize vent-type stack flashing at thru-roof penetrations.
2. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

    a. Custom Solution Roof and Metal Products.
    b. Milcor Inc.; Commercial Products Group of Hart & Cooley, Inc.
    c. Thaler Metal USA Inc.

3. Metal: Aluminum sheet, 0.063 inch thick.
4. Height: 13 inches.
5. Diameter: As required for vent size as indicated on plumbing drawings and for pipe sizes at support systems.
6. Finish: Manufacturer's standard.

2.6 GENERAL FINISH REQUIREMENTS

A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.
B. Appearance of Finished Work: Noticeable variations in same piece are not acceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, to verify actual locations, dimensions, and other conditions affecting performance of the Work.
B. Verify that substrate is sound, dry, smooth, clean, sloped for drainage, and securely anchored.
C. Verify dimensions of roof openings for roof accessories.
D. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. General: Install roof accessories according to manufacturer's written instructions.

1. Install roof accessories level, plumb, true to line and elevation, and without warping, jogs in alignment, excessive oil canning, buckling, or tool marks.

2. Anchor roof accessories securely in place so they are capable of resisting indicated loads.
3. Use fasteners, separators, sealants, and other miscellaneous items as required to complete installation of roof accessories and fit them to substrates.
4. Install roof accessories to resist exposure to weather without failing, rattling, leaking, or loosening of fasteners and seals.

B. Metal Protection: Protect metals against galvanic action by separating dissimilar metals from contact with each other or with corrosive substrates by painting contact surfaces with bituminous coating or by other permanent separation as recommended by manufacturer.

1. Coat concealed side of uncoated aluminum roof accessories with bituminous coating where in contact with wood, ferrous metal, or cementitious construction.
2. Underlayment: Where installing roof accessories directly on cementitious or wood substrates, install a course of felt underlayment and cover with a slip sheet, or install a course of polyethylene sheet.
3. Bed flanges in thick coat of asphalt roofing cement where required by manufacturers of roof accessories for waterproof performance.

C. Roof Curb Installation: Install each roof curb so top surface is level.
D. Equipment Support Installation: Install equipment supports so top surfaces are level with each other.
E. Pipe Support Installation: Install pipe supports so top surfaces are in contact with and provide equally distributed support along length of supported item.
F. Preformed Flashing-Sleeve Installation: Secure flashing sleeve to roof membrane according to flashing-sleeve manufacturer's written instructions.
G. Seal joints with elastomeric sealant as required by roof accessory manufacturer.

3.3 REPAIR AND CLEANING

A. Clean exposed surfaces according to manufacturer's written instructions.
B. Clean off excess sealants.
C. Replace roof accessories that have been damaged or that cannot be successfully repaired by finish touchup or similar minor repair procedures.

END OF SECTION 077200

SECTION 079200 - JOINT SEALANTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes joint sealants for the following applications, including those specified by reference to this Section:

1. Exterior joints in the following vertical surfaces and horizontal nontraffic surfaces:

a. Construction joints in cast-in-place concrete.
b. Control and expansion joints in unit masonry and precast concrete (cast stone).
c. Joints in exterior insulation and finish systems.
d. Perimeter joints between materials listed above and frames of doors windows and louvers.
e. Control and expansion joints in ceilings and other overhead surfaces.
f. Other joints as indicated.

2. Interior joints in the following vertical surfaces and horizontal nontraffic surfaces:

a. Control and expansion joints on exposed interior surfaces of exterior walls.
b. Perimeter joints of exterior openings where indicated.
c. Tile control and expansion joints.
d. Vertical joints on exposed surfaces of interior unit masonry or concrete walls and partitions.
e. Perimeter joints between interior wall surfaces and frames of interior doors, windows and elevator entrances.
f. Joints between plumbing fixtures and adjoining walls, floors, and counters.
g. Other joints as indicated.

B. Related Sections include the following:

1. Division 04 Section "Unit Masonry" for masonry control and expansion joint fillers and gaskets.
2. Division 07 Section "Fire-Resistive Joint Systems" for sealing joints in fire-resistance-rated construction.
3. Division 08 Section "Glazing" for glazing sealants.
4. Division 09 Section "Gypsum Board" for sealing perimeter joints of gypsum board partitions to reduce sound transmission.
5. Division 09 Section "Tiling" for sealing tile joints.
6. Division 09 Section "Acoustical Panel Ceilings" for sealing edge moldings at perimeters of acoustical ceilings.
7. Division 32 Section "Concrete Paving Joint Sealants" for sealing joints in pavements, walkways, and curbing.

1.3 PERFORMANCE REQUIREMENTS

A. Provide elastomeric joint sealants that establish and maintain watertight and airtight continuous joint seals without staining or deteriorating joint substrates.
B. Provide joint sealants for interior applications that establish and maintain airtight and water-resistant continuous joint seals without staining or deteriorating joint substrates.

1.4 ACTION SUBMITTALS

A. Product Data: For each joint-sealant product indicated.
B. Samples for Initial Selection: Manufacturer's color charts consisting of strips of cured sealants showing the full range of colors available for each product exposed to view.
C. Samples for Verification: For each kind and color of joint sealant required, provide Samples with joint sealants in 1/2-inch- (13-mm-) wide joints formed between two 6-inch- (150-mm-) long strips of material matching the appearance of exposed surfaces adjacent to joint sealants.
D. Joint-Sealant Schedule: Include the following information:

1. Joint-sealant application, joint location, and designation.
2. Joint-sealant manufacturer and product name.
3. Joint-sealant formulation.
4. Joint-sealant color.

1.5 INFORMATIONAL SUBMITTALS

A. Qualification Data: For qualified Installer.
B. Product Certificates: For each kind of joint sealant and accessory, from manufacturer.
C. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, indicating that sealants comply with requirements.
D. Preconstruction Compatibility and Adhesion Test Reports: From sealant manufacturer, indicating the following:

1. Materials forming joint substrates and joint-sealant backings have been tested for compatibility and adhesion with joint sealants.
2. Interpretation of test results and written recommendations for primers and substrate preparation needed for adhesion.

E. Warranties: Sample of special warranties.

1.6 QUALITY ASSURANCE

A. Installer Qualifications: Manufacturer's authorized Installer who is approved or licensed for installation of elastomeric sealants required for this Project.
B. Source Limitations: Obtain each type of joint sealant through one source from a single manufacturer.
C. Product Testing: Obtain test results for "Product Test Reports" Paragraph in "Submittals" Article from a qualified testing agency based on testing current sealant formulations within a 36-month period preceding the commencement of the Work.

1. Test elastomeric joint sealants for compliance with requirements specified by reference to ASTM C 920, and where applicable, to other standard test methods.
2. Test other joint sealants for compliance with requirements indicated by referencing standard specifications and test methods.

D. Preinstallation Conference: Conduct conference at Project site to comply with requirements in Division 01 Section "Project Management and Coordination."

1.7 PROJECT CONDITIONS

A. Do not proceed with installation of joint sealants under the following conditions:

1. When ambient and substrate temperature conditions are outside limits permitted by joint-sealant manufacturer or are below 40 deg F.
2. When joint substrates are wet.
3. Where joint widths are less than those allowed by joint-sealant manufacturer for applications indicated.
4. Contaminants capable of interfering with adhesion have not yet been removed from joint substrates.

1.8 WARRANTY

A. Special Installer's Warranty: Installer's standard form in which Installer agrees to repair or replace elastomeric joint sealants that do not comply with performance and other requirements specified in this Section within specified warranty period.

1. Warranty Period: Two years from date of Substantial Completion.

B. Special Manufacturer's Warranty: Manufacturer's standard form in which elastomeric sealant manufacturer agrees to furnish elastomeric joint sealants to repair or replace those that do not comply with performance and other requirements specified in this Section within specified warranty period.

1. Warranty Period: Ten years from date of Substantial Completion.

C. Special warranties specified in this Article exclude deterioration or failure of elastomeric joint sealants from the following:

1. Movement of the structure resulting in stresses on the sealant exceeding sealant manufacturer's written specifications for sealant elongation and compression caused by structural settlement or errors attributable to design or construction.
2. Disintegration of joint substrates from natural causes exceeding design specifications.
3. Mechanical damage caused by individuals, tools, or other outside agents.
4. Changes in sealant appearance caused by accumulation of dirt or other atmospheric contaminants.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, products listed in other Part 2 articles.
B. VOC Content of Interior Sealants: Provide sealants and sealant primers for use inside the weatherproofing system that comply with the following limits for VOC content when calculated according to 40 CFR 59, Part 59, Subpart D (EPA Method 24):

1. Architectural Sealants: 250 g/L.
2. Sealant Primers for Nonporous Substrates: 250 g/L.
3. Sealant Primers for Porous Substrates: 775 g/L.

2.2 MATERIALS, GENERAL

A. Compatibility: Provide joint sealants, backings, and other related materials that are compatible with one another and with joint substrates under conditions of service and application, as demonstrated by sealant manufacturer, based on testing and field experience.
B. Colors of Exposed Joint Sealants: As selected by Architect from manufacturer's full range.

2.3 ELASTOMERIC JOINT SEALANTS

A. Elastomeric Sealants: Comply with ASTM C 920 and other requirements indicated for each liquid-applied chemically curing sealant specified, including those referencing ASTM C 920 classifications for type, grade, class, and uses related to exposure and joint substrates.
B. Stain-Test-Response Characteristics: Where elastomeric sealants are specified to be nonstaining to porous substrates, provide products that have undergone testing according to ASTM C 1248 and have not stained porous joint substrates indicated for Project.
C. Suitability for Contact with Food: Where elastomeric sealants are indicated for joints that will come in repeated contact with food, provide products that comply with 21 CFR 177.2600.
D. Single-component or Multi-component Non-sag Urethane Sealant:

1. Available Products:

a. Pecora Corporation
b. Tremco
c. Schnee-Morehead, Inc.
d. Sika Corporation, Inc.
e. Sonneborn, Division of ChemRex Inc.

2. Type and Grade: M (multi-component) or S (single-component) and NS (nonsag).
3. Class: 50.
4. Use Related to Exposure: T (traffic) and NT (nontraffic).
5. Uses Related to Joint Substrates: M, G, A, and, as applicable to joint substrates indicated, O.

2.4 PREFORMED JOINT SEALANTS

A. Preformed Foam Sealant: Manufacturer's standard preformed, precompressed, open-cell foam sealant that is manufactured from high-density urethane foam impregnated with a nondrying, water-repellent agent; is factory produced in precompressed sizes in roll or stick form to fit joint widths indicated; is coated on one side with a pressure-sensitive adhesive and covered with protective wrapping; develops a watertight and airtight seal when compressed to the degree specified by manufacturer; and complies with the following:

1. Available Products:

a. EMSEAL Joint Systems, Ltd.; Emseal 25V.
b. illbruck Sealant Systems, Inc.; Wilseal 600.
c. Polytite Manufacturing Corporation; Polytite B.
d. Polytite Manufacturing Corporation; Polytite Standard.
e. Sandell Manufacturing Co., Inc.; Polyseal.

2. Properties: Permanently elastic, mildew resistant, nonmigratory, nonstaining, and compatible with joint substrates and other joint sealants.

a. Density: Manufacturer's standard.

2.5 JOINT-SEALANT BACKING

A. General: Provide sealant backings of material and type that are nonstaining; are compatible with joint substrates, sealants, primers, and other joint fillers; and are approved for applications indicated by sealant manufacturer based on field experience and laboratory testing.
B. Elastomeric Tubing Sealant Backings: Neoprene, butyl, EPDM, or silicone tubing complying with ASTM D 1056, nonabsorbent to water and gas, and capable of remaining resilient at temperatures down to minus 26 deg F . Provide products with low compression set and of size and shape to provide a secondary seal, to control sealant depth, and to otherwise contribute to optimum sealant performance.
C. Bond-Breaker Tape: Polyethylene tape or other plastic tape recommended by sealant manufacturer for preventing sealant from adhering to rigid, inflexible joint-filler materials or joint surfaces at back of joint where such adhesion would result in sealant failure. Provide self-adhesive tape where applicable.

2.6 MISCELLANEOUS MATERIALS

A. Primer: Material recommended by joint-sealant manufacturer where required for adhesion of sealant to joint substrates indicated, as determined from preconstruction joint-sealant-substrate tests and field tests.
B. Cleaners for Nonporous Surfaces: Chemical cleaners acceptable to manufacturers of sealants and sealant backing materials, free of oily residues or other substances capable of staining or harming joint substrates and adjacent nonporous surfaces in any way, and formulated to promote optimum adhesion of sealants to joint substrates.
C. Masking Tape: Nonstaining, nonabsorbent material compatible with joint sealants and surfaces adjacent to joints.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine joints indicated to receive joint sealants, with Installer present, for compliance with requirements for joint configuration, installation tolerances, and other conditions affecting joint-sealant performance.
B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Surface Cleaning of Joints: Clean out joints immediately before installing joint sealants to comply with joint-sealant manufacturer's written instructions and the following requirements:

1. Remove all foreign material from joint substrates that could interfere with adhesion of joint sealant, including dust, paints (except for permanent, protective coatings tested and approved for sealant adhesion and compatibility by sealant manufacturer), old joint sealants, oil, grease, waterproofing, water repellents, water, surface dirt, and frost.
2. Clean porous joint substrate surfaces by brushing, grinding, blast cleaning, mechanical abrading, or a combination of these methods to produce a clean, sound substrate capable of developing optimum bond with joint sealants. Remove loose particles remaining after cleaning operations above by vacuuming or blowing out joints with oil-free compressed air. Porous joint substrates include the following:

    a. Concrete.
    b. Masonry.
    c. Unglazed surfaces of ceramic tile.

3. Remove laitance and form-release agents from concrete.

4. Clean nonporous surfaces with chemical cleaners or other means that do not stain, harm substrates, or leave residues capable of interfering with adhesion of joint sealants. Nonporous joint substrates include the following:

    a. Metal.
    b. Glass.
    c. Porcelain enamel.
    d. Glazed surfaces of ceramic tile.

B. Joint Priming: Prime joint substrates, where recommended in writing by joint-sealant manufacturer, based on preconstruction joint-sealant-substrate tests or prior experience. Apply primer to comply with joint-sealant manufacturer's written instructions. Confine primers to areas of joint-sealant bond; do not allow spillage or migration onto adjoining surfaces.

C. Masking Tape: Use masking tape where required to prevent contact of sealant with adjoining surfaces that otherwise would be permanently stained or damaged by such contact or by cleaning methods required to remove sealant smears. Remove tape immediately after tooling without disturbing joint seal.

3.3 INSTALLATION OF JOINT SEALANTS

A. General: Comply with joint-sealant manufacturer's written installation instructions for products and applications indicated, unless more stringent requirements apply.

B. Sealant Installation Standard: Comply with recommendations in ASTM C 1193 for use of joint sealants as applicable to materials, applications, and conditions indicated.

C. Install sealant backings of type indicated to support sealants during application and at position required to produce cross-sectional shapes and depths of installed sealants relative to joint widths that allow optimum sealant movement capability.

    1. Do not leave gaps between ends of sealant backings.
    2. Do not stretch, twist, puncture, or tear sealant backings.
    3. Remove absorbent sealant backings that have become wet before sealant application and replace them with dry materials.

D. Install bond-breaker tape behind sealants where sealant backings are not used between sealants and backs of joints.

E. Install sealants using proven techniques that comply with the following and at the same time backings are installed:

    1. Place sealants so they directly contact and fully wet joint substrates.
    2. Completely fill recesses in each joint configuration.
    3. Produce uniform, cross-sectional shapes and depths relative to joint widths that allow optimum sealant movement capability.

F. Tooling of Nonsag Sealants: Immediately after sealant application and before skinning or curing begins, tool sealants according to requirements specified below to form smooth, uniform beads of configuration indicated; to eliminate air pockets; and to ensure contact and adhesion of sealant with sides of joint.

    1. Remove excess sealant from surfaces adjacent to joints.
    2. Use tooling agents that are approved in writing by sealant manufacturer and that do not discolor sealants or adjacent surfaces.
    3. Provide concave joint configuration per Figure 5A in ASTM C 1193, unless otherwise indicated.

G. Installation of Preformed Tapes: Install according to manufacturer's written instructions.

H. Installation of Preformed Foam Sealants: Install each length of sealant immediately after removing protective wrapping, taking care not to pull or stretch material, producing seal

continuity at ends, turns, and intersections of joints. For applications at low ambient temperatures where expansion of sealant requires acceleration to produce seal, apply heat to sealant in compliance with sealant manufacturer's written instructions.

3.4 CLEANING

A. Clean off excess sealant or sealant smears adjacent to joints as the Work progresses by methods and with cleaning materials approved in writing by manufacturers of joint sealants and of products in which joints occur.

3.5 PROTECTION

A. Protect joint sealants during and after curing period from contact with contaminating substances and from damage resulting from construction operations or other causes so sealants are without deterioration or damage at time of Substantial Completion. If, despite such protection, damage or deterioration occurs, cut out and remove damaged or deteriorated joint sealants immediately so installations with repaired areas are indistinguishable from original work.

END OF SECTION 079200

SECTION 081113 - HOLLOW METAL DOORS AND FRAMES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section includes hollow-metal work.
B. Related Requirements:
   1. Section 087100 "Door Hardware" for door hardware for hollow-metal doors.

1.3 DEFINITIONS

A. Minimum Thickness: Minimum thickness of base metal without coatings according to NAAMM-HMMA 803 or SDI A250.8.

1.4 COORDINATION

A. Coordinate anchorage installation for hollow-metal frames. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors. Deliver such items to Project site in time for installation.

1.5 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1.6 ACTION SUBMITTALS

A. Product Data: For each type of product.
   1. Include construction details, material descriptions, core descriptions, fire-resistance ratings, temperature-rise ratings, and finishes.

B. Shop Drawings: Include the following:
   1. Elevations of each door type.
   2. Details of doors, including vertical- and horizontal-edge details and metal thicknesses.
   3. Frame details for each frame type, including dimensioned profiles and metal thicknesses.
      a. Knock-down frames are not permitted.
      b. Fully welded face and throats are required.
   4. Locations of reinforcement and preparations for hardware.
   5. Details of each different wall opening condition.
   6. Details of anchorages, joints, field splices, and connections.
   7. Details of accessories.

8. Details of moldings, removable stops, and glazing.
9. Details of conduit and preparations for power, signal, and control systems.

C. Samples for Verification:

1. For each type of exposed finish required, prepared on Samples of not less than 3 by 5 inches.
2. For "Doors" and "Frames" subparagraphs below, prepare Samples approximately 8 by 10 inches to demonstrate compliance with requirements for quality of materials and construction:

   a. Doors: Show vertical-edge, top, and bottom construction; core construction; and hinge and other applied hardware reinforcement. Include separate section showing glazing if applicable.
   b. Frames: Show profile, corner joint, floor and wall anchors, and silencers. Include separate section showing fixed hollow-metal panels and glazing if applicable.

D. Schedule: Provide a schedule of hollow-metal work prepared by or under the supervision of supplier, using same reference numbers for details and openings as those on Drawings. Coordinate with final Door Hardware Schedule.

1.7 INFORMATIONAL SUBMITTALS

A. Product Test Reports: For each type of hollow-metal door and frame assembly, for tests performed by a qualified testing agency.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Deliver hollow-metal work palletized, packaged, or crated to provide protection during transit and Project-site storage. Do not use nonvented plastic.

1. Provide additional protection to prevent damage to factory-finished units.

B. Deliver welded frames with two removable spreader bars across bottom of frames, tack welded to jambs and mullions.

C. Store hollow-metal work vertically under cover at Project site with head up. Place on minimum 4-inch- high wood blocking. Provide minimum 1/4-inch space between each stacked door to permit air circulation.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

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

1. Amweld Building Products, LLC.
2. Ceco Door Products; an Assa Abloy Group company.
3. Curries Company; an Assa Abloy Group company.
4. Firedoor Corporation.
5. Fleming Door Products Ltd.; an Assa Abloy Group company.
6. Habersham Metal Products Company.
7. Mesker Door Inc.
8. Pioneer Industries, Inc.
9. Security Metal Products Corp.

10. Steelcraft; an Ingersoll-Rand company.
11. Windsor Republic Doors.

B. Source Limitations: Obtain hollow-metal work from single source from single manufacturer.

2.2 REGULATORY REQUIREMENTS

A. Fire-Rated Assemblies: Complying with NFPA 80 and listed and labeled by a qualified testing agency acceptable to authorities having jurisdiction for fire-protection ratings and temperature-rise limits indicated, based on testing at positive pressure according to NFPA 252 or UL 10C.

1. Smoke- and Draft-Control Assemblies: Provide an assembly with gaskets listed and labeled for smoke and draft control by a qualified testing agency acceptable to authorities having jurisdiction, based on testing according to UL 1784 and installed in compliance with NFPA 105.

B. Fire-Rated, Borrowed-Light Assemblies: Complying with NFPA 80 and listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction for fire-protection ratings indicated, based on testing according to NFPA 257 or UL 9.

2.3 INTERIOR DOORS AND FRAMES

A. Construct interior doors and frames to comply with the standards indicated for materials, fabrication, hardware locations, hardware reinforcement, tolerances, and clearances, and as specified.

B. Commercial Doors and Frames: NAAMM-HMMA 861. At locations indicated in the Door and Frame Schedule.

1. Physical Performance: Level A according to SDI A250.4.
2. Doors:

    a. Type: As indicated in the Door and Frame Schedule.
    b. Thickness: 1-3/4 inches
    c. Face: Metallic-coated, cold-rolled steel sheet, minimum thickness of 0.042 inch .
    d. Edge Construction: Continuously welded with no visible seam.
    e. Core: Steel stiffeners with polystyrene, polyurethane, polyisocyanurate or mineral-board insulation for sound reduction.

3. Frames:

    a. Construction: Fabricate frames with mitered corners and full profile welded.

4. Exposed Finish: Prime.

2.4 HOLLOW-METAL PANELS

A. Provide hollow-metal panels of same materials, construction, and finish as adjacent door assemblies.

2.5 FRAME ANCHORS

A. Jamb Anchors:

1. Masonry Type: Adjustable strap-and-stirrup or T-shaped anchors to suit frame size, not less than 0.042 inch thick, with corrugated or perforated straps not less than 2 inches wide by 10 inches long; or wire anchors not less than 0.177 inch thick.

2. Stud-Wall Type: Designed to engage stud, welded to back of frames; not less than 0.042 inch thick.
3. Postinstalled Expansion Type for In-Place Concrete or Masonry: Minimum 3/8-inch-diameter bolts with expansion shields or inserts. Provide pipe spacer from frame to wall, with throat reinforcement plate, welded to frame at each anchor location.

B. Floor Anchors: Formed from same material as frames, minimum thickness of 0.042 inch , and as follows:

1. Monolithic Concrete Slabs: Clip-type anchors, with two holes to receive fasteners.

2.6 HEAD & JAMB ADJUSTABLE SEAL

A. Adjustable door stop constructed of extruded aluminum housing of thickness 0.093 inches. Adjusting screws shall be provided 12 inch O.C., giving an adjusting range of 0.310. Adjusting screws shall be #8 x1 1/2” stainless steel, shall have a special shoulder for retaining clip, and shall be held in the assembly by a retainer clip. Adjusting screw must engage a solid adjusting channel which has been drilled and tapped to provide a complete circumference engagement for screw thread. No spring retainers, self tapping adjusting screws, or channels which do not contain a drilled and tapped hole for the adjusting screw will be allowed.

B. The housing dimensions shall be 1-1/2” deep and 15/16” wide. The seals are constructed of tubular, solid neoprene. Install with neoprene touching door and compressed 1/32”. Solid neoprene to be used inside the housing to prevent sound from “flanking” through the mechanism. The assembly must have a weight of at least 0.825 lbs/ft in order to ensure durability. Note: Fire rated gaskets usually require mounting to the stop of the door jamb. Because the gasket dimension adds to the stop dimension, a lever handle should be used. If using knob locks, a 3-1/4” backset lock should be supplied.

C. The following are acceptable:

1. #770 from Zero International, Inc., Bronx, NY 800-635-5335
2. Products manufactured by Reese Enterprises, Inc., or National Guard Products which meet the above requirements may be submitted for approval.

2.7 MEETING STILES

A. Meeting stile for double leaf doors are an adjustable and spring loaded mortised astragal type (surface applied for fire rated doors) with a neoprene seal at the door intersection. The seals should be continuous with no interference from door hardware such as closers, exit devices, etc. Install seals so they are compressed against each other by 1/16".

B. The following are acceptable:

1. #555/ #55 from Zero International, Inc., Bronx, NY 800-635-5335
2. Products manufactured by Reese Enterprises, Inc., or National Guard Products which meet the above requirements may be submitted for approval.

2.8 RABBETED SADDLE

A. Rabbeted type saddle on floor constructed of aluminum with built-in tadpole-type neoprene seal. Length not to exceed 3-3/4" with a minimum one inch flat horizontal portion. Total clearance above finish floor shall not exceed 1/2" in order to make the saddle compatible with handicap accessibility requirements.

B. The following are acceptable:

1. #564 (fire rated) from Zero International, Inc., Bronx, NY , 800-635-5335
2. #S248N (fire rated) from Reese Enterprises Inc, Rosemount, MN, 800-328-0953
3. #8135NS from National Guard Products, Memphis, TN 800-647-7874
4. or approved equal.

2.9 MATERIALS

A. Recycled Content of Steel Products: Postconsumer recycled content plus one-half of preconsumer recycled content not less than 25 percent.
B. Cold-Rolled Steel Sheet: ASTM A 1008/A 1008M, Commercial Steel (CS), Type B; suitable for exposed applications.
C. Hot-Rolled Steel Sheet: ASTM A 1011/A 1011M, Commercial Steel (CS), Type B; free of scale, pitting, or surface defects; pickled and oiled.
D. Metallic-Coated Steel Sheet: ASTM A 653/A 653M, Commercial Steel (CS), Type B.
E. Frame Anchors: ASTM A 879/A 879M, Commercial Steel (CS), 04Z coating designation; mill phosphatized.

    1. For anchors built into exterior walls, steel sheet complying with ASTM A 1008/A 1008M or ASTM A 1011/A 1011M, hot-dip galvanized according to ASTM A 153/A 153M, Class B.

F. Inserts, Bolts, and Fasteners: Hot-dip galvanized according to ASTM A 153/A 153M.
G. Power-Actuated Fasteners in Concrete: Fastener system of type suitable for application indicated, fabricated from corrosion-resistant materials, with clips or other accessory devices for attaching hollow-metal frames of type indicated.
H. Grout: ASTM C 476, except with a maximum slump of 4 inches , as measured according to ASTM C 143/C 143M.
I. Mineral-Fiber Insulation: ASTM C 665, Type I (blankets without membrane facing); consisting of fibers manufactured from slag or rock wool; with maximum flame-spread and smoke-developed indexes of 25 and 50, respectively; passing ASTM E 136 for combustion characteristics.
J. Glazing: Comply with requirements in Section 088000 "Glazing."
K. Bituminous Coating: Cold-applied asphalt mastic, compounded for 15-mil dry film thickness per coat. Provide inert-type noncorrosive compound free of asbestos fibers, sulfur components, and other deleterious impurities.

2.10 FABRICATION

A. Fabricate hollow-metal work to be rigid and free of defects, warp, or buckle. Accurately form metal to required sizes and profiles, with minimum radius for metal thickness. Where practical, fit and assemble units in manufacturer's plant. To ensure proper assembly at Project site, clearly identify work that cannot be permanently factory assembled before shipment.
B. Hollow-Metal Doors:

    1. Steel-Stiffened Door Cores: Provide minimum thickness 0.026 inch , steel vertical stiffeners of same material as face sheets extending full-door height, with vertical webs spaced not more than 6 inches apart. Spot weld to face sheets no more than 5 inches o.c. Fill spaces between stiffeners with insulation.
    2. Metal Door Leaves for Acoustic Doors: For hollow doors requiring acoustic gasket hardware, the door leaf shall be insulated hollow metal, 1-3/4" thick flush construction with minimum door leaf weight (not including hardware) of 5 lb/ft^2. Steel door leaf shall be constructed from welded minimum 16 gauge cold rolled steel seamless sheets with a polyisocyanurate or extruded polystyrene core.
    3. Fire Door Cores: As required to provide fire-protection and temperature-rise ratings indicated.
    4. Vertical Edges for Single-Acting Doors: Bevel edges 1/8 inch in 2 inches.
    5. Top Edge Closures: Close top edges of doors with flush closures of same material as face sheets.
    6. Bottom Edge Closures: Close bottom edges of doors with end closures or channels of same material as face sheets.
    7. Astragals: Provide overlapping astragal on one leaf of pairs of doors where required by NFPA 80 for fire-performance rating or where indicated. Extend minimum 3/4 inch

beyond edge of door on which astragal is mounted or as required to comply with published listing of qualified testing agency.

C. Hollow-Metal Frames: Where frames are fabricated in sections due to shipping or handling limitations, provide alignment plates or angles at each joint, fabricated of same thickness metal as frames.

1. Sidelight and Transom Bar Frames: Provide closed tubular members with no visible face seams or joints, fabricated from same material as door frame. Fasten members at crossings and to jambs by butt welding.
2. Provide countersunk, flat- or oval-head exposed screws and bolts for exposed fasteners unless otherwise indicated.
3. Grout Guards: Weld guards to frame at back of hardware mortises in frames to be grouted.
4. Frames for Gasketed Doors: Frames shall be continuously grout-filled when applied to masonry or concrete partition openings, or packed tightly with fire safing insulation and caulked with acoustical sealant around the perimeter of both sides of the frame when applied to stud partition openings.
5. Floor Anchors: Weld anchors to bottoms of jambs with at least four spot welds per anchor; however, for slip-on drywall frames, provide anchor clips or countersunk holes at bottoms of jambs.
6. Jamb Anchors: Provide number and spacing of anchors as follows:

    a. Masonry Type: Locate anchors not more than 16 inches from top and bottom of frame. Space anchors not more than 32 inches o.c., to match coursing, and as follows:

        1) Two anchors per jamb up to 60 inches high.
        2) Three anchors per jamb from 60 to 90 inches high.
        3) Four anchors per jamb from 90 to 120 inches high.
        4) Four anchors per jamb plus one additional anchor per jamb for each 24 inches or fraction thereof above 120 inches high.

    b. Stud-Wall Type: Locate anchors not more than 18 inches from top and bottom of frame. Space anchors not more than 32 inches o.c. and as follows:

        1) Three anchors per jamb up to 60 inches high.
        2) Four anchors per jamb from 60 to 90 inches high.
        3) Five anchors per jamb from 90 to 96 inches high.
        4) Five anchors per jamb plus one additional anchor per jamb for each 24 inches or fraction thereof above 96 inches high.

    c. Postinstalled Expansion Type: Locate anchors not more than 6 inches from top and bottom of frame. Space anchors not more than 26 inches o.c.

7. Door Silencers: Except on weather-stripped frames, drill stops to receive door silencers as follows. Keep holes clear during construction.

    a. Single-Door Frames: Drill stop in strike jamb to receive three door silencers.
    b. Double-Door Frames: Drill stop in head jamb to receive two door silencers.

D. Fabricate concealed stiffeners and edge channels from either cold- or hot-rolled steel sheet.
E. Hardware Preparation: Factory prepare hollow-metal work to receive templated mortised hardware; include cutouts, reinforcement, mortising, drilling, and tapping according to SDI A250.6, the Door Hardware Schedule, and templates.

1. Reinforce doors and frames to receive nontemplated, mortised, and surface-mounted door hardware.

2. Comply with applicable requirements in SDI A250.6 and BHMA A156.115 for preparation of hollow-metal work for hardware.

F. Stops and Moldings: Provide stops and moldings around glazed lites and louvers where indicated. Form corners of stops and moldings with mitered hairline joints.

1. Single Glazed Lites: Provide fixed stops and moldings welded on secure side of hollow-metal work.
2. Multiple Glazed Lites: Provide fixed and removable stops and moldings so that each glazed lite is capable of being removed independently.
3. Vision Panels on Acoustically Gasketed Doors: Vision panels for acoustically gasketed doors shall comprise two panes of glazing, with frames and seals that will not degrade the acoustical performance. Glazing shall consist of one 1/4” thick lite and one 3/8” thick lite with a minimum 1/2” air space.
4. Provide fixed frame moldings on outside of exterior and on secure side of interior doors and frames.
5. Provide loose stops and moldings on inside of hollow-metal work.
6. Coordinate rabbet width between fixed and removable stops with glazing and installation types indicated.

2.11 STEEL FINISHES

A. Prime Finish: Clean, pretreat, and apply manufacturer's standard primer.

1. Shop Primer: Manufacturer's standard, fast-curing, lead- and chromate-free primer complying with SDI A250.10; recommended by primer manufacturer for substrate; compatible with substrate and field-applied coatings despite prolonged exposure.

2.12 ACCESSORIES

A. Louvers: Provide louvers for interior doors, where indicated, which comply with SDI 111C, with blades or baffles formed of 0.020-inch- thick, cold-rolled steel sheet set into 0.032-inch- thick steel frame.

1. Lightproof Louver: Stationary louvers constructed with baffles to prevent light from passing from one side to the other.

B. Mullions and Transom Bars: Join to adjacent members by welding or rigid mechanical anchors.
C. Grout Guards: Formed from same material as frames, not less than 0.016 inch thick.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
B. Examine roughing-in for embedded and built-in anchors to verify actual locations before frame installation.
C. Prepare written report, endorsed by Installer, listing conditions detrimental to performance of the Work.
D. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Remove welded-in shipping spreaders installed at factory. Restore exposed finish by grinding, filling, and dressing, as required to make repaired area smooth, flush, and invisible on exposed faces.
B. Drill and tap doors and frames to receive nontemplated, mortised, and surface-mounted door hardware.

3.3 INSTALLATION

A. General: Install hollow-metal work plumb, rigid, properly aligned, and securely fastened in place. Comply with Drawings and manufacturer's written instructions.
B. Hollow-Metal Frames: Install hollow-metal frames of size and profile indicated. Comply with SDI A250.11 or NAAMM-HMMA 840 as required by standards specified.
    1. Set frames accurately in position; plumbed, aligned, and braced securely until permanent anchors are set. After wall construction is complete, remove temporary braces, leaving surfaces smooth and undamaged.
        a. At fire-rated openings, install frames according to NFPA 80.
        b. Where frames are fabricated in sections because of shipping or handling limitations, field splice at approved locations by welding face joint continuously; grind, fill, dress, and make splice smooth, flush, and invisible on exposed faces.
        c. Install frames with removable stops located on secure side of opening.
        d. Install door silencers in frames before grouting.
        e. Remove temporary braces necessary for installation only after frames have been properly set and secured.
        f. Check plumb, square, and twist of frames as walls are constructed. Shim as necessary to comply with installation tolerances.
        g. Field apply bituminous coating to backs of frames that will be filled with grout.
    2. Floor Anchors: Provide floor anchors for each jamb and mullion that extends to floor, and secure with postinstalled expansion anchors.
        a. Floor anchors may be set with power-actuated fasteners instead of postinstalled expansion anchors if so indicated and approved on Shop Drawings.
    3. Metal-Stud Partitions: Solidly pack mineral-fiber insulation inside frames.
    4. Masonry Walls: Coordinate installation of frames to allow for solidly filling space between frames and masonry with grout.
    5. Concrete Walls: Solidly fill space between frames and concrete with mineral-fiber insulation.
    6. In-Place Concrete or Masonry Construction: Secure frames in place with postinstalled expansion anchors. Countersink anchors, and fill and make smooth, flush, and invisible on exposed faces.
    7. Installation Tolerances: Adjust hollow-metal door frames for squareness, alignment, twist, and plumb to the following tolerances:
        a. Squareness: Plus or minus 1/16 inch , measured at door rabbet on a line 90 degrees from jamb perpendicular to frame head.
        b. Alignment: Plus or minus 1/16 inch , measured at jambs on a horizontal line parallel to plane of wall.
        c. Twist: Plus or minus 1/16 inch , measured at opposite face corners of jambs on parallel lines, and perpendicular to plane of wall.
        d. Plumbness: Plus or minus 1/16 inch , measured at jambs at floor.
C. Hollow-Metal Doors: Fit hollow-metal doors accurately in frames, within clearances specified below. Shim as necessary.
    1. Non-Fire-Rated Steel Doors:

a. Between Door and Frame Jambs and Head: 1/8 inch plus or minus 1/32 inch .
b. Between Edges of Pairs of Doors: 1/8 inch to 1/4 inch plus or minus 1/32 inch .
c. At Bottom of Door: 5/8 inch plus or minus 1/32 inch .
d. Between Door Face and Stop: 1/16 inch to 1/8 inch plus or minus 1/32 inch .

2. Fire-Rated Doors: Install doors with clearances according to NFPA 80.
3. Smoke-Control Doors: Install doors and gaskets according to NFPA 105.

D. Glazing: Comply with installation requirements in Section 088000 "Glazing" and with hollow-metal manufacturer's written instructions.

1. Secure stops with countersunk flat- or oval-head machine screws spaced uniformly not more than 9 inches o.c. and not more than 2 inches o.c. from each corner.

3.4 ADJUSTING AND CLEANING

A. Final Adjustments: Check and readjust operating hardware items immediately before final inspection. Leave work in complete and proper operating condition. Remove and replace defective work, including hollow-metal work that is warped, bowed, or otherwise unacceptable.
B. Remove grout and other bonding material from hollow-metal work immediately after installation.
C. Prime-Coat Touchup: Immediately after erection, sand smooth rusted or damaged areas of prime coat and apply touchup of compatible air-drying, rust-inhibitive primer.
D. Metallic-Coated Surface Touchup: Clean abraded areas and repair with galvanizing repair paint according to manufacturer's written instructions.

END OF SECTION 081113

SECTION 081416 - FLUSH WOOD DOORS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

1. Solid-core doors and transom and or side panels with wood-veneer faces.
2. Factory finishing flush wood doors.
3. Factory fitting flush wood doors to frames and factory machining for hardware.
4. Division 06 Section "Interior Architectural Woodwork" for requirements for veneers from the same flitches for both flush wood doors and wood paneling.
5. Division 08 Section "Glazing" for glass view panels in flush wood doors.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of door indicated. Include details of core and edge construction, louvers, and trim for openings. Include factory-finishing specifications.

B. Shop Drawings: Indicate location, size, and hand of each door; elevation of each kind of door; construction details not covered in Product Data; location and extent of hardware blocking; and other pertinent data.

1. Indicate dimensions and locations of mortises and holes for hardware.
2. Indicate dimensions and locations of cutouts.
3. Indicate requirements for veneer matching.
4. Indicate doors to be factory finished and finish requirements.
5. Indicate fire-protection ratings for fire-rated doors.

C. Samples for Initial Selection: For factory-finished doors.

D. Samples for Verification:

1. Factory finishes applied to actual door face materials, approximately 8 by 10 inches, for each material and finish. For each wood species and transparent finish, provide set of three samples showing typical range of color and grain to be expected in the finished work.
2. Corner sections of doors, approximately 8 by 10 inches, with door faces and edges representing actual materials to be used.
    a. Provide samples for each species of veneer and solid lumber required.
    b. Provide samples for each color, texture, and pattern of plastic laminate required.
    c. Finish veneer-faced door samples with same materials proposed for factory-finished doors.

1.4 INFORMATIONAL SUBMITTALS

A. Warranty: Sample of special warranty specified.

1.5 QUALITY ASSURANCE

A. Manufacturer Qualifications: A qualified manufacturer that is certified for chain of custody by an FSC-accredited certification body.

B. Source Limitations: Obtain flush wood doors from single manufacturer.

C. Quality Standard: In addition to requirements specified, comply with AWI's "Architectural Woodwork Quality Standards Illustrated." or WDMA I.S.1-A, "Architectural Wood Flush Doors."

1. Provide AWI Quality Certification Labels or an AWI letter of licensing for Project indicating that doors comply with requirements of grades specified.
2. Provide WI-Certified Compliance Certificate indicating that doors comply with requirements of grades specified.
3. Provide WI-Certified Compliance Certificate for installation.

D. Fire-Rated Wood Doors: Doors complying with NFPA 80 that are listed and labeled by a qualified testing agency, for fire-protection ratings indicated, based on testing at positive pressure according to NFPA 252 or UL 10C.

1. Temperature-Rise Limit: At vertical exit enclosures and exit passageways, provide doors that have a maximum transmitted temperature end point of not more than 450 deg F above ambient after 30 minutes of standard fire-test exposure.

E. Preinstallation Conference: Conduct conference at Project site.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Comply with requirements of referenced standard and manufacturer's written instructions.

B. Package doors individually in plastic bags or cardboard cartons.

C. Mark each door on bottom rail with opening number used on Shop Drawings.

1.7 PROJECT CONDITIONS

A. Environmental Limitations: Do not deliver or install doors until spaces are enclosed and weathertight, wet work in spaces is complete and dry, and HVAC system is operating and maintaining ambient temperature and humidity conditions at occupancy levels during the remainder of the construction period.

1.8 WARRANTY

A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace doors that fail in materials or workmanship within specified warranty period.

1. Failures include, but are not limited to, the following:

a. Warping (bow, cup, or twist) more than 1/4 inch in a 42-by-84-inch section.
b. Telegraphing of core construction in face veneers exceeding 0.01 inch in a 3-inch span.

2. Warranty shall also include installation and finishing that may be required due to repair or replacement of defective doors.
3. Warranty Period for Solid-Core Interior Doors: Life of installation.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

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

1. Algoma Hardwoods, Inc. (Basis of Design)
2. Ampco, Inc.
3. Buell Door Company Inc.
4. Chappell Door Co.
5. Eagle Plywood & Door Manufacturing, Inc.
6. Eggers Industries.
7. Graham; an Assa Abloy Group company.
8. Ideal Architectural Doors & Plywood.
9. Marshfield Door Systems, Inc.
10. Mohawk Flush Doors, Inc.; a Masonite company.
11. Oshkosh Architectural Door Company.

2.2 DOOR CONSTRUCTION, GENERAL

A. Low-Emitting Materials: Provide doors made with adhesives and composite wood products that do not contain urea formaldehyde.
B. Particleboard-Core Doors:

1. Particleboard: ANSI A208.1, Grade LD-2.
2. Particleboard: Straw-based particleboard complying with ANSI A208.1, Grade LD-2 or M-2, except for density.
3. Blocking: Provide wood blocking in particleboard-core doors as needed to eliminate through-bolting hardware.
4. Provide doors with either glued-wood-stave or structural-composite-lumber cores instead of particleboard cores for doors indicated to receive exit devices.

C. Structural-Composite-Lumber-Core Doors:

1. Structural Composite Lumber: WDMA I.S.10.

a. Screw Withdrawal, Face: 700 lbf .
b. Screw Withdrawal, Edge: 400 lbf .

D. Fire-Protection-Rated Doors: Provide core specified or mineral core as needed to provide fire-protection rating indicated.

1. Edge Construction: Provide edge construction with intumescent seals concealed by outer stile. Comply with specified requirements for exposed edges.
2. Pairs: Provide fire-retardant stiles that are listed and labeled for applications indicated without formed-steel edges and astragals. Comply with specified requirements for exposed edges.
3. Pairs: Provide formed-steel edges and astragals.

a. Finish steel edges and astragals with baked enamel.

E. Mineral-Core Doors:

1. Core: Noncombustible mineral product complying with requirements of referenced quality standard and testing and inspecting agency for fire-protection rating indicated.
2. Blocking: Provide composite blocking with improved screw-holding capability approved for use in doors of fire-protection ratings indicated as needed to eliminate through-bolting hardware.
3. Edge Construction: At hinge stiles, provide laminated-edge construction with improved screw-holding capability and split resistance. Comply with specified requirements for exposed edges.

2.3 VENEERED-FACED DOORS FOR TRANSPARENT FINISH

A. Interior Solid-Core Doors:

1. Grade: Premium, with Grade A faces.
2. Species: Natural birch.
3. Cut: Rotary cut.
4. Match between Veneer Leaves: Book match.
5. Assembly of Veneer Leaves on Door Faces: Balance match.
6. Pair and Set Match: Provide for doors hung in same opening or separated only by mullions.
7. Transom Match: Continuous match.
8. Blueprint Match: Where indicated, provide doors with faces produced from same flitches as adjacent wood paneling and arranged to provide blueprint match with wood paneling. Comply with requirements in Division 06 Section "Interior Architectural Woodwork."
9. Exposed Vertical and Top Edges: Same species as faces.
10. Core: Particleboard, glued wood stave or structural composite lumber. Mineral or wood core at fire rated doors
11. Construction: Five plies. Stiles and rails are bonded to core, then entire unit abrasive planed before veneering. Faces are bonded to core using a hot press.

2.4 LOUVERS AND LIGHT FRAMES

A. Metal Louvers:

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

    a. Air Louvers Inc.
    b. Anemostat; a Mestek company.
    c. Hiawatha Incorporated.
    d. L & L Louvers, Inc.
    e. LL Building Products, Inc.; a division of GAF Materials Corporation.
    f. Louvers & Dampers, Inc.; a Mestek company.
    g. McGill Architectural Products.

2. Blade Type: Vision-proof, inverted Y.
3. Metal and Finish: Hot-dip galvanized steel, 0.040 inch thick, with powder coated finish.

B. Louvers for Fire-Rated Doors: Metal louvers with fusible link and closing device, listed and labeled for use in doors with fire-protection rating of 1-1/2 hours and less.

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

    a. Air Louvers Inc.
    b. Anemostat; a Mestek company.
    c. Hiawatha Incorporated.
    d. L & L Louvers, Inc.
    e. LL Building Products, Inc.; a division of GAF Materials Corporation.

f. Louvers & Dampers, Inc.; a Mestek company.
g. McGill Architectural Products.

2. Metal and Finish: Hot-dip galvanized steel, 0.040 inch thick, with powder-coated finish.

C. Metal Frames for Light Openings: Manufacturer's standard frame formed of 0.048-inch- thick, cold-rolled steel sheet; with powder-coated finish; and approved for use in doors of fire-protection rating indicated.

D. Vision Panels on Acoustically Gasketed Doors:

1. Vision panels for acoustically gasketed doors shall comprise two panes of glazing, with frames and seals that will not degrade the acoustical performance. Glazing shall consist of one 1/4” thick lite and one 3/8” thick lite with a minimum 1/2” air space.

2.5 AUTOMATIC DOOR BOTTOM

A. Mounting: Surface-mounted.

B. Seal:

1. Actuated by an adjustable operating rod that seals automatically when the door contacts the hinge jamb seal retainer. The door bottom mechanism must drop first at the hinge edge of the door and then continue to drop towards the lock edge of door as the door continues to swing shut. The seal must be self-centering to a flat-plate threshold to provide a proper seal across the entire door width if the floor surface is not entirely even. Automatic door bottom mechanism shall have only one moving part and shall not utilize any plastic parts, lever mechanism or actuation at both the lock edge and hinge edge of door.
2. Gasket material to be a solid extruded high grade neoprene bulb. Door bottom is to utilize neoprene seals inside the mechanism to prevent sound from “flanking” through mechanism.
3. Housing: Extruded aluminum, minimum wall thickness of .093”.

C. The following products are acceptable:

1. #367 (surface mounted) from Zero International, Inc., Bronx, NY, 800-635-5335
2. Products manufactured by Reese Enterprises, Inc., or National Guard Products that meet the above requirements may be submitted for approval.

2.6 HEAD & JAMB ADJUSTABLE SEAL

A. Adjustable door stop constructed of extruded aluminum housing of thickness 0.093 inches. Adjusting screws shall be provided 12 inch O.C., giving an adjusting range of 0.310. Adjusting screws shall be #8 x1 1/2” stainless steel, shall have a special shoulder for retaining clip, and shall be held in the assembly by a retainer clip. Adjusting screw must engage a solid adjusting channel which has been drilled and tapped to provide a complete circumference engagement for screw thread. No spring retainers, self tapping adjusting screws, or channels which do not contain a drilled and tapped hole for the adjusting screw will be allowed.

B. The housing dimensions shall be 1-1/2” deep and 15/16” wide. The seals are constructed of tubular, solid neoprene. Install with neoprene touching door and compressed 1/32”. Solid neoprene to be used inside the housing to prevent sound from “flanking” through the mechanism. The assembly must have a weight of at least 0.825 lbs/ft in order to ensure durability. Note: Fire rated gaskets usually require mounting to the stop of the door jamb. Because the gasket dimension adds to the stop dimension, a lever handle should be used. If using knob locks, a 3-1/4” backset lock should be supplied.

C. The following are acceptable:

1. #770 from Zero International, Inc., Bronx, NY 800-635-5335
2. Products manufactured by Reese Enterprises, Inc., or National Guard Products which meet the above requirements may be submitted for approval.

2.7 MEETING STILES

A. Meeting stile for double leaf doors are an adjustable and spring loaded mortised astragal type (surface applied for fire rated doors) with a neoprene seal at the door intersection. The seals should be continuous with no interference from door hardware such as closers, exit devices, etc. Install seals so they are compressed against each other by 1/16".

B. The following are acceptable:

1. #555/ #55 from Zero International, Inc., Bronx, NY 800-635-5335
2. Products manufactured by Reese Enterprises, Inc., or National Guard Products which meet the above requirements may be submitted for approval.

2.8 RABBETED SADDLE

A. Rabbeted type saddle on floor constructed of aluminum with built-in tadpole-type neoprene seal. Length not to exceed 3-3/4" with a minimum one inch flat horizontal portion. Total clearance above finish floor shall not exceed 1/2" in order to make the saddle compatible with handicap accessibility requirements.

B. The following are acceptable:

1. #564 (fire rated) from Zero International, Inc., Bronx, NY , 800-635-5335
2. #S248N (fire rated) from Reese Enterprises Inc, Rosemount, MN, 800-328-0953
3. #8135NS from National Guard Products, Memphis, TN 800-647-7874
4. or approved equal.

2.9 FABRICATION

A. Factory fit doors to suit frame-opening sizes indicated. Comply with clearance requirements of referenced quality standard for fitting unless otherwise indicated.

1. Comply with requirements in NFPA 80 for fire-rated doors.

B. Factory machine doors for hardware that is not surface applied. Locate hardware to comply with DHI-WDHS-3. Comply with final hardware schedules, door frame Shop Drawings, DHI A115-W series standards, and hardware templates.

1. Coordinate with hardware mortises in metal frames to verify dimensions and alignment before factory machining.
2. Metal Astragals: Factory machine astragals and formed-steel edges for hardware for pairs of fire-rated doors.

C. Transom and Side Panels: Fabricate matching panels with same construction, exposed surfaces, and finish as specified for associated doors. Finish bottom edges of transoms and top edges of rabbeted doors same as door stiles.

1. Fabricate door and transom panels with full-width, solid-lumber meeting rails. Provide factory-installed spring bolts for concealed attachment into jambs of metal door frames.

D. Openings: Cut and trim openings through doors in factory.

1. Light Openings: Trim openings with moldings of material and profile indicated.
2. Louvers: Factory install louvers in prepared openings.

2.10 FACTORY FINISHING

A. General: Comply with referenced quality standard for factory finishing. Complete fabrication, including fitting doors for openings and machining for hardware that is not surface applied, before finishing.

1. Finish faces, all four edges, edges of cutouts, and mortises.

B. Finish doors at factory.
C. Transparent Finish:

1. Grade: Premium.
2. Finish: AWI catalyzed polyurethane system.
3. Staining: As selected by Architect from manufacturer's full range.
4. Effect: Filled finish.
5. Sheen: Satin.
6. Color: RA-1052 (Algoma)

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine doors and installed door frames before hanging doors.

1. Verify that frames comply with indicated requirements for type, size, location, and swing characteristics and have been installed with level heads and plumb jambs.
2. Reject doors with defects.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. Hardware: For installation, see Division 08 Section "Door Hardware."
B. Installation Instructions: Install doors to comply with manufacturer's written instructions and the referenced quality standard, and as indicated.

1. Install fire-rated doors in corresponding fire-rated frames according to NFPA 80.

C. Factory-Fitted Doors: Align in frames for uniform clearance at each edge.
D. Factory-Finished Doors: Restore finish before installation if fitting or machining is required at Project site.

3.3 ADJUSTING

A. Operation: Rehang or replace doors that do not swing or operate freely.
B. Finished Doors: Replace doors that are damaged or that do not comply with requirements. Doors may be repaired or refinished if work complies with requirements and shows no evidence of repair or refinishing.

END OF SECTION 081416

SECTION 083113 - ACCESS DOORS AND FRAMES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes the following:

1. Access doors and frames for walls and ceilings.

B. Related Sections include the following:

1. Division 07 Section "Insulated Core Metal Panels" for cutting, priming, and anchoring access door frames set in metal panel construction.
2. Division 07 Section "Roof Accessories" for roof hatches.
3. Division 08 Section "Door Hardware" for mortise or rim cylinder locks and master keying.
4. Division 09 Section "Acoustical Tile Ceilings" for suspended acoustical tile ceilings.
5. Division 23 Section "Air Duct Accessories" for heating and air-conditioning duct access doors.

1.3 SUBMITTALS

A. Product Data: For each type of access door and frame indicated. Include construction details, fire ratings, materials, individual components and profiles, and finishes.

B. Shop Drawings: Show fabrication and installation details of access doors and frames for each type of substrate. Include plans, elevations, sections, details, and attachments to other work.

C. Samples: For each door face material, at least 3 by 5 inches in size, in specified finish.

D. Access Door and Frame Schedule: Provide complete access door and frame schedule, including types, locations, sizes, latching or locking provisions, and other data pertinent to installation.

E. Ceiling Coordination Drawings: Reflected ceiling plans, drawn to scale, on which ceiling-mounted items including access doors and frames, lighting fixtures, diffusers, grilles, speakers, sprinklers, and special trim are shown and coordinated with each other.

1.4 QUALITY ASSURANCE

A. Source Limitations: Obtain each type of access door(s) and frame(s) through one source from a single manufacturer.

B. Fire-Rated Access Doors and Frames: Units complying with NFPA 80 that are identical to access door and frame assemblies tested for fire-test-response characteristics per the following

test method and that are listed and labeled by UL or another testing and inspecting agency acceptable to authorities having jurisdiction:

1. NFPA 252 or UL 10B for vertical access doors and frames.
2. ASTM E 119 or UL 263 for horizontal access doors and frames.

C. Size Variations: Obtain Architect's acceptance of manufacturer's standard-size units, which may vary slightly from sizes indicated.

1.5 COORDINATION

A. Verification: Determine specific locations and sizes for access doors needed to gain access to concealed plumbing, mechanical, or other concealed work, and indicate in the schedule specified in "Submittals" Article.

PART 2 - PRODUCTS

2.1 STAINLESS-STEEL MATERIALS

A. Stainless-Steel Sheet, Strip, Plate, and Flat Bars: ASTM A 666, Type 316. Remove tool and die marks and stretch lines or blend into finish.

1. Finish: Directional Satin Finish, No. 4.

2.2 ACCESS DOORS AND FRAMES FOR WALLS AND CEILINGS

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

1. Acudor Products, Inc.
2. Babcock-Davis; A Cierra Products Co.
3. Bar-Co, Inc. Div.; Alfab, Inc.
4. Cendrex Inc.
5. Dur-Red Products.
6. Elmdor/Stoneman; Div. of Acorn Engineering Co.
7. Jensen Industries.
8. J. L. Industries, Inc.
9. Karp Associates, Inc.
10. Larsen's Manufacturing Company.
11. MIFAB, Inc.
12. Milcor Inc.
13. Nystrom, Inc.
14. Williams Bros. Corporation of America (The).

B. Flush Access Doors and Frames with Exposed Trim: Fabricated from stainless-steel sheet.

1. Locations: Wall and ceiling surfaces.
2. Door: Minimum 0.060-inch- thick sheet metal, set flush with exposed face flange of frame.
3. Frame: Minimum 0.060-inch- thick sheet metal with 1-inch- wide, surface-mounted trim.
4. Hinges: Continuous piano.
5. Lock: Cylinder (provided by panel manufacturer).

C. Fire-Rated, Insulated, Flush Access Doors and Frames with Exposed Trim: Fabricated from stainless-steel sheet.

1. Locations: Wall and ceiling surfaces.
2. Fire-Resistance Rating: Not less than that of adjacent construction.
3. Temperature Rise Rating: 250 deg F at the end of 30 minutes.
4. Door: Flush panel with a core of mineral-fiber insulation enclosed in sheet metal with a minimum thickness of 0.036 inch.
5. Frame: Minimum 0.060-inch- thick sheet metal with 1-inch- wide, surface-mounted trim.
6. Hinges: Continuous piano.
7. Automatic Closer: Spring type.
8. Lock: Self-latching device with cylinder lock (provided by panel manufacturer).

2.3 FABRICATION

A. General: Provide access door and frame assemblies manufactured as integral units ready for installation.

B. Metal Surfaces: For metal surfaces exposed to view in the completed Work, provide materials with smooth, flat surfaces without blemishes. Do not use materials with exposed pitting, seam marks, roller marks, rolled trade names, or roughness.

C. Doors and Frames: Grind exposed welds smooth and flush with adjacent surfaces. Furnish attachment devices and fasteners of type required to secure access panels to types of supports indicated.

1. Exposed Flanges: Nominal 1 to 1-1/2 inches wide around perimeter of frame.
2. Provide mounting holes in frames for attachment of units to metal framing.
3. Provide mounting holes in frame for attachment of masonry anchors. Furnish adjustable metal masonry anchors.

D. Latching Mechanisms: Furnish number required to hold doors in flush, smooth plane when closed.

1. For cylinder lock, furnish two keys per lock and key all locks alike.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Comply with manufacturer's written instructions for installing access doors and frames.
B. Set frames accurately in position and attach securely to supports with plane of face panels aligned with adjacent finish surfaces.
C. Install doors flush with adjacent finish surfaces or recessed to receive finish material.

3.2 ADJUSTING AND CLEANING

A. Adjust doors and hardware after installation for proper operation.
B. Remove and replace doors and frames that are warped, bowed, or otherwise damaged.

END OF SECTION 083113

SECTION 084117 – INTERIOR ALUMINUM-FRAMED ENTRANCES AND STOREFRONTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

1. Interior storefront framing for window walls.
2. Interior storefront framing for butt-glazed window walls
3. Interior storefront framing for punched openings.
4. Interior manual-swing door-frame units.

B. Related Sections:

1. Section 084417 "Exterior Aluminum Framed Entrances and Storefronts" for exterior storefront systems.
2. Division 07 Section "Insulated Core Metal Panels" for cutting, priming, and anchoring access door frames set in metal panel construction.
3. Division 08 Section "Door Hardware" for mortise or rim cylinder locks and master keying.

1.3 DEFINITIONS

A. ADA/ABA Accessibility Guidelines: U.S. Architectural & Transportation Barriers Compliance Board's "Americans with Disability Act (ADA) and Architectural Barriers Act (ABA) Accessibility Guidelines for Buildings and Facilities."

1.4 PERFORMANCE REQUIREMENTS

A. General Performance: Aluminum-framed systems shall withstand the effects of the following performance requirements without exceeding performance criteria or failure due to defective manufacture, fabrication, installation, or other defects in construction:

1. Movements of supporting structure indicated on Drawings including, but not limited to, story drift and deflection from uniformly distributed and concentrated live loads.
2. Dimensional tolerances of building frame and other adjacent construction.
3. Failure includes the following:

a. Deflection exceeding specified limits.
b. Thermal stresses transferring to building structure.
c. Framing members transferring stresses, including those caused by thermal and structural movements to glazing.
d. Glazing-to-glazing contact.
e. Noise or vibration created by wind and by thermal and structural movements.
f. Loosening or weakening of fasteners, attachments, and other components.
g. Sealant failure.

h. Failure of operating units.

B. Delegated Design: Design aluminum-framed systems, including comprehensive engineering analysis by a qualified professional engineer, using performance requirements and design criteria indicated.

C. Structural Loads:

1. As indicated by Chapter 16 of Florida Building Code.

D. Deflection of Framing Members:

1. Deflection Normal to Wall Plane: Limited to edge of glass in a direction perpendicular to glass plane shall not exceed L/175 of the glass edge length for each individual glazing lite or an amount that restricts edge deflection of individual glazing lites to 3/4 inch , whichever is less.
2. Deflection Parallel to Glazing Plane: Limited to L/360 of clear span or 1/8 inch , whichever is smaller.

E. Structural-Test Performance: Provide aluminum-framed systems tested according to ASTM E 330 as follows:

1. When tested at positive and negative wind-load design pressures, systems do not evidence deflection exceeding specified limits.
2. When tested at 150 percent of positive and negative wind-load design pressures, systems, including anchorage, do not evidence material failures, structural distress, and permanent deformation of main framing members exceeding 0.2 percent of span.
3. Test Durations: As required by design wind velocity, but not fewer than 10 seconds.

F. Air Infiltration: Provide aluminum-framed systems with maximum air leakage through fixed glazing and framing areas of 0.06 cfm/sq. ft. of fixed wall area when tested according to ASTM E 283 at a minimum static-air-pressure difference of 1.57 lbf/sq. ft..

G. Sound Transmission: Provide aluminum-framed systems with fixed glazing and framing areas having the following sound-transmission characteristics:

1. Sound Transmission Class (STC): Minimum 35 STC when tested for laboratory sound transmission loss according to ASTM E 90 and determined by ASTM E 413.

H. Structural Sealant: Capable of withstanding tensile and shear stresses imposed by aluminum-framed systems without failing adhesively or cohesively. When tested for preconstruction adhesion and compatibility, cohesive failure of sealant shall occur before adhesive failure.

1. Adhesive failure occurs when sealant pulls away from substrate cleanly, leaving no sealant material behind.
2. Cohesive failure occurs when sealant breaks or tears within itself but does not separate from each substrate because sealant-to-substrate bond strength exceeds sealant's internal strength.

I. Structural-Sealant Joints: Designed to produce tensile or shear stress of less than 20 psi .

1.5 ACTION SUBMITTALS

A. Product Data: For each type of product indicated. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for aluminum-framed systems.

B. Shop Drawings: For aluminum-framed systems. Include plans, elevations, sections, details, and attachments to other work.

1. Include details of provisions for system expansion and contraction and for drainage of moisture in the system to the exterior.

C. Samples for Verification: For each type of exposed finish required, in manufacturer's standard sizes.

D. Other Action Submittals:

1. Entrance Door Hardware Schedule: Prepared by or under the supervision of supplier, detailing fabrication and assembly of entrance door hardware, as well as procedures and diagrams. Coordinate final entrance door hardware schedule with doors, frames, and related work to ensure proper size, thickness, hand, function, and finish of entrance door hardware.

E. Delegated-Design Submittal: For aluminum-framed systems indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

1. Detail fabrication and assembly of aluminum-framed systems.
2. Include design calculations.

1.6 INFORMATIONAL SUBMITTALS

A. Qualification Data: For qualified Installer.
B. Welding certificates.
C. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, for aluminum-framed systems, indicating compliance with performance requirements.
D. Source quality-control reports.
E. Quality-Control Program for Structural-Sealant-Glazed System: Include reports.
F. Warranties: Sample of special warranties.

1.7 CLOSEOUT SUBMITTALS

A. Maintenance Data: For aluminum-framed systems to include in maintenance manuals.

1.8 QUALITY ASSURANCE

A. Installer Qualifications: Manufacturer's authorized representative who is trained and approved for installation of units required for this Project.

B. Engineering Responsibility: Prepare data for aluminum-framed systems, including Shop Drawings, based on testing and engineering analysis of manufacturer's standard units in systems similar to those indicated for this Project.

C. Product Options: Information on Drawings and in Specifications establishes requirements for systems' aesthetic effects and performance characteristics. Aesthetic effects are indicated by dimensions, arrangements, alignment, and profiles of components and assemblies as they relate to sightlines, to one another, and to adjoining construction. Performance characteristics are indicated by criteria subject to verification by one or more methods including preconstruction testing, field testing, and in-service performance.

1. Do not revise intended aesthetic effects, as judged solely by Architect, except with Architect's approval. If revisions are proposed, submit comprehensive explanatory data to Architect for review.

D. Accessible Entrances: Comply with applicable provisions in the U.S. Architectural & Transportation Barriers Compliance Board's ADA-ABA Accessibility Guidelines and FBC/ANSI A117.1.

E. Source Limitations for Aluminum-Framed Systems: Obtain from single source from single manufacturer.

F. Welding Qualifications: Qualify procedures and personnel according to AWS D1.2, "Structural Welding Code - Aluminum."

G. Preinstallation Conference: Conduct conference at Project site.

1.9 PROJECT CONDITIONS

A. Field Measurements: Verify actual locations of structural supports for aluminum-framed systems by field measurements before fabrication and indicate measurements on Shop Drawings.

1.10 WARRANTY

A. Warranty: The Manufacturer and Installer agree to repair or replace components of interior aluminum-framed entrances and storefronts that do not comply with requirements or that fail in materials or workmanship within specified warranty period.

1. Failures include, but are not limited to, the following:

   a. Structural failures including, but not limited to, excessive deflection.
   b. Noise or vibration created by thermal and structural movements.
   c. Water penetration through fixed glazing and framing areas.
   d. Failure of components.

2. Warranty Period: Ten (10) years from date of Substantial Completion for interior aluminum framed entrances and storefronts.

B. Finish Warranty: Standard form in which manufacturer agrees to repair finishes or replace aluminum that shows evidence of deterioration of factory-applied finishes within specified warranty period.

1. Deterioration includes, but is not limited to, the following:

   a. Color fading more than 5 Hunter units when tested according to ASTM D 2244.
   b. Chalking in excess of a No. 8 rating when tested according to ASTM D 4214.

C. Warranty Period: Ten (10) years from date of Substantial Completion.

1.11 MAINTENANCE SERVICE

A. Entrance Door Hardware:

1. Maintenance Tools and Instructions: Furnish a complete set of specialized tools and maintenance instructions as needed for Owner's continued adjustment, maintenance, and removal and replacement of entrance door hardware.
2. Initial Maintenance Service: Beginning at Substantial Completion, provide 12 months' full maintenance by skilled employees of entrance door hardware Installer. Include quarterly preventive maintenance, repair or replacement of worn or defective components, lubrication, cleaning, and adjusting as required for proper entrance door hardware

operation at rated speed and capacity. Provide parts and supplies the same as those used in the manufacture and installation of original equipment.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

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

1. Arch Aluminum & Glass Co., Inc.
2. Kawneer North America; an Alcoa company.
3. Pittco Architectural Metals, Inc.
4. United States Aluminum.
5. Vistawall Architectural Products; The Vistawall Group; a Bluescope Steel company.
6. YKK AP America Inc.
7. Or Equal

2.2 MATERIALS

A. Aluminum: Alloy and temper recommended by manufacturer for type of use and finish indicated.

1. Sheet and Plate: ASTM B 209 .
2. Extruded Bars, Rods, Profiles, and Tubes: ASTM B 221 .
3. Extruded Structural Pipe and Tubes: ASTM B 429.
4. Structural Profiles: ASTM B 308/B 308M.
5. Welding Rods and Bare Electrodes: AWS A5.10/A5.10M.

B. Steel Reinforcement: Manufacturer's standard zinc-rich, corrosion-resistant primer, complying with SSPC-PS Guide No. 12.00; applied immediately after surface preparation and pretreatment. Select surface preparation methods according to recommendations in SSPC-SP COM and prepare surfaces according to applicable SSPC standard.

1. Structural Shapes, Plates, and Bars: ASTM A 36/A 36M.
2. Cold-Rolled Sheet and Strip: ASTM A 1008/A 1008M.
3. Hot-Rolled Sheet and Strip: ASTM A 1011/A 1011M.

2.3 FRAMING SYSTEMS

A. Framing Members: Manufacturer's standard extruded-aluminum framing members of thickness required and reinforced as required to support imposed loads.

1. Construction: Nonthermal.
2. Glazing System: Retained mechanically with gaskets on four sides and retained by structural sealant at vertical edges and mechanically with gaskets at horizontal edges.
3. Glazing Plane: Center.
4. Framing Member Sizes:

a. 4 1/2” x 1 3/4”

1) Interior storefront framing for window walls.
2) Interior storefront framing for punched openings.

3) Interior manual-swing door-frame units and units in window walls.

B. Brackets and Reinforcements: Manufacturer's standard high-strength aluminum with nonstaining, nonferrous shims for aligning system components.

C. Fasteners and Accessories: Manufacturer's standard corrosion-resistant, nonstaining, nonbleeding fasteners and accessories compatible with adjacent materials.

1. Use self-locking devices where fasteners are subject to loosening or turning out from thermal and structural movements, wind loads, or vibration.
2. Reinforce members as required to receive fastener threads.
3. Use exposed fasteners with countersunk Phillips screw heads fabricated from stainless steel.

D. Concrete and Masonry Inserts: Hot-dip galvanized cast-iron, malleable-iron, or steel inserts, complying with ASTM A 123/A 123M or ASTM A 153/A 153M.

E. Concealed Flashing: Dead-soft, 0.018-inch- thick stainless steel, ASTM A 240/A 240M of type recommended by manufacturer.

F. Framing System Gaskets and Sealants: Manufacturer's standard, recommended by manufacturer for joint type.

1. Sealants used inside the weatherproofing system shall have a VOC content of 250 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

2.4 GLAZING SYSTEMS

A. Glazing: As specified in Section 088000 "Glazing."

B. Glazing Gaskets: Manufacturer's standard compression types; replaceable, molded or extruded, of profile and hardness required to maintain watertight seal.

C. Spacers and Setting Blocks: Manufacturer's standard elastomeric type.

D. Bond-Breaker Tape: Manufacturer's standard TFE-fluorocarbon or polyethylene material to which sealants will not develop adhesion.

E. Glazing Sealants: For structural-sealant-glazed systems, as recommended by manufacturer for joint type, and as follows:

1. Weatherseal Sealant: ASTM C 920 for Type S, Grade NS, Class 25, Uses NT, G, A, and O; single-component neutral-curing formulation that is compatible with structural sealant and other system components with which it comes in contact; recommended by structural-sealant, weatherseal-sealant, and aluminum-framed-system manufacturers for this use.

a. Sealants used inside the weatherproofing system shall have a VOC content of 250 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
b. Color: Matching structural sealant.

2.5 ENTRANCE DOOR SYSTEMS

A. Entrance Doors: Manufacturer's standard glazed entrance doors for manual-swing operation.

1. Door Construction: 1-3/4-inch overall thickness, with minimum 0.125-inch- thick, extruded-aluminum tubular rail and stile members. Mechanically fasten corners with reinforcing brackets that are deeply penetrated and fillet welded or that incorporate concealed tie rods.
2. Door Design:
    a. Narrow stile; 2-inch nominal width when used with 4” storefront system.
    b. Medium stile; 3-1/2-inch nominal width when used with 4 1/2” storefront system.
3. Accessible Doors: Smooth surfaced for width of door in area within 10 inches above floor or ground plane at Medium stile doors.
4. Glazing Stops and Gaskets: Square, snap-on, extruded-aluminum stops and preformed gaskets.
    a. Provide nonremovable glazing stops on outside of door.

B. Entrance Door Hardware: Locking mechanism as hardware specified in Section 087100 "Door Hardware."

2.6 ACCESSORY MATERIALS

A. Joint Sealants: For installation at perimeter of aluminum-framed systems, as specified in Section 079200 "Joint Sealants."

1. Sealants used inside the weatherproofing system shall have a VOC content of 250 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

B. Bituminous Paint: Cold-applied, asphalt-mastic paint complying with SSPC-Paint 12 requirements except containing no asbestos; formulated for 30-mil thickness per coat.

2.7 FABRICATION

A. Form or extrude aluminum shapes before finishing.

B. Weld in concealed locations to greatest extent possible to minimize distortion or discoloration of finish. Remove weld spatter and welding oxides from exposed surfaces by descaling or grinding.

C. Framing Members, General: Fabricate components that, when assembled, have the following characteristics:

1. Profiles that are sharp, straight, and free of defects or deformations.
2. Accurately fitted joints with ends coped or mitered.
3. Means to drain water passing joints, condensation within framing members, and moisture migrating within the system to exterior.
4. Physical and thermal isolation of glazing from framing members.
5. Accommodations for thermal and mechanical movements of glazing and framing to maintain required glazing edge clearances.
6. Provisions for field replacement of glazing from [**interior**].
7. Fasteners, anchors, and connection devices that are concealed from view to greatest extent possible.

D. Mechanically Glazed Framing Members: Fabricate for flush glazing without projecting stops.

E. Storefront Framing: Fabricate components for assembly using shear-block system.

F. Entrance Door Frames: Reinforce as required to support loads imposed by door operation and for installing entrance door hardware.

G. Entrance Doors: Reinforce doors as required for installing entrance door hardware.

H. Entrance Door Hardware Installation: Factory install entrance door hardware to the greatest extent possible. Cut, drill, and tap for factory-installed entrance door hardware before applying finishes.

I. After fabrication, clearly mark components to identify their locations in Project according to Shop Drawings.

2.8 ALUMINUM FINISHES

A. Clear Anodic Finish: AAMA 611, AA-M12C22A41, Class I, 0.018 mm or thicker.

2.9 SOURCE QUALITY CONTROL

A. Testing Agency: Engage a qualified testing agency to evaluate structural-sealant-glazed systems.

B. Prepare test and inspection reports.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine areas and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. General:

1. Comply with manufacturer's written instructions.
2. Do not install damaged components.
3. Fit joints to produce hairline joints free of burrs and distortion.
4. Rigidly secure nonmovement joints.
5. Install anchors with separators and isolators to prevent metal corrosion and electrolytic deterioration.
6. Seal joints as if to be watertight unless otherwise indicated.

B. Metal Protection:

1. Where aluminum will contact dissimilar metals, protect against galvanic action by painting contact surfaces with primer or applying sealant or tape, or by installing nonconductive spacers as recommended by manufacturer for this purpose.
2. Where aluminum will contact concrete or masonry, protect against corrosion by painting contact surfaces with bituminous paint.

C. Install components as if to drain water passing joints, condensation occurring within framing members, and moisture migrating within the system to exterior.
D. Set continuous sill members and flashing in full sealant bed as specified in Section 079200 "Joint Sealants" as if to produce weathertight installation.
E. Install components plumb and true in alignment with established lines and grades, and without warp or rack.
F. Install glazing as specified in Section 088000 "Glazing."
G. Entrance Doors: Install doors to produce smooth operation and tight fit at contact points.

    1. Field-Installed Entrance Door Hardware: Install surface-mounted entrance door hardware according to entrance door hardware manufacturers' written instructions using concealed fasteners to greatest extent possible.

H. Install perimeter joint sealants as specified in Section 079200 "Joint Sealants" as if to produce weathertight installation.

3.3 ERECTION TOLERANCES

A. Install aluminum-framed systems to comply with the following maximum erection tolerances:

    1. Location and Plane: Limit variation from true location and plane to 1/8 inch in 12 feet ; 1/4 inch over total length.
    2. Alignment:

        a. Where surfaces abut in line, limit offset from true alignment to 1/16 inch .
        b. Where surfaces meet at corners, limit offset from true alignment to 1/32 inch .

B. Diagonal Measurements: Limit difference between diagonal measurements to 1/8 inch .

3.4 ADJUSTING

A. Adjust operating entrance door hardware to function smoothly as recommended by manufacturer.

    1. For entrance doors accessible to people with disabilities, adjust closers to provide a 3-second closer sweep period for doors to move from a 70-degree open position to 3 inches from the latch, measured to the leading door edge.

END OF SECTION 084113

SECTION 087100 – DOOR HARDWARE

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes items known commercially as finish or door hardware that are required for swing, sliding, and folding doors, except special types of unique hardware specified in the same sections as the doors and door frames on which they are installed.

B. This Section includes the following:
1. Hinges
2. Continuous hinges
3. Lock cylinders and keys
4. Lock and latch sets
5. Bolts
6. Exit Devices
7. Push/Pull units
8. Closers
9. Overhead holders
10. Miscellaneous door control devices
11. Door trim units
12. Protection plates
13. Weatherstripping for exterior doors
14. Sound stripping for interior doors
15. Automatic drop seals (door bottoms)
16. Astragals or meeting seals on pairs of doors
17. Thresholds

C. Related Sections: The following Sections contain requirements that relate to this Section:
1. Section 012000: Price and Payment Procedures
2. Section 081113: Hollow Metal Doors and Frames
3. Section 084117: Aluminum -Framed Entrances And Storefronts
4. Section 081416: Flush Wood Doors
5. Division 26: Electrical

1.3 REFERENCES

A. Standards of the following as referenced:

1. American National Standards Institute (ANSI)
2. Door and Hardware Institute (DHI)
3. Factory Mutual (FM)
4. Life Safety Code (NFPA 101)
5. National Fire Protection Association – Doors and Windows (NFPA 80)

6. Underwriters' Laboratories, Inc. (UL)
   a. UL 10C - Fire Tests Door Assemblies
7. Warnock Hersey
8. State Building Codes, Local Amendments.

B. Regulatory standards of the following as referenced:

1. Department of Justice, Office of the Attorney General, Americans with Disabilities Act, Public Law 101-336 (ADA).
2. CABO/ANSI A117.1: Providing Accessibility and Usability for Physically Handicapped People, 1992 edition.

1.4 SUBMITTALS

A. General: Submit the following in accordance with Conditions of Contract and Division 1 Specification sections.

B. Product data including manufacturers' technical product data for each item of door hardware, installation instructions, maintenance of operating parts and finish, and other information necessary to show compliance with requirements. For items other than those scheduled in the “Headings” of Section 3, provide catalog information for the specified items and for those submitted.

C. Final hardware schedule coordinated with doors, frames, and related work to ensure proper size, thickness, hand, function, and finish of door hardware.

1. Final Hardware Schedule Content: Based on hardware indicated, organize schedule into vertical format “hardware sets" indicating complete designations of every item required for each door or opening. Use specification Heading numbers with any variations suffixed a, b, etc. Include the following information:
   a. Type, style, function, size, and finish of each hardware item.
   b. Name and manufacturer of each item.
   c. Fastenings and other pertinent information.
   d. Location of each hardware set cross-referenced to indications on Drawings both on floor plans and in door and frame schedule.
   e. Explanation of all abbreviations, symbols, and codes contained in schedule.
   f. Mounting locations for hardware.
   g. Door and frame sizes and materials.
   h. Keying information.
   i. Cross-reference numbers used within schedule deviating from those specified.
      1) Column 1: State specified item and manufacturer.
      2) Column 2: State prior approved substituted item and its manufacturer.
2. Furnish complete wiring diagrams, riser diagrams, elevation drawings and operational descriptions of electrical components and systems, listed by opening in the hardware submittals. Elevation drawings shall identify locations of the system components with respect to their placement in the door opening. Operational descriptions shall fully detail how each electrical component will function within the opening, including all conditions of ingress and egress. Provide a copy with each hardware schedule submitted for approval. Supply a copy with delivery of hardware to the jobsite and another copy to the Owner at the time of project completion.
3. Submittal Sequence: Submit final schedule at earliest possible date particularly where acceptance of hardware schedule must precede fabrication of other work that is critical in the Project construction schedule. Include with schedule the product data, samples,

shop drawings of other work affected by door hardware, and other information essential to the coordinated review of schedule.

4. Keying Schedule: Submit separate detailed schedule indicating clearly how the Owner's final instructions on keying of locks has been fulfilled.

D. Templates for doors, frames, and other work specified to be factory prepared for the installation of door hardware. Check shop drawings of other work to confirm that adequate provisions are made for locating and installing door hardware to comply with indicated requirements.

E. Contract closeout submittals:

1. Operation and maintenance data: Complete information for installed door hardware.
2. Warranty: Completed and executed warranty forms.

1.5 QUALITY ASSURANCE

A. Single Source Responsibility: Obtain each type of hardware (latch and locksets, hinges, closers, etc.) from a single manufacturer.

B. Supplier Qualifications: A recognized architectural door hardware supplier, with warehousing facilities in the Project's vicinity, that has a record of successful in-service performance for supplying door hardware similar in quantity, type, and quality to that indicated for this Project and that employs an experienced Architectural Hardware Consultant (AHC) who is available for consultation to Owner, Architect, and Contractor, at reasonable times during the course of the Work.

C. Coordination Meetings:

1. Contractor shall set up and attend the following:
   a. Lock distributor to meet with the Owner to finalize lock functions and keying requirements and to obtain final instructions in writing.
   b. Lock distributor and lock, closer and exit device manufacturer to meet with the installer prior to beginning of installation of door hardware. Instruct installer on proper installation of specified products.
2. General Contractor shall set up and attend the following:
   a. Meet with the Owner, General Contractor, Supplier, electrical and security contractors to coordinate all electrical hardware items. Supplier to provide riser diagrams, elevation drawings, wiring diagrams and operational descriptions as required by the General and sub-contractors.

D. Fire-Rated Openings: Provide door hardware for fire-rated openings that complies with NFPA Standard No. 80 requirements of authorities having jurisdiction. Provide only items of door hardware that are listed and tested by UL or Warnock Hersey for given type/size opening and degree of label. Provide proper latching hardware, door closers, approved-bearing hinges and seals whether listed in the Hardware Schedule or not. All hardware shall comply with State and local codes and UL 10C.

1. Where emergency exit devices are required on fire-rated doors, (with supplementary marking on doors' UL labels indicating "Fire Door to be equipped with Fire Exit Hardware") provide UL label on exit devices indicating "Fire Exit Hardware".

E. All hardware is to comply with Federal and State Handicap laws. Provide tactile warning at the

back of all outside levers to electrical, mechanical, machine rooms and doors that lead to hazardous areas.

1.6 PRODUCT HANDLING

A. Tag each item or package separately with identification related to final hardware schedule, and include basic installation instructions with each item or package.

B. Packaging of door hardware is responsibility of supplier. As material is received by hardware supplier from various manufacturers, sort and repackage in containers clearly marked with appropriate hardware set number to match set numbers of approved hardware schedule. Two or more identical sets may be packed in same container.

C. Inventory door hardware jointly with representatives of hardware supplier and hardware installer until each is satisfied that count is correct.

D. Deliver individually packaged door hardware items promptly to place of installation (shop or Project site).

E. Provide secure lock-up for door hardware delivered to the Project, but not yet installed. Control handling and installation of hardware items that are not immediately replaceable so that completion of the Work will not be delayed by hardware losses both before and after installation.

1.7 WARRANTY

A. Special warranties:
1. Door Closers: Ten year period
2. Locks and Cylinders: Five year period
3. Exit Devices: Five Year period

1.8 MAINTENANCE

A. Maintenance Tools and Instructions: Furnish a complete set of specialized tools and maintenance instructions as needed for Owner's continued adjustment, maintenance, and removal and replacement of door hardware.

PART 2 - PRODUCTS

2.1 MANUFACTURED UNITS
(*Denotes manufacturer referenced in the Hardware Headings)

A. Hinges:
1. Acceptable manufacturers:
a. Stanley
b. Hager
c. McKinney
2. Characteristics:
a. Templates: Provide only template-produced units.
b. Screws: Provide Phillips flat-head screws complying with the following

requirements:

1) For metal doors and frames install machine screws into drilled and tapped holes.
2) For wood doors and frames install threaded-to-the-head wood screws.
3) For fire-rated wood doors install #12 x 1-1/4 inch, threaded-to-the-head steel wood screws.
4) Finish screw heads to match surface of hinges or pivots.

c. Hinge pins: Except as otherwise indicated, provide hinge pins as follows:
   1) Out-Swing Corridor Doors with Locks: Non-removable pins.
   2) Interior Doors: Non-rising pins.
   3) Tips: Flat button and matching plug. Finished to match leafs.

d. Size: Size hinges in accordance with specified manufacturer's published recommendations.

e. Quantity: Furnish one pair of hinges for all doors up to 5'-0" high. Furnish one hinge for each additional 2-1/2 feet or fraction thereof.

B. Continuous Hinges:

1. Acceptable manufacturers:
   a. Pemko
   b. Hager
   c. Markar
2. Characteristics:
   a. Continuous gear hinges to be manufactured of extruded 6063-T6 aluminum alloy with anodized finish, or factory painted finish as scheduled.
   b. All hinges are to be manufactured to template. Uncut hinges shall be non-handed and shall be a pinless assembly of three interlocking extrusions applied to the full height of the door and frame without mortising.
   c. Vertical door loads shall be carried on chemically lubricated polyacetal thrust bearings. The door and frame leaves shall be continually geared together for the entire hinge length and secured with a full cover channel. Hinge to operate to a full 180°.
   d. Hinges to be milled, anodized and assembled in matching pairs.
   e. Provide UL listed continuous hinges at fire doors. Continuous hinges at fire doors shall meet the required ratings without the use of auxiliary fused pins or studs.

C. Keying:

1. Acceptable manufacturers:
   a. BEST locking systems
2. Characteristics:
   a. All locks and cylinders to be factory keyed to owners existing BEST system as directed by owner.
   b. Provide and install temporary and permanent SFIC cores and keys.

D. Cylinders:

1. Acceptable manufacturers:
   a. Best (Stanley Security Systems) - SFIC
2. Characteristics:
   a. Furnish locks with Temporary cores and temporary construction keys.
   b. Furnish SFIC rim or mortise cylinders for exit devices, mullions and other doors as

required with temporary SFIC cores and construction keys.

c. Deliver temporary keys, including temporary control keys to Contractor.
d. Metals: Construct lock cylinder parts from brass or bronze, stainless steel, or nickel silver.
e. All permanent cores and keys shall be furnished by the door hardware supplier as part of this package, keyed as directed by owner.
f. Furnish a list of cylinder types, locations (door numbers) and quantities required for the project to the owner with submittals.
g. Key Material: Provide keys of nickel silver only.
h. Key Quantity: Furnish 10 temporary construction keys and 2 temporary control keys to the Contractor.

E. Locksets, Latchsets, Deadbolts:

1. Acceptable manufacturers:
   a. Stanley/Best - 93K Series.
2. Cylindrical Locksets and Latchsets: as scheduled.

   a. Basis of design: Stanley/Best - 93K Series.
   b. Certifications:
      1) ANSI A156.2-2003, Series 4000, Grade 1.

F. Exit Devices:

1. Acceptable manufacturers
   a. Von Duprin - 98 Series

2. Characteristics
   a. Exit devices to be UL Listed for life safety. Exit devices for fire rated openings to have “UL" labels for “Fire Exit Hardware."
   b. Exit devices mounted on labeled wood doors to be mounted on the door per the door manufacturer’s requirements.
   c. All trim to be thru-bolted to the lock stile case.
   d. Lever trim to be solid case material with a break-away feature ay exterior locations to limit damage to the unit from vandalism. Lever design to match locksets.
   e. All exit devices to be made of brass, bronze, or stainless steel material. Aluminum or powder coated steel finishes are not acceptable.All devices shall feature a Pullman latch.
   f. Provide glass bead conversion kits to shim exit devices on doors with raised glass beads.
   g. Furnish steel or aluminum mullions with key-removable feature as scheduled.
   h. All exit devices and mullions to be Von Duprin. No deviation will be considered.
   i. Surface vertical rod devices to be UL labeled for fire door applications without the use of bottom rod assemblies. Where bottom rods are required for security applications, the devices to be UL labeled for fire doors applications with rod and latch guards by the device manufacturer.

F. Closers and Door Control Devices:

1. Acceptable manufacturers:

   a. LCN – 4041 series
   b. Sargent Manufacturing – 351 Series.

2. Characteristics:

   a. Door closers shall have fully hydraulic, full rack and pinion action with one-piece body.
   b. Furnish closers with special brackets, shims drop plates and fasteners as required for a complete installation. Closers shall be installed on wood doors with sex-nuts and bolts (SNB).
   c. Spring power shall be continuously adjustable over the full range of closer sizes, and allow for reduced opening force for the physically handicapped. Spring power adjustment (LCN Fast ™ Power Adjust) allows for quick and accurate power adjustment and visually shows closer power size settings by way of dial adjustment gauge located on closer spring tube. Hydraulic regulation shall be by tamper-proof, non-critical valves. Closers shall have separate adjustment for latch speed, general speed and back check.
   d. All surface closers shall be certified to exceed ten million (10,000,000) full load cycles by a recognized independent testing laboratory. All closers (overhead, surface and concealed) shall be of one manufacturer and carry manufacturer's ten year warranty (electric closers to have two year warranty).
   e. Access-Free Manual Closers: Where manual closers are indicated for doors required to be accessible to the physically handicapped provide adjustable units complying with ADA and ANSI A-117.1 provisions for door opening force.
   f. Closers to be installed to allow door swing as shown on plans. Doors swinging into exit corridors shall provide for corridor clear width as required by code. Where possible, mount closers inside rooms.
   g. Powder coating finish to be certified to exceed 100 hours salt spray testing by ETL, an independent testing laboratory used by BHMA for ANSI certification.

G. Floor Stops and Wall Bumpers:

1. Acceptable manufacturers:
   a. Hager
   b. Ives
   c. Rockwood Manufacturing
2. Characteristics: Refer to Hardware Headings.

H. Door Bolts/Coordinators:

1. Acceptable manufacturers:
   a. Hager
   b. Ives
   c. Rockwood Manufacturing
2. Characteristics:
   a. Flush bolts to be forged brass 6-3/4" x 1", with 1/2" diameter bolts. Plunger to be supplied with milled surface one side that fits into a matching guide.

b. Automatic flush bolts to be UL listed as top and bottom bolts on a pair of classified fire doors. Bolt construction to be of rugged steel and brass components.
c. Self-latching flush bolts to be UL listed as top and bottom bolts on a pair of classified fire doors. Bolt construction to be of rugged steel and brass components.
d. Automatic flush bolts and self-latching flush bolts shall be UL listed for fire door application without bottom bolts.
e. Furnish dust proof bottom strikes.
f. Coordinator to be soffit mounted non-handed fully automatic UL listed coordinating device for sequential closing of paired doors with or without astragals.
g. Provide filler pieced to close the header. Provide brackets as required for mounting of soffit applied hardware.

I. Push Plates:

1. Acceptable manufacturers:
   a. Hager
   b. Ives
   c. Rockwood Manufacturing
2. Characteristics:
   a. Exposed Fasteners: Provide manufacturers standard exposed fasteners.
   b. Provide plates sized as shown in Hardware Headings.

J. Door Pulls & Pull Plates:

1. Acceptable manufacturers:
   a. Hager
   b. Ives
   c. Rockwood Manufacturing
2. Characteristics:
   a. Provide concealed thru-bolted trim on back to back mounted pulls, but not for single units.
   b. Material to be stainless steel.
   c. Provide units of type and sizes as shown in Hardware Headings.

K. Protective Plates:

1. Acceptable manufacturers:
   a. Hager
   b. Ives*
   c. Rockwood Manufacturing
2. Characteristics:
   a. Provide manufacturers standard exposed fasteners for door trim units consisting of either machine screws or self-tapping screws.
   b. Materials:
      1) Metal Plates: Stainless Steel, .050 inch (U.S. 18 gage).
   c. Fabricate protection plates not more than 2 inches less than door width on push side and not more than 1 inch less than door width on pull side.
   d. Heights:
      1) Kick plates to be 10 inches in height.
      2) Mop plates to be 4 inches in height.
      3) Armor plates to be 34 inches in height. Armor plates on fire doors to comply with NFPA 80.

L. Thresholds:

1. Acceptable manufacturers:
   a. National Guard Products, Inc.
   b. Pemko Mfg.
   c. Hager mfg
2. Types: Indicated in Hardware Headings.

M. Door Seals/Gasketing:

1. Acceptable manufacturers:
   a. National Guard Products, Inc.
   b. Pemko Mfg.
   c. Hager mfg
2. Types: Indicated in Hardware Headings.

N. Silencers:

1. Acceptable manufacturers:
   a. Hager mfg
   b. Hager
   c. Rockwood Manufacturing
2. Three for each single door; two for each pair of doors.

2.2 MATERIALS AND FABRICATION

A. Manufacturer's Name Plate: Do not use manufacturers' products that have manufacturer's name or trade name displayed in a visible location (omit removable nameplates) except in conjunction with required fire-rated labels and as otherwise acceptable to Architect.
   1. Manufacturer's identification will be permitted on rim of lock cylinders only.

B. Base Metals: Produce hardware units of basic metal and forming method indicated, using manufacturer's standard metal alloy, composition, temper, and hardness, but in no case of lesser (commercially recognized) quality than specified for applicable hardware units by applicable ANSI/BHMA A156 series standards for each type of hardware item and with ANSI/BHMA A156.18 for finish designations indicated. Do not furnish "optional" materials or forming methods for those indicated, except as otherwise specified.

C. Fasteners: Provide hardware manufactured to conform to published templates, generally prepared for machine screw installation.

1. Do not provide hardware that has been prepared for self-tapping sheet metal screws, except as specifically indicated.
2. Furnish screws for installation with each hardware item. Provide Phillips flat-head screws except as otherwise indicated. Finish exposed (exposed under any condition) screws to match hardware finish or, if exposed in surfaces of other work, to match finish of this other work as closely as possible including “prepared for paint" surfaces to receive painted finish.
3. Provide concealed fasteners for hardware units that are exposed when door is closed except to the extent no standard units of type specified are available with concealed fasteners.
4. Use thru-bolts for installation of all exit devices, closers, and surface-mounted overhead

stops. Coordinate with wood doors and metal doors and frames. Where thru-bolts are used, provide sleeves for each thru-bolt as a means of reinforcing the work, or provide sex nuts and bolts.

2.3 HARDWARE FINISHES

A. Match items to the manufacturer's standard color and texture finish for the latch and lock sets (or push-pull units if no latch or lock sets).

B. Provide finishes that match those established by ANSI or, if none established, match the Architect's sample.

C. Provide quality of finish, including thickness of plating or coating (if any), composition, hardness, and other qualities complying with manufacturer's standards, but in no case less than specified by referenced standards for the applicable units of hardware.

D. Provide protective lacquer coating on all exposed hardware finishes of brass, bronze, and aluminum, except as otherwise indicated. The suffix "-NL" is used with standard finish designations to indicate "no lacquer."

E. The designations used to indicate hardware finishes are those listed in ANSI/BHMA A156.18, "Materials and Finishes," including coordination with the traditional U.S. finishes shown by certain manufacturers for their products.

1. Hinges: 652 (US26D) Satin Chrome Plated Steel or 630 (US32D) Satin Stainless Steel.
2. Continuous Hinges: 628 (US28) Clear Anodized Aluminum
3. Flush Bolts: 626 (US26D) Satin Chrome Plated Brass/Bronze
4. Exit Devices: 630 (US32d) (US32D) Satin Stainless Steel.
5. Locks: 626 (US26D) Satin Chrome Plated
6. Door Closers: 689 Powder Coat Aluminum
7. Push Plates: 630 (US32D) Satin Stainless Steel
8. Pull Plates: 630 (US32D) Satin Stainless Steel
9. Push Pull Sets: 630 (US32D) Satin Stainless Steel
10. Protective Plates: 630 (US32D) Satin Stainless Steel
11. Door Stops: 626 (US26D) Satin Chrome Plated Brass/Bronze
12. Overhead Holders: 652 (US26D) Satin Chrome Plated Steel or 630 (US32D) Satin Stainless Steel.
13. Thresholds: Mill finish *Pemkote* Extruded Aluminum.
14. Weatherstripping: 627/628 (US27/US28) Aluminum
15. Acoustical Seals, Door Bottoms, and Thresholds: Anodized Aluminum

PART 3 - EXECUTION

3.1 INSTALLATION

A. Mount hardware units at heights indicated in following applicable publications, except as specifically indicated or required to comply with governing regulations and except as otherwise directed by Architect.
1. "Recommended Locations for Builders Hardware for Standard Steel Doors and Frames" by the Door and Hardware Institute.
2. "Recommended Locations for Builders Hardware for Custom Steel Doors and Frames" by the

Door and Hardware Institute.

3. NWWDA Industry Standard I.S.1.7, "Hardware Locations for Wood Flush Doors."

B. Install each hardware item in compliance with the manufacturer's instructions and recommendations. Where cutting and fitting is required to install hardware onto or into surfaces that are later to be painted or finished in another way, coordinate removal, storage, and reinstallation or application of surface protection with finishing work specified in the Division 9 Sections. Do not install surface-mounted items until finishes have been completed on the substrates involved.

C. Set units level, plumb, and true to line and location. Adjust and reinforce the attachment substrate as necessary for proper installation and operation.

D. Install wood blocking in drywall partitions where wall stops are to be mounted.

E. Drill and countersink units that are not factory prepared for anchorage fasteners. Space fasteners and anchors in accordance with industry standards.

F. Set thresholds for exterior doors in full bed of butyl-rubber or polyisobutylene mastic sealant complying with requirements specified in Division 7 Section “Joint Sealers”.

G. Weatherstripping and Seals: Comply with manufacturer's instructions and recommendations to the extent installation requirements are not otherwise indicated.

3.2 ADJUSTING, CLEANING, AND DEMONSTRATING

A. Adjust and check each operating item of hardware and each door to ensure proper operation or function of every unit. Replace units that cannot be adjusted to operate freely and smoothly or as intended for the application made.

1. Where door hardware is installed more than one month prior to acceptance or occupancy of a space or area, return to the installation during the week prior to acceptance or occupancy and make final check and adjustment of all hardware items in such space or area. Clean operating items as necessary to restore proper function and finish of hardware and doors. Adjust door control devices to function properly with final operation of heating and ventilating equipment.

B. Clean adjacent surfaces soiled by hardware installation.

C. Door Hardware Supplier's Field Service:

1. Inspect door hardware items for correct installation and adjustment after complete installation of door hardware.
2. Instruct Owner's personnel in the proper adjustment and maintenance of door hardware and hardware finishes.
3. File written report of this inspection to Architect.

D. Manufacturer’s Abbreviations:

1. HA - Hager
2. PE - Pemko
3. VD – Von Duprin
4. RO - Rockwood
5. BE - Stanley Security Solutions Inc (BE)

END OF SECTION 087100

Hardware Group No. 01
Provide each door with the following:
DOORS # 2-103, 2-105, 3-100, 3-101

3 Hinges	ECBB1101 4 1/2 X 4 1/2 NRP	US32D	HA
1 Lockset	9K3-7D15D S3	626	BE
1 Deadbolt	83T7K STK	626	BE
1 Door Closer	4041 x 3077 CNS	AL	LCN
1 Brush Door Sweep	315CN	C	PE
2 Gasket	290APK @ Both Jambs	A	PE
1 Gasket	2891APK @Head	A	PE
1 Saddle Threshold	171A	A	PE

Hardware Group No. 02
Provide each door with the following:
DOOR # 1-101, 2-100, 2-102

3 Hinges	ECBB1100 4 1/2 X 4 1/2	US26D	HA
1 Lockset	9K3-7R15D S3	626	BE
1 Door Closer	4041 x Rw/PA	AL	LCN
1 Wall stop	236W	630	HA
3 Silencers	307D	Gray	HA

Hardware Group No. 03
Provide each door with the following:
DOORS # 2-103.1, 2-106

3 Hinges	ECBB1100 4 1/2 X 4 1/2 NRP	US26D	HA
1 Lockset	9K3-7AB15D S3	626	BE
1 Wall stop	236W	630	HA
3 Silencers	307D	Gray	HA

Hardware Group No. 04
Provide each door with the following:
DOOR # 2-105.1

3 Hinges	ECBB1101 4 1/2 X 4 1/2 NRP	US32D	HA
1 Push plate	30S 4x16	630	HA
1 Pull plate	33G 4x16	630	HA
1 Door Closer	4041 x Rw/PA	AL	LCN
1 Saddle Threshold	171A	A	PE

Hardware Group No. 05
Provide each door with the following:
DOORS # 2-107, 2-108, 2-110.1, 2-111.1

3 Hinges	ECBB1100 4 1/2 X 4 1/2 NRP	US26D	HA
1 Privacy Set	9K3-0L15D S3	626	BE
1 Wall Stop	236W	US32D	HA
3 Silencers	307D	Gray	HA

Hardware Group No. 06
Provide each door with the following:
DOORS # 2-109

3 Hinges	ECBB1101 4 1/2 X 4 1/2 NRP	US32D	HA
1 Lockset	9K3-7D15D S3	626	BE
1 Deadbolt	83T7K STK	626	BE
1 Door Closer	4041 x 3077 CNS	AL	LCN
1 Saddle Threshold	171A	A	PE

Hardware Group No. 07
Provide each door with the following:
DOORS # 2-110, 2-111

3 Hinges	ECBB1101 4 1/2 X 4 1/2 NRP	US32D	HA
1 Push plate	30S 4x16	630	HA
1 Pull plate	33G 4x16	630	HA
1 Deadbolt	83T7S STK	626	BE
1 Door Closer	4041 x Rw/PA	AL	LCN
1 Brush Door Sweep	315CN	C	PE
2 Gasket	290APK @ Both Jambs	A	PE
1 Gasket	2891APK @Head	A	PE
1 Saddle Threshold	171A	A	PE

Hardware Group No. 08
Provide each door with the following:
DOOR # 2-112

6 Hinges	ECBB1101 4 1/2 X 4 1/2 NRP	US32D	HA
1 Lockset	9K3-7D15D S3	626	BE
1 Deadbolt	83T7K STK	626	BE
2 Door Closer	4041 x 3077 CNS	AL	LCN
2 Surface bolts	585-12”	626	RO
2 Brush Door Sweep	315CN	C	PE
2 Gasket	290APK @ Both Jambs	A	PE
1 Gasket	2891APK @Head	A	PE
1 Saddle Threshold	171A	A	PE

END OF SECTION 087100

SECTION 088000 - GLAZING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section includes glazing for the following products and applications, including those specified in other Sections where glazing requirements are specified by reference to this Section:

Windows.
Doors.
Glazed curtain walls.
Storefront framing.
Glazed entrances.
Interior borrowed lites.

B. Related Sections:

Division 08 Section "Hollow Metal Doors and Frames"
Division 08 Section "Flush Wood Doors"
Division 08 Section "Interior Aluminum Framed Entrances & Storefronts"

1.3 DEFINITIONS

A. Glass Manufacturers: Firms that produce primary glass, fabricated glass, or both, as defined in referenced glazing publications.
B. Glass Thicknesses: Indicated by thickness designations in millimeters according to ASTM C 1036.
C. Interspace: Space between lites of an insulating-glass unit.

1.4 PERFORMANCE REQUIREMENTS

A. General: Installed glazing systems shall withstand normal thermal movement and wind and impact loads (where applicable) without failure, including loss or glass breakage attributable to the following: defective manufacture, fabrication, or installation; failure of sealants or gaskets to remain watertight and airtight; deterioration of glazing materials; or other defects in construction.

B. Delegated Design: Design glass, including comprehensive engineering analysis according to FBC's 2007 Florida Building Code by a qualified professional engineer, using the following design criteria:

Design Wind Pressures: Determine design wind pressures applicable to Project according to ASCE/SEI 7, based on heights above grade indicated on Drawings.

a. Wind Design Data: As indicated on Drawings.
b. Basic Wind Speed: 130.

c. Importance Factor: 1.15.
d. Exposure Category: C.

Vertical Glazing: For glass surfaces sloped 15 degrees or less from vertical, design glass to resist design wind pressure based on glass type factors for short-duration load.
Maximum Lateral Deflection: For glass supported on all four edges, limit center-of-glass deflection at design wind pressure to not more than 1/50 times the short-side length or 1 inch, whichever is less.
Differential Shading: Design glass to resist thermal stresses induced by differential shading within individual glass lites.

C. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes acting on glass framing members and glazing components.

Temperature Change: 120 deg F, ambient; 180 deg F, material surfaces.

1.5 PRECONSTRUCTION TESTING

A. Preconstruction Adhesion and Compatibility Testing: Test each glazing material type, tape sealant, gasket, glazing accessory, and glass-framing member for adhesion to and compatibility with elastomeric glazing sealants.

Testing will not be required if data are submitted based on previous testing of current sealant products and glazing materials matching those submitted.
Use ASTM C 1087 to determine whether priming and other specific joint-preparation techniques are required to obtain rapid, optimum adhesion of glazing sealants to glass, tape sealants, gaskets, and glazing channel substrates.
Test no fewer than eight Samples of each type of material, including joint substrates, shims, sealant backings, secondary seals, and miscellaneous materials.
Schedule sufficient time for testing and analyzing results to prevent delaying the Work.
For materials failing tests, submit sealant manufacturer's written instructions for corrective measures including the use of specially formulated primers.

1.6 ACTION SUBMITTALS

A. Product Data: For each glass product and glazing material indicated.

B. Glass Samples: For each type of glass product other than clear monolithic vision glass; 12 inches square.

Tinted glass.
Coated glass.
Laminated glass with colored interlayer.

C. Glazing Accessory Samples: For gaskets sealants and colored spacers, in 12-inch lengths. Install sealant Samples between two strips of material representative in color of the adjoining framing system.

D. Glazing Schedule: List glass types and thicknesses for each size opening and location. Use same designations indicated on Drawings.

E. Delegated-Design Submittal: For glass indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

1.7 INFORMATIONAL SUBMITTALS

A. Qualification Data: For installers, manufacturers of insulating-glass units with sputter-coated, low-e coatings, glass testing agency and sealant testing agency.

B. Product Certificates: For glass and glazing products, from manufacturer.

C. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, for tinted glass coated glass insulating glass glazing sealants and glazing gaskets.

For glazing sealants, provide test reports based on testing current sealant formulations within previous 36-month period.

D. Preconstruction adhesion and compatibility test report.

E. Warranties: Sample of special warranties.

1.8 QUALITY ASSURANCE

A. Manufacturer Qualifications for Insulating-Glass Units with Sputter-Coated, Low-E Coatings: A qualified insulating-glass manufacturer who is approved by coated-glass manufacturer.

B. Installer Qualifications: A qualified installer who employs glass installers for this Project who are certified under the National Glass Association's Certified Glass Installer Program.

C. Glass Testing Agency Qualifications: A qualified independent testing agency accredited according to the NFRC CAP 1 Certification Agency Program.

D. Sealant Testing Agency Qualifications: An independent testing agency qualified according to ASTM C 1021 to conduct the testing indicated.

E. Source Limitations for Glass: Obtain tinted float glass coated float glass laminated glass and insulating glass from single source from single manufacturer for each glass type.

F. Source Limitations for Glazing Accessories: Obtain from single source from single manufacturer for each product and installation method.

G. Glazing Publications: Comply with published recommendations of glass product manufacturers and organizations below, unless more stringent requirements are indicated. Refer to these publications for glazing terms not otherwise defined in this Section or in referenced standards.

GANA Publications: GANA's "Laminated Glazing Reference Manual" and GANA's "Glazing Manual."
AAMA Publications: AAMA GDSG-1, "Glass Design for Sloped Glazing," and AAMA TIR-A7, "Sloped Glazing Guidelines."
IGMA Publication for Insulating Glass: SIGMA TM-3000, "North American Glazing Guidelines for Sealed Insulating Glass Units for Commercial and Residential Use."

H. Safety Glazing Labeling: Where safety glazing labeling is indicated, permanently mark glazing with certification label of the SGCC or another certification agency acceptable to authorities having jurisdiction or the manufacturer. Label shall indicate manufacturer's name, type of glass, thickness, and safety glazing standard with which glass complies.

I. Mockups: Build mockups to verify selections made under sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.

Install glazing in mockups specified in Division 08 Section "Aluminum-Framed Entrances and Storefronts, Aluminum Windows, Glazed Aluminum Curtain Walls" to match glazing systems required for Project, including glazing methods.
Approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

J. Pre-installation Conference: Conduct conference at Project site.

Review and finalize construction schedule and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
Review temporary protection requirements for glazing during and after installation.

1.9 DELIVERY, STORAGE, AND HANDLING

A. Protect glazing materials according to manufacturer's written instructions. Prevent damage to glass and glazing materials from condensation, temperature changes, direct exposure to sun, or other causes.

B. Comply with insulating-glass manufacturer's written recommendations for venting and sealing units to avoid hermetic seal ruptures due to altitude change.

1.10 PROJECT CONDITIONS

A. Environmental Limitations: Do not proceed with glazing when ambient and substrate temperature conditions are outside limits permitted by glazing material manufacturers and when glazing channel substrates are wet from rain, frost, condensation, or other causes.

Do not install glazing sealants when ambient and substrate temperature conditions are outside limits permitted by sealant manufacturer or below 40 deg F.

1.11 WARRANTY

A. Manufacturer's Special Warranty for Coated-Glass Products: Manufacturer's standard form in which coated-glass manufacturer agrees to replace coated-glass units that deteriorate within specified warranty period. Deterioration of coated glass is defined as defects developed from normal use that are not attributed to glass breakage or to maintaining and cleaning coated glass contrary to manufacturer's written instructions. Defects include peeling, cracking, and other indications of deterioration in coating.

Warranty Period: 10 years from date of Substantial Completion.

B. Manufacturer's Special Warranty on Laminated Glass: Manufacturer's standard form in which laminated-glass manufacturer agrees to replace laminated-glass units that deteriorate within specified warranty period. Deterioration of laminated glass is defined as defects developed from normal use that are not attributed to glass breakage or to maintaining and cleaning laminated glass contrary to manufacturer's written instructions. Defects include edge separation, delamination materially obstructing vision through glass, and blemishes exceeding those allowed by referenced laminated-glass standard.

Warranty Period: Five years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 GLASS PRODUCTS, GENERAL

A. Thickness: Where glass thickness is indicated, it is a minimum. Provide glass lites in thicknesses as needed to comply with requirements indicated.

Minimum Glass Thickness for Exterior Lites: Not less than 6.0 mm.
Thickness of Tinted Glass: Provide same thickness for tint color indicated throughout Project.

B. Strength: Where float glass is indicated, provide annealed float glass, Kind HS heat-treated float glass, or Kind FT heat-treated float glass as needed to comply with "Performance Requirements" Article. Where heat-strengthened glass is indicated, provide Kind HS heat-treated float glass or Kind FT heat-treated float glass as needed to comply with "Performance Requirements" Article. Where fully tempered glass is indicated, provide Kind FT heat-treated float glass.

C. Windborne-Debris-Impact Resistance: Provide exterior glazing that passes enhanced-protection testing requirements in ASTM E 1996 for Wind Zone 4 when tested according to ASTM E 1886. Test specimens shall be no smaller in width and length than glazing indicated for use on the Project and shall be installed in same manner as glazing indicated for use on the Project.

Large-Missile Test: For glazing located within 30 feet of grade.
Small-Missile Test: For glazing located more than 30 feet above grade.

D. Thermal and Optical Performance Properties: Provide glass with performance properties specified, as indicated in manufacturer's published test data, based on procedures indicated below:

For monolithic-glass lites, properties are based on units with lites 6.0 mm min. thick.
U-Factors: Center-of-glazing values, according to NFRC 100 and based on LBL's WINDOW 5.2 computer program, expressed as Btu/sq. ft. x h x deg F.
Solar Heat-Gain Coefficient and Visible Transmittance: Center-of-glazing values, according to NFRC 200 and based on LBL's WINDOW 5.2 computer program.
Visible Reflectance: Center-of-glazing values, according to NFRC 300.

2.2 GLASS PRODUCTS

A. Float Glass: ASTM C 1036, Type I, Quality-Q3, Class I (clear) unless otherwise indicated.

B. Heat-Treated Float Glass: ASTM C 1048; Type I; Quality-Q3; Class I (clear) unless otherwise indicated; of kind and condition indicated.

Fabrication Process: By horizontal (roller-hearth) process with roll-wave distortion parallel to bottom edge of glass as installed unless otherwise indicated.
For uncoated glass, comply with requirements for Condition A.
For coated vision glass, comply with requirements for Condition C (other coated glass).

C. Coated Tinted Float Glass: Class 2, complying with other requirements specified.

Basis-of-Design Product: Subject to compliance with requirements, provide PPG Solarblue Glass ¼", 6mm

2.3 GLAZING GASKETS

A. Dense Compression Gaskets: Molded or extruded gaskets of profile and hardness required to maintain watertight seal, made from one of the following:

Neoprene complying with ASTM C 864.
EPDM complying with ASTM C 864.
Silicone complying with ASTM C 1115.
Thermoplastic polyolefin rubber complying with ASTM C 1115.

2.4 GLAZING SEALANTS

A. General:

Compatibility: Provide glazing sealants that are compatible with one another and with other materials they will contact, including glass products, seals of insulating-glass units, and glazing channel substrates, under conditions of service and application, as demonstrated by sealant manufacturer based on testing and field experience.
Suitability: Comply with sealant and glass manufacturers' written instructions for selecting glazing sealants suitable for applications indicated and for conditions existing at time of installation.
Sealants used inside the weatherproofing system, shall have a VOC content of not more than 250 g/L when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
Colors of Exposed Glazing Sealants: As selected by Architect from manufacturer's full range.

B. Glazing Sealant: Neutral-curing silicone glazing sealant complying with ASTM C 920, Type S, Grade NS, Class 100/50, Use NT.

Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:

a. Dow Corning Corporation; 790.
b. GE Advanced Materials - Silicones; SilPruf LM SCS2700.
c. Pecora Corporation; 890.
d. Sika Corporation, Construction Products Division; SikaSil-C990.
e. Tremco Incorporated; Spectrem 1.

C. Glazing Sealants for Fire-Rated Glazing Products: Products that are approved by testing agencies that listed and labeled fire-resistant glazing products with which they are used for applications and fire-protection ratings indicated.

2.5 MISCELLANEOUS GLAZING MATERIALS

A. General: Provide products of material, size, and shape complying with referenced glazing standard, requirements of manufacturers of glass and other glazing materials for application indicated, and with a proven record of compatibility with surfaces contacted in installation.

B. Cleaners, Primers, and Sealers: Types recommended by sealant or gasket manufacturer.

C. Setting Blocks: Elastomeric material with a Shore, Type A durometer hardness of 85, plus or minus 5.

D. Spacers: Elastomeric blocks or continuous extrusions of hardness required by glass manufacturer to maintain glass lites in place for installation indicated.

E. Edge Blocks: Elastomeric material of hardness needed to limit glass lateral movement (side walking).

F. Cylindrical Glazing Sealant Backing: ASTM C 1330, Type O (open-cell material), of size and density to control glazing sealant depth and otherwise produce optimum glazing sealant performance.

G. Perimeter Insulation for Fire-Resistive Glazing: Product that is approved by testing agency that listed and labeled fire-resistant glazing product with which it is used for application and fire-protection rating indicated.

2.6 FABRICATION OF GLAZING UNITS

A. Fabricate glazing units in sizes required to fit openings indicated for Project, with edge and face clearances, edge and surface conditions, and bite complying with written instructions of product manufacturer and referenced glazing publications, to comply with system performance requirements.

B. Clean-cut or flat-grind vertical edges of butt-glazed monolithic lites to produce square edges with slight chamfers at junctions of edges and faces.

C. Grind smooth and polish exposed glass edges and corners.

2.7 MONOLITHIC-GLASS TYPES

A. Clear fully tempered float glass.

Thickness: 6.0 mm minimum.
Provide safety glazing labeling.

B. Clear fully tempered float glass in interior butt-glazed application.

Thickness: 9.0 mm minimum
Provide safety glazing labeling.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine framing, glazing channels, and stops, with Installer present, for compliance with the following:

Manufacturing and installation tolerances, including those for size, squareness, and offsets at corners.
Presence and functioning of weep systems.
Minimum required face and edge clearances.
Effective sealing between joints of glass-framing members.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Clean glazing channels and other framing members receiving glass immediately before glazing. Remove coatings not firmly bonded to substrates.

B. Examine glazing units to locate exterior and interior surfaces. Label or mark units as needed so that exterior and interior surfaces are readily identifiable. Do not use materials that will leave visible marks in the completed work.

3.3 GLAZING, GENERAL

A. Comply with combined written instructions of manufacturers of glass, sealants, gaskets, and other glazing materials, unless more stringent requirements are indicated, including those in referenced glazing publications.

B. Adjust glazing channel dimensions as required by Project conditions during installation to provide necessary bite on glass, minimum edge and face clearances, and adequate sealant thicknesses, with reasonable tolerances.

C. Protect glass edges from damage during handling and installation. Remove damaged glass from Project site and legally dispose of off Project site. Damaged glass is glass with edge damage or other imperfections that, when installed, could weaken glass and impair performance and appearance.

D. Apply primers to joint surfaces where required for adhesion of sealants, as determined by preconstruction testing.

E. Install setting blocks in sill rabbets, sized and located to comply with referenced glazing publications, unless otherwise required by glass manufacturer. Set blocks in thin course of compatible sealant suitable for heel bead.

F. Do not exceed edge pressures stipulated by glass manufacturers for installing glass lites.

G. Provide spacers for glass lites where length plus width is larger than 50 inches .

> Locate spacers directly opposite each other on both inside and outside faces of glass.
> Install correct size and spacing to preserve required face clearances, unless gaskets and glazing tapes are used that have demonstrated ability to maintain required face clearances and to comply with system performance requirements.
> Provide 1/8-inch minimum bite of spacers on glass and use thickness equal to sealant width. With glazing tape, use thickness slightly less than final compressed thickness of tape.

H. Provide edge blocking where indicated or needed to prevent glass lites from moving sideways in glazing channel, as recommended in writing by glass manufacturer and according to requirements in referenced glazing publications.

I. Set glass lites in each series with uniform pattern, draw, bow, and similar characteristics.

J. Where glazing is installed in butt-glazed applications, install glazing so that all bowing of glass units is in the same direction. Adjust glazing panel locations to minimize panel-to-panel offset.

K. Set glass lites with proper orientation so that coatings face exterior or interior as specified.

L. Where wedge-shaped gaskets are driven into one side of channel to pressurize sealant or gasket on opposite side, provide adequate anchorage so gasket cannot walk out when installation is subjected to movement.

M. Square cut wedge-shaped gaskets at corners and install gaskets in a manner recommended by gasket manufacturer to prevent corners from pulling away; seal corner joints and butt joints with sealant recommended by gasket manufacturer.

3.4 GASKET GLAZING (DRY)

A. Cut compression gaskets to lengths recommended by gasket manufacturer to fit openings exactly, with allowance for stretch during installation.

B. Installation with Drive-in Wedge Gaskets: Center glass lites in openings on setting blocks and press firmly against soft compression gasket by inserting dense compression gaskets formed and installed to lock in place against faces of removable stops. Start gasket applications at corners and work toward centers of openings. Compress gaskets to produce a weathertight seal without developing bending stresses in glass. Seal gasket joints with sealant recommended by gasket manufacturer.

C. Installation with Pressure-Glazing Stops: Center glass lites in openings on setting blocks and press firmly against soft compression gasket. Install dense compression gaskets and pressure-glazing stops, applying pressure uniformly to compression gaskets. Compress gaskets to produce a weathertight seal without developing bending stresses in glass. Seal gasket joints with sealant recommended by gasket manufacturer.

D. Install gaskets so they protrude past face of glazing stops.

3.5 SEALANT GLAZING (WET)

A. Install continuous spacers, or spacers combined with cylindrical sealant backing, between glass lites and glazing stops to maintain glass face clearances and to prevent sealant from extruding into glass channel and blocking weep systems until sealants cure. Secure spacers or spacers and backings in place and in position to control depth of installed sealant relative to edge clearance for optimum sealant performance.

B. Force sealants into glazing channels to eliminate voids and to ensure complete wetting or bond of sealant to glass and channel surfaces.

C. Tool exposed surfaces of sealants to provide a substantial wash away from glass.

3.6 CLEANING AND PROTECTION

A. Protect exterior glass from damage immediately after installation by attaching crossed streamers to framing held away from glass. Do not apply markers to glass surface. Remove nonpermanent labels and clean surfaces.

B. Protect glass from contact with contaminating substances resulting from construction operations. If, despite such protection, contaminating substances do come into contact with glass, remove substances immediately as recommended in writing by glass manufacturer.

C. Examine glass surfaces adjacent to or below exterior concrete and other masonry surfaces at frequent intervals during construction, but not less than once a month, for buildup of dirt, scum, alkaline deposits, or stains; remove as recommended in writing by glass manufacturer.

D. Remove and replace glass that is broken, chipped, cracked, or abraded or that is damaged from natural causes, accidents, and vandalism, during construction period.

E. Wash glass on both exposed surfaces in each area of Project not more than four days before date scheduled for inspections that establish date of Substantial Completion. Wash glass as recommended in writing by glass manufacturer.

END OF SECTION 088000

SECTION 089000 - LOUVERS AND VENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

1. Fixed, extruded-aluminum louvers.

B. Related Sections:

1. Division 07 Section "Insulated Core Metal Panels" for cutting, priming, and anchoring access door frames set in metal panel construction.
2. Division 07 Section "Roof Accessories" for roof hatches.
3. Division 08 Section "Door Hardware" for mortise or rim cylinder locks and master keying.
4. Division 09 Section "Acoustical Tile Ceilings" for suspended acoustical tile ceilings.
5. Division 23 Section "Air Duct Accessories" for heating and air-conditioning duct access doors

1.3 DEFINITIONS

A. Louver Terminology: Definitions of terms for metal louvers contained in AMCA 501 apply to this Section unless otherwise defined in this Section or in referenced standards.

B. Horizontal Louver: Louver with horizontal blades; i.e., the axes of the blades are horizontal.

C. Storm-Resistant Louver: Louver that provides specified wind-driven rain performance, as determined by testing according to AMCA 500-L.

1.4 PERFORMANCE REQUIREMENTS

A. Delegated Design: Design louvers, including comprehensive engineering analysis by a qualified professional engineer, using structural performance requirements and design criteria indicated.

B. Structural Performance: Louvers shall withstand the effects of gravity loads and the following loads and stresses within limits and under conditions indicated without permanent deformation of louver components, noise or metal fatigue caused by louver blade rattle or flutter, or permanent damage to fasteners and anchors. Wind pressures shall be considered to act normal to the face of the building.

C. Structural Loads:

1. Wind Loads: As indicated on Drawings.

a. Basic Wind Speed: 130 mph.
b. Importance Factor: 1.15.
c. Exposure Category: C.

D. Louver Performance Ratings: Provide louvers complying with requirements specified, as demonstrated by testing manufacturer's stock units identical to those provided, except for length and width according to AMCA 500-L.

1.5 SUBMITTALS

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

1. For louvers specified to bear AMCA seal, include printed catalog pages showing specified models with appropriate AMCA Certified Ratings Seals.

B. Shop Drawings: For louvers and accessories. Include plans, elevations, sections, details, and attachments to other work. Show frame profiles and blade profiles, angles, and spacing.

1. Show weep paths, gaskets, flashing, sealant, and other means of preventing water intrusion.
2. Show mullion profiles and locations.
3. Wiring Diagrams: For power, signal, and control wiring for motorized adjustable louvers.

C. Samples for Verification: For each type of metal finish required.

D. Delegated Design Submittal: For louvers indicated to comply with structural performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

E. Product Test Reports: Based on evaluation of comprehensive tests performed according to AMCA 500-L by a qualified testing agency or by manufacturer and witnessed by a qualified testing agency, for each type of louver and showing compliance with performance requirements specified.

1.6 QUALITY ASSURANCE

A. Source Limitations: Obtain louvers and vents from single source from a single manufacturer where indicated to be of same type, design, or factory-applied color finish.

B. Welding: Qualify procedures and personnel according to the following:

1. AWS D1.2/D1.2M, "Structural Welding Code - Aluminum."

C. SMACNA Standard: Comply with recommendations in SMACNA's "Architectural Sheet Metal Manual" for fabrication, construction details, and installation procedures.

1.7 PROJECT CONDITIONS

A. Field Measurements: Verify actual dimensions of openings by field measurements before fabrication.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Aluminum Extrusions: ASTM B 221, Alloy 6063-T5, T-52, or T6.

B. Fasteners: Use types and sizes to suit unit installation conditions.

1. Use hex-head or Phillips pan-head screws for exposed fasteners unless otherwise indicated.
2. For fastening aluminum, use aluminum or 300 series stainless-steel fasteners.

C. Post installed Fasteners for Concrete and Masonry: Torque-controlled expansion anchors, made from stainless-steel components, with capability to sustain, without failure, a load equal to 4 times the loads imposed, for concrete, or 6 times the load imposed, for masonry, as determined by testing per ASTM E 488, conducted by a qualified independent testing agency.

D. Bituminous Paint: Cold-applied asphalt emulsion complying with ASTM D 1187.

2.2 FABRICATION, GENERAL

A. Assemble louvers in factory to minimize field splicing and assembly. Disassemble units as necessary for shipping and handling limitations. Clearly mark units for reassembly and coordinated installation.

B. Vertical Assemblies: Where height of louver units exceeds fabrication and handling limitations, fabricate units to permit field-bolted assembly with close-fitting joints in jambs and mullions, reinforced with splice plates.

1. Continuous Vertical Assemblies: Fabricate units without interrupting blade-spacing pattern.
2. Horizontal Mullions: Provide horizontal mullions at joints unless continuous vertical assemblies are indicated.

C. Maintain equal louver blade spacing, including separation between blades and frames at head and sill, to produce uniform appearance.

D. Fabricate frames, including integral sills, to fit in openings of sizes indicated, with allowances made for fabrication and installation tolerances, adjoining material tolerances, and perimeter sealant joints.

1. Frame Type: Channel, unless otherwise indicated.

E. Include supports, anchorages, and accessories required for complete assembly.

F. Provide vertical mullions of type and at spacings indicated, but not more than recommended by manufacturer, or 72 inches o.c., whichever is less.

1. Exposed Mullions: Where indicated, provide units with exposed mullions of same width and depth as louver frame. Where length of louver exceeds fabrication and handling limitations, provide interlocking split mullions designed to permit expansion and contraction.

G. Provide subsills made of same material as louvers or extended sills for recessed louvers.

H. Join frame members to each other and to fixed louver blades with fillet welds concealed from view unless otherwise indicated or size of louver assembly makes bolted connections between frame members necessary.

2.3 FIXED, EXTRUDED-ALUMINUM LOUVERS

A. Horizontal Storm-Resistant Louver <Insert drawing designation, e.g., LV-1>:

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

a. Air Balance Inc.; a Mestek company.
b. Air Flow Company, Inc.
c. Airolite Company, LLC (The).
d. All-Lite Architectural Products.
e. American Warming and Ventilating, Inc.; a Mestek company.
f. Arrow United Industries; a division of Mestek, Inc.
g. Construction Specialties, Inc.
h. Greenheck Fan Corporation.
i. Industrial Louvers, Inc.
j. NCA Manufacturing, Inc.
k. Nystrom Building Products.
l. Reliable Products, Inc.
m. Ruskin Company; Tomkins PLC.
n. United Enertech Corp.

2. Louver Depth: 5 inches.
3. Frame and Blade Nominal Thickness: Not less than 0.080 inch.
4. Louver Performance Ratings:

a. Free Area: Not less than 6.0 sq. ft. for 48-inch- wide by 48-inch- high louver.
b. Air Performance: Not more than 0.10-inch wg static pressure drop at 600-fpm free-area exhaust or intake velocity.
c. Wind-Driven Rain Performance: Not less than 99 percent effectiveness when subjected to a rainfall rate of 8 inches per hour and a wind speed of 50 mph at a core-area intake velocity of 500 fpm.

5. AMCA Seal: Mark units with AMCA Certified Ratings Seal.

2.4 LOUVER SCREENS

A. General: Provide screen at [each exterior louver] [louvers indicated].

1. Screen Location for Fixed Louvers: Interior face.
2. Screening Type: Bird screening except where insect screening is indicated.

B. Secure screen frames to louver frames with stainless-steel machine screws, spaced a maximum of 6 inches from each corner and at 12 inches o.c.

C. Louver Screen Frames: Fabricate with mitered corners to louver sizes indicated.

1. Metal: Same kind and form of metal as indicated for louver to which screens are attached. Reinforce extruded-aluminum screen frames at corners with clips.
2. Finish: Same finish as louver frames to which louver screens are attached.
3. Type: Rewirable frames with a driven spline or insert.

D. Louver Screening for Aluminum Louvers:

1. Bird Screening: Stainless steel, 1/2-inch- square mesh, 0.047-inch wire.
2. Insect Screening: Stainless steel, 18-by-18 mesh, 0.009-inch wire.

2.5 FINISHES, GENERAL

A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.

2.6 ALUMINUM FINISHES

A. Finish louvers after assembly.

B. Clear Anodic Finish: AAMA 611, AA-M12C22A41, Class I, 0.018 mm or thicker.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates and openings, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Coordinate setting drawings, diagrams, templates, instructions, and directions for installation of anchorages that are to be embedded in concrete or masonry construction. Coordinate delivery of such items to Project site.

3.3 INSTALLATION

A. Locate and place louvers and vents level, plumb, and at indicated alignment with adjacent work.

B. Use concealed anchorages where possible. Provide brass or lead washers fitted to screws where required to protect metal surfaces and to make a weathertight connection.

C. Form closely fitted joints with exposed connections accurately located and secured.

D. Provide perimeter reveals and openings of uniform width for sealants and joint fillers, as indicated.

E. Repair finishes damaged by cutting, welding, soldering, and grinding. Restore finishes so no evidence remains of corrective work. Return items that cannot be refinished in the field to the factory, make required alterations, and refinish entire unit or provide new units.

F. Protect unpainted galvanized and nonferrous-metal surfaces that will be in contact with concrete, masonry, or dissimilar metals from corrosion and galvanic action by applying a heavy coating of bituminous paint or by separating surfaces with waterproof gaskets or nonmetallic flashing.

G. Install concealed gaskets, flashings, joint fillers, and insulation as louver installation progresses, where weathertight louver joints are required. Comply with Division 07 Section "Joint Sealants" for sealants applied during louver installation.

3.4 ADJUSTING AND CLEANING

A. Test operation of adjustable louvers and adjust as needed to produce fully functioning units that comply with requirements.

B. Clean exposed surfaces of louvers and vents that are not protected by temporary covering, to remove fingerprints and soil during construction period. Do not let soil accumulate during construction period.

C. Before final inspection, clean exposed surfaces with water and a mild soap or detergent not harmful to finishes. Thoroughly rinse surfaces and dry.

D. Restore louvers and vents damaged during installation and construction so no evidence remains of corrective work. If results of restoration are unsuccessful, as determined by Architect, remove damaged units and replace with new units.

END OF SECTION 089000

SECTION 092216 - NON-STRUCTURAL METAL FRAMING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes non-load-bearing steel framing members for the following applications:

1. Interior framing systems (e.g., supports for partition walls, framed soffits, furring, etc.).
2. Interior suspension systems (e.g., supports for ceilings, suspended soffits, etc.).

B. Related Sections include the following:

1. Division 05 Section "Cold-Formed Metal Framing" for exterior and interior load-bearing and exterior non-load-bearing wall studs; roof rafters and ceiling joists.
2. Division 07 Section "Fire-Resistive Joint Systems" for head-of-wall joint systems installed with non-load-bearing steel framing.
3. Division 09 Section "Portland Cement Plastering" for metal lath supported by non-load-bearing steel framing.

1.3 SUBMITTALS

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

1.4 QUALITY ASSURANCE

A. Fire-Test-Response Characteristics: For fire-resistance-rated assemblies that incorporate non-load-bearing steel framing, provide materials and construction identical to those tested in assembly indicated according to ASTM E 119 by an independent testing agency.

PART 2 - PRODUCTS

2.1 NON-LOAD-BEARING STEEL FRAMING, GENERAL

A. Framing Members, General: Comply with ASTM C 754 for conditions indicated.

1. Steel Sheet Components: Comply with ASTM C 645 requirements for metal, unless otherwise indicated.
2. Protective Coating: ASTM A 653/A 653M, G60, hot-dip galvanized, unless otherwise indicated.

2.2 SUSPENSION SYSTEM COMPONENTS

A. Tie Wire: ASTM A 641/A 641M, Class 1 zinc coating, soft temper, 0.0625-inch- diameter wire, or double strand of 0.0475-inch- diameter wire.

B. Hanger Attachments to Concrete:

1. Anchors: Fabricated from corrosion-resistant materials with holes or loops for attaching wire hangers and capable of sustaining, without failure, a load equal to 5 times that imposed by construction as determined by testing according to ASTM E 488 by an independent testing agency.
2. Powder-Actuated Fasteners: Suitable for application indicated, fabricated from corrosion-resistant materials with clips or other devices for attaching hangers of type indicated, and capable of sustaining, without failure, a load equal to 10 times that imposed by construction as determined by testing according to ASTM E 1190 by an independent testing agency.

C. Wire Hangers: ASTM A 641/A 641M, Class 1 zinc coating, soft temper, 0.162-inch diameter.

D. Carrying Channels: Cold-rolled, commercial-steel sheet with a base-metal thickness of 0.0538 inch and minimum 1/2-inch- wide flanges.

1. Depth: As indicated on Drawings or, if not indicated, minimum 1-1/2 inches.

E. Furring Channels (Furring Members):

1. Cold-Rolled Channels: 0.0538-inch bare-steel thickness, with minimum 1/2-inch- wide flanges, 3/4 inch deep.
2. Steel Studs: ASTM C 645.

a. Minimum Base-Metal Thickness: 0.0179 inch.
b. Depth: As indicated on Drawings or, if not indicated, minimum 3-5/8 inches.

3. Hat-Shaped, Rigid Furring Channels: ASTM C 645, 7/8 inch deep.

a. Minimum Base Metal Thickness: 0.0179 inch.

4. Resilient Furring Channels: 1/2-inch- deep members designed to reduce sound transmission.

a. Configuration: Asymmetrical or hat shaped.

2.3 STEEL FRAMING FOR FRAMED ASSEMBLIES

A. Steel Studs and Runners: ASTM C 645.

1. Minimum Base-Metal Thickness: 0.0179 inch, except minimum 0.0312 inch at doorframes and framing supporting ceramic tile substrates.
2. Depth: As indicated on Drawings or, if not indicated, minimum 3-5/8 inches.

B. Slip-Type Head Joints: Where indicated, provide one of the following:

1. Single Long-Leg Runner System: ASTM C 645 top runner with 2-inch- deep flanges in thickness not less than indicated for studs, installed with studs friction fit into top runner and with continuous bridging located within 12 inches of the top of studs to provide lateral bracing.
2. Double-Runner System: ASTM C 645 top runners, inside runner with 2-inch- deep flanges in thickness not less than indicated for studs and fastened to studs, and outer runner sized to friction fit inside runner.

3. Deflection Track: Steel sheet top runner manufactured to prevent cracking of finishes applied to interior partition framing resulting from deflection of structure above; in thickness not less than indicated for studs and in width to accommodate depth of studs.

    a. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, the following:

        1) Superior Metal Trim; Superior Flex Track System (SFT).

C. Firestop Tracks: Top runner manufactured to allow partition heads to expand and contract with movement of the structure while maintaining continuity of fire-resistance-rated assembly indicated; in thickness not less than indicated for studs and in width to accommodate depth of studs.

1. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, the following:

    a. Fire Trak Corp.; Fire Trak attached to studs with Fire Trak Slip Clip.
    b. Metal-Lite, Inc.; The System.

D. Cold-Rolled Channel Bridging: 0.0538-inch bare-steel thickness, with minimum 1/2-inch- wide flanges.

1. Depth: As indicated on Drawings or, if not indicated, minimum 1-1/2 inches.
2. Clip Angle: Not less than 1-1/2 by 1-1/2 inches, 0.068-inch- thick, galvanized steel.

E. Hat-Shaped, Rigid Furring Channels: ASTM C 645.

1. Minimum Base Metal Thickness: 0.0179 inch.
2. Depth: 7/8 inch.

F. Resilient Furring Channels: 1/2-inch- deep, steel sheet members designed to reduce sound transmission.

1. Configuration: Asymmetrical or hat shaped.

G. Cold-Rolled Furring Channels: 0.0538-inch bare-steel thickness, with minimum 1/2-inch- wide flanges.

1. Depth: 3/4 inch.
2. Furring Brackets: Adjustable, corrugated-edge type of steel sheet with minimum bare-steel thickness of 0.0312 inch.
3. Tie Wire: ASTM A 641/A 641M, Class 1 zinc coating, soft temper, 0.0625-inch- diameter wire, or double strand of 0.0475-inch- diameter wire.

H. Z-Shaped Furring: With slotted or nonslotted web, face flange of 1-1/4 inches, wall attachment flange of 7/8 inch , minimum bare-metal thickness of 0.0179 inch , and depth required to fit insulation thickness indicated.

2.4 AUXILIARY MATERIALS

A. General: Provide auxiliary materials that comply with referenced installation standards.

1. Fasteners for Metal Framing: Of type, material, size, corrosion resistance, holding power, and other properties required to fasten steel members to substrates.

B. Isolation Strip at Exterior Walls: Provide the following:

1. Asphalt-Saturated Organic Felt: ASTM D 226, Type I (No. 15 asphalt felt), nonperforated.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine areas and substrates, with Installer present, and including welded hollow-metal frames, cast-in anchors, and structural framing, for compliance with requirements and other conditions affecting performance.

1. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Suspended Assemblies: Coordinate installation of suspension systems with installation of overhead structure to ensure that inserts and other provisions for anchorages to building structure have been installed to receive hangers at spacing required to support the Work and that hangers will develop their full strength.

1. Furnish concrete inserts and other devices indicated to other trades for installation in advance of time needed for coordination and construction.

B. Coordination with Sprayed Fire-Resistive Materials:

1. Before sprayed fire-resistive materials are applied, attach offset anchor plates or ceiling runners (tracks) to surfaces indicated to receive sprayed fire-resistive materials. Where offset anchor plates are required, provide continuous plates fastened to building structure not more than 24 inches o.c.
2. After sprayed fire-resistive materials are applied, remove them only to extent necessary for installation of non-load-bearing steel framing. Do not reduce thickness of fire-resistive materials below that required for fire-resistance ratings indicated. Protect adjacent fire-resistive materials from damage.

3.3 INSTALLATION, GENERAL

A. Installation Standard: ASTM C 754, except comply with framing sizes and spacing indicated.

1. Portland Cement Plaster Assemblies: Also comply with requirements in ASTM C 1063 that apply to framing installation.
2. Gypsum Board Assemblies: Also comply with requirements in ASTM C 840 that apply to framing installation.

B. Install supplementary framing, and blocking to support fixtures, equipment services, heavy trim, grab bars, toilet accessories, furnishings, or similar construction.

C. Install bracing at terminations in assemblies.

D. Do not bridge building control and expansion joints with non-load-bearing steel framing members. Frame both sides of joints independently.

3.4 INSTALLING SUSPENSION SYSTEMS

A. Install suspension system components in sizes and spacings indicated on Drawings, but not less than those required by referenced installation standards for assembly types and other assembly components indicated.

B. Isolate suspension systems from building structure where they abut or are penetrated by building structure to prevent transfer of loading imposed by structural movement.

C. Suspend hangers from building structure as follows:

1. Install hangers plumb and free from contact with insulation or other objects within ceiling plenum that are not part of supporting structural or suspension system.

    a. Splay hangers only where required to miss obstructions and offset resulting horizontal forces by bracing, countersplaying, or other equally effective means.

2. Where width of ducts and other construction within ceiling plenum produces hanger spacings that interfere with locations of hangers required to support standard suspension system members, install supplemental suspension members and hangers in the form of trapezes or equivalent devices.

    a. Size supplemental suspension members and hangers to support ceiling loads within performance limits established by referenced installation standards.

3. Wire Hangers: Secure by looping and wire tying, either directly to structures or to inserts, eye screws, or other devices and fasteners that are secure and appropriate for substrate, and in a manner that will not cause hangers to deteriorate or otherwise fail.
4. Do not attach hangers to steel roof deck.
5. Do not attach hangers to permanent metal forms. Furnish cast-in-place hanger inserts that extend through forms.
6. Do not attach hangers to rolled-in hanger tabs of composite steel floor deck.
7. Do not connect or suspend steel framing from ducts, pipes, or conduit.

D. Fire-Resistance-Rated Assemblies: Wire tie furring channels to supports.

E. Installation Tolerances: Install suspension systems that are level to within 1/8 inch in 12 feet measured lengthwise on each member that will receive finishes and transversely between parallel members that will receive finishes.

3.5 INSTALLING FRAMED ASSEMBLIES

A. Where studs are installed directly against exterior masonry walls or dissimilar metals at exterior walls, install isolation strip between studs and exterior wall.

B. Install studs so flanges within framing system point in same direction.

1. Space studs as follows:

    a. Single-Layer Application: 16 inches o.c., unless otherwise indicated.
    b. Multilayer Application: 16 inches o.c., unless otherwise indicated.
    c. Tile backing panels: 16 inches o.c., unless otherwise indicated.

C. Install tracks (runners) at floors and overhead supports. Extend framing full height to structural supports or substrates above suspended ceilings, except where partitions are indicated to terminate at suspended ceilings. Continue framing around ducts penetrating partitions above ceiling.

1. Slip-Type Head Joints: Where framing extends to overhead structural supports, install to produce joints at tops of framing systems that prevent axial loading of finished assemblies.
2. Door Openings: Screw vertical studs at jambs to jamb anchor clips on door frames; install runner track section (for cripple studs) at head and secure to jamb studs.

    a. Install two studs at each jamb, unless otherwise indicated.
    b. Install cripple studs at head adjacent to each jamb stud, with a minimum 1/2-inch clearance from jamb stud to allow for installation of control joint in finished assembly.
    c. Extend jamb studs through suspended ceilings and attach to underside of overhead structure.

3. Other Framed Openings: Frame openings other than door openings the same as required for door openings, unless otherwise indicated. Install framing below sills of openings to match framing required above door heads.
4. Fire-Resistance-Rated Partitions: Install framing to comply with fire-resistance-rated assembly indicated and support closures and to make partitions continuous from floor to underside of solid structure.

    a. Firestop Track: Where indicated, install to maintain continuity of fire-resistance-rated assembly indicated.

5. Sound-Rated Partitions: Install framing to comply with sound-rated assembly indicated.
6. Curved Partitions:

    a. Bend track to uniform curve and locate straight lengths so they are tangent to arcs.
    b. Begin and end each arc with a stud, and space intermediate studs equally along arcs. On straight lengths of not less than 2 studs at ends of arcs, place studs 6 inches o.c.

D. Direct Furring:

1. Attach to concrete or masonry with stub nails, screws designed for masonry attachment, or powder-driven fasteners spaced 24 inches o.c.

E. Z-Furring Members:

1. Erect insulation (specified in Division 07 Section "Thermal Insulation") vertically and hold in place with Z-furring members spaced 24 inches o.c.
2. Except at exterior corners, securely attach narrow flanges of furring members to wall with concrete stub nails, screws designed for masonry attachment, or powder-driven fasteners spaced 24 inches o.c.
3. At exterior corners, attach wide flange of furring members to wall with short flange extending beyond corner; on adjacent wall surface, screw-attach short flange of furring channel to web of attached channel. At interior corners, space second member no more than 12 inches from corner and cut insulation to fit.

F. Installation Tolerance: Install each framing member so fastening surfaces vary not more than 1/8 inch from the plane formed by faces of adjacent framing.

END OF SECTION 092216

SECTION 092400 - PORTLAND CEMENT PLASTERING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

1. Interior Keene cement plasterwork on metal lath unit masonry and metal lath on monolithic concrete.
2. Exterior portland cement plasterwork (stucco) on metal lath unit masonry and monolithic concrete.

B. Related Sections:

1. Division 05 Section "Cold-Formed Metal Framing" for structural, load-bearing (transverse and axial) steel studs and joists that support lath and portland cement plaster.
2. Division 06 Section "Sheathing" for sheathing and water-resistant barriers included in portland cement plaster assemblies.
3. Division 07 Section "Thermal Insulation" for thermal insulations and vapor retarders included in portland cement plaster assemblies.
4. Division 09 Section "Non-Structural Metal Framing" for non-structural framing and suspension systems that support lath and portland cement plaster.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product indicated.
B. Shop Drawings: Show locations and installation of control and expansion joints including plans, elevations, sections, details of components, and attachments to other work.
C. Samples for Initial Selection: For each type of factory-prepared finish coat indicated.
D. Samples for Verification: For each type of factory-prepared and textured finish coat indicated; 12 by 12 inches, and prepared on rigid backing.
E. Provide written statement of procedures to be followed during hot-weather plaster work including wetting/misting schedule.

1. Include manufacturer’s statement of acceptance.

1.4 QUALITY ASSURANCE

A. Fire-Resistance Ratings: Where indicated, provide portland cement plaster assemblies identical to those of assemblies tested for fire resistance per ASTM E 119 by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.

1. Indicate design designations from UL's "Fire Resistance Directory" or from the listings of another qualified testing agency.

B. Sound-Transmission Characteristics: Where indicated, provide portland cement plaster assemblies identical to those of assemblies tested for STC ratings per ASTM E 90 and classified according to ASTM E 413 by a qualified testing agency.
C. Mockups: Before plastering, install mockups of at least 100 sq. ft. in surface area to demonstrate aesthetic effects and set quality standards for materials and execution.

1. Install mockups for each type of finish indicated.
2. For interior plasterwork, simulate finished lighting conditions for review of mockups.
3. Approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

D. Preinstallation Conference: Conduct conference at Project site.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Store materials inside under cover and keep them dry and protected against damage from weather, direct sunlight, surface contamination, corrosion, construction traffic, and other causes.

1.6 PROJECT CONDITIONS

A. Comply with ASTM C 926 requirements.
B. Interior Plasterwork: Maintain room temperatures at greater than 40 deg F for at least 48 hours before plaster application, and continuously during and after application.

1. Avoid conditions that result in plaster drying out during curing period. Distribute heat evenly; prevent concentrated or uneven heat on plaster.
2. Ventilate building spaces as required to remove water in excess of that required for hydrating plaster in a manner that prevents drafts of air from contacting surfaces during plaster application and until plaster is dry.

C. Exterior Plasterwork:

1. Apply and cure plaster to prevent plaster drying out during curing period. Use procedures required by climatic conditions, including moist curing, providing coverings, and providing barriers to deflect sunlight and wind.
2. Apply plaster when ambient temperature is greater than 40 deg F .
3. Protect plaster coats from freezing for not less than 48 hours after set of plaster coat has occurred.

D. Factory-Prepared Finishes: Comply with manufacturer's written recommendations for environmental conditions for applying finishes.

PART 2 - PRODUCTS

2.1 METAL LATH

A. Expanded-Metal Lath: ASTM C 847 with ASTM A 653/A 653M, G60, hot-dip galvanized zinc coating.

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

a. Alabama Metal Industries Corporation; a Gibraltar Industries company.
b. CEMCO.
c. Clark Western Building Systems.
d. Dietrich Metal Framing; a Worthington Industries company.
e. MarinoWARE.
f. Phillips Manufacturing Co.

2. Recycled Content: Postconsumer recycled content plus one-half of preconsumer recycled content not less than 25 percent.
3. Diamond-Mesh Lath: Flat and Self-furring, 3.4 lb/sq. yd. .
4. Flat Rib Lath: Rib depth of not more than 1/8 inch , 3.4 lb/sq. yd. .
5. 3/8-Inch Rib Lath: 4 lb/sq. yd.

2.2 ACCESSORIES

A. General: Comply with ASTM C 1063 and coordinate depth of trim and accessories with thicknesses and number of plaster coats required.
B. Metal Accessories:

1. Accessories for exterior use shall be zinc; accessories for use in interior locations shall be zinc or zinc-coated (galvanized) steel.
2. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

a. Alabama Metal Industries Corporation; a Gibraltar Industries company.
b. CEMCO.
c. Clark Western Building Systems.
d. Dietrich Metal Framing; a Worthington Industries company.
e. MarinoWARE.
f. Phillips Manufacturing Co.

3. Foundation Weep Screed: Fabricated from hot-dip galvanized-steel sheet, ASTM A 653/A 653M, G60 zinc coating.
4. Cornerbeads: Fabricated from zinc or zinc-coated (galvanized) steel.

a. Small nose cornerbead with expanded flanges; use unless otherwise indicated.
b. Small nose cornerbead with perforated flanges; use on curved corners.
c. Small nose cornerbead with expanded flanges reinforced by perforated stiffening rib; use on columns and for finishing masonry corners.

5. Casing Beads: Fabricated from zinc or zinc-coated (galvanized) steel; square-edged style; with expanded flanges.
6. Control Joints: Fabricated from zinc or zinc-coated (galvanized) steel; one-piece-type, folded pair of unperforated screeds in M-shaped configuration; with perforated flanges and removable protective tape on plaster face of control joint.
7. Expansion Joints: Fabricated from zinc or zinc-coated (galvanized) steel; folded pair of unperforated screeds in M-shaped configuration; with expanded flanges.
8. Two-Piece Expansion Joints: Fabricated from zinc or zinc-coated (galvanized) steel; formed to produce slip-joint and square-edged reveal that is adjustable from 1/4 to 5/8 inch wide; with perforated flanges.

2.3 MISCELLANEOUS MATERIALS

A. Water for Mixing: Potable and free of substances capable of affecting plaster set or of damaging plaster, lath, or accessories.

B. Fiber for Base Coat: Alkaline-resistant glass or polypropylene fibers, 1/2 inch long, free of contaminants, manufactured for use in portland cement plaster.
C. Bonding Compound: ASTM C 932.
D. Steel Drill Screws: For metal-to-metal fastening, ASTM C 1002 or ASTM C 954, as required by thickness of metal being fastened; with pan head that is suitable for application; in lengths required to achieve penetration through joined materials of no fewer than three exposed threads.
E. Fasteners for Attaching Metal Lath to Substrates: Complying with ASTM C 1063.
F. Wire: ASTM A 641/A 641M, Class 1 zinc coating, soft temper, not less than 0.0475-inch diameter, unless otherwise indicated.
G. Sound Attenuation Blankets: ASTM C 665, Type I (blankets without membrane facing) produced by combining thermosetting resins with mineral fibers manufactured from glass, slag wool, or rock wool.

1. Fire-Resistance-Rated Assemblies: Comply with mineral-fiber requirements of assembly.
2. Recycled Content: Postconsumer recycled content plus one-half of preconsumer recycled content not less than 10% percent by weight.

2.4 PLASTER MATERIALS

A. Portland Cement: ASTM C 150, Type II (exterior).

1. Color for Finish Coats: Gray.

B. Plastic Cement: ASTM C 1328.
C. Lime: ASTM C 206, Type S; or ASTM C 207, Type S.
D. Sand Aggregate: ASTM C 897.
E. Ready-Mixed Finish-Coat Plaster: Mill-mixed portland cement, aggregates, and proprietary ingredients.

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:

a. Bonsal American, an Oldcastle Company; Marblesil Stucco Mix.
b. Florida Stucco; Florida Stucco.
c. Omega Products International, Inc.; ColorTek Exterior Stucco.
d. QUIKCRETE; QUIKCRETE Finish Coat Stucco, No. 1201.
e. Shamrock Stucco LLC; Exterior Stucco.
f. SonoWall, BASF Wall Systems, Inc.; Thoro Stucco.
g. USG Corporation; Oriental Exterior Finish Stucco.

F. Keene Cement: ASTM C61 (for all interior cement plaster)

2.5 PLASTER MIXES

A. General: Comply with ASTM C 926 for applications indicated.

1. Fiber Content: Add fiber to base-coat mixes after ingredients have mixed at least two minutes. Comply with fiber manufacturer's written instructions for fiber quantities in mixes, but do not exceed 1 lb of fiber/cu. yd. of cementitious materials.

B. Base-Coat Mixes for Use over Metal Lath: Scratch and brown coats for three-coat plasterwork as follows:

1. Portland Cement Mixes:

a. Scratch Coat: For cementitious material, mix 1 part portland cement and 0 to 3/4 parts lime. Use 2-1/2 to 4 parts aggregate per part of cementitious material.
b. Brown Coat: For cementitious material, mix 1 part portland cement and 0 to 3/4 parts lime. Use 3 to 5 parts aggregate per part of cementitious material, but not less than volume of aggregate used in scratch coat.

2. Portland and Plastic Cement Mixes:

a. Scratch Coat: For cementitious material, mix 1 part plastic cement and 1 part portland cement. Use 2-1/2 to 4 parts aggregate per part of cementitious material.
b. Brown Coat: For cementitious material, mix 1 part plastic cement and 1 part portland cement. Use 3 to 5 parts aggregate per part of cementitious material, but not less than volume of aggregate used in scratch coat.

C. Factory-Prepared Finish-Coat Mixes: For ready-mixed finish-coat plasters, comply with manufacturer's written instructions.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine areas and substrates, with Installer present, and including welded hollow-metal frames, cast-in anchors, and structural framing, for compliance with requirements and other conditions affecting performance of the Work.
B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Protect adjacent work from soiling, spattering, moisture deterioration, and other harmful effects caused by plastering.
B. Prepare solid substrates for plaster that are smooth or that do not have the suction capability required to bond with plaster according to ASTM C 926.

3.3 INSTALLATION, GENERAL

A. Fire-Resistance-Rated Assemblies: Install components according to requirements for design designations from listing organization and publication indicated on Drawings.
B. Sound Attenuation Blankets: Where required, install blankets before installing lath unless blankets are readily installed after lath has been installed on one side.

3.4 INSTALLING METAL LATH

A. Expanded-Metal Lath: Install according to ASTM C 1063.

1. Partition Framing and Vertical Furring: Install flat rib lath.
2. Flat-Ceiling and Horizontal Framing: Install 3/8-inch rib lath.
3. Curved-Ceiling Framing: Install flat diamond-mesh lath.
4. On Solid Surfaces, Not Otherwise Furred: Install self-furring, diamond-mesh lath.

3.5 INSTALLING ACCESSORIES

A. Install according to ASTM C 1063 and at locations indicated on Drawings.
B. Reinforcement for External Corners:

1. Install cornerbead at interior and exterior locations.

C. Control Joints: Install control joints at locations indicated on Drawings and/or in specific locations approved by Architect for visual effect as follows:

1. As required to delineate plasterwork into areas (panels) of the following maximum sizes:

a. Vertical Surfaces: 144 sq. ft. .
b. Horizontal and other Nonvertical Surfaces: 100 sq. ft. .

2. At distances between control joints of not greater than 18 feet o.c.
3. As required to delineate plasterwork into areas (panels) with length-to-width ratios of not greater than 2-1/2:1.
4. Where control joints occur in surface of construction directly behind plaster.
5. Where plasterwork areas change dimensions, to delineate rectangular-shaped areas (panels) and to relieve the stress that occurs at the corner formed by the dimension change.

3.6 PLASTER APPLICATION

A. General: Comply with ASTM C 926.

1. Do not deviate more than plus or minus 1/4 inch in 10 feet from a true plane in finished plaster surfaces, as measured by a 10-foot straightedge placed on surface.
2. Finish plaster flush with metal frames and other built-in metal items or accessories that act as a plaster ground unless otherwise indicated. Where casing bead does not terminate plaster at metal frame, cut base coat free from metal frame before plaster sets and groove finish coat at junctures with metal.
3. Provide plaster surfaces that are ready to receive field-applied finishes indicated.

B. Bonding Compound: Apply on unit masonry and concrete plaster bases.
C. Walls; Base-Coat Mixes for Use over Metal Lath: Scratch and brown coats for three-coat plasterwork, on masonry or on concrete; 3/4-inch thickness.

1. Portland and plastic cement mixes.

D. Ceilings; Base-Coat Mixes for Use over Metal Lath: Scratch and brown coats for three-coat plasterwork; 3/4 inch thick on concrete.

1. Portland and plastic cement mixes.

E. Walls; Base-Coat Mix: Scratch coat for three-coat plasterwork; 3/4 inch thick on concrete masonry.

1. Portland and plastic cement mixes.

F. Ceilings; Base-Coat Mix: Scratch coat for three-coat plasterwork; 3/4 inch thick on substrate indicated.

1. Portland and plastic cement mixes.

G. Plaster Finish Coats: Apply to provide float finish to match Architect's sample.

H. Acrylic-Based Finish Coatings: Apply coating system, including primers, finish coats, and sealing topcoats, according to manufacturer's written instructions.

I. Concealed Interior Plasterwork:

1. Where plaster application will be concealed behind built-in cabinets, similar furnishings, and equipment, apply finish coat.
2. Where plaster application will be concealed above suspended ceilings and in similar locations, finish coat may be omitted.

3.7 PLASTER REPAIRS

A. Repair or replace work to eliminate cracks, dents, blisters, buckles, crazing and check cracking, dry outs, efflorescence, sweat outs, and similar defects and where bond to substrate has failed.

3.8 PROTECTION

A. Remove temporary protection and enclosure of other work. Promptly remove plaster from door frames, windows, and other surfaces not indicated to be plastered. Repair floors, walls, and other surfaces stained, marred, or otherwise damaged during plastering.

END OF SECTION 092400

SECTION 092900 - GYPSUM BOARD

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes the following:

1. Interior gypsum board.
2. Interior sound reducing gypsum board

B. Related Sections include the following:

1. Division 05 Section "Cold-Formed Metal Framing" for load-bearing steel framing that supports gypsum board.
2. Division 06 Section "Rough Carpentry" for wood framing and furring that supports gypsum board.
3. Division 06 Section “Sheathing” for exterior Glass Matt Faced Gypsum Sheathing
4. Division 07 Section "Thermal Insulation" for insulation and vapor retarders installed in assemblies that incorporate gypsum board.
5. Division 07 Section "Fire-Resistive Joint Systems" for head-of-wall assemblies that incorporate gypsum board.
6. Division 09 Section "Non-Structural Metal Framing" for non-structural framing and suspension systems that support gypsum board.
7. Division 09 Section "Tiling" for cementitious backer units installed as substrates for ceramic tile.
8. Division 09 painting Sections for primers applied to gypsum board surfaces.

1.3 SUBMITTALS

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

B. Submittals:

1. Product Data for adhesives used to laminate gypsum board panels to substrates, documentation including printed statement of VOC content.
2. Laboratory Test Reports for adhesives used to laminate gypsum board panels to substrates, documentation indicating that products comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."

C. Samples: For the following products:

1. Textured Finishes: Manufacturer's standard size for each textured finish indicated and on same backing indicated for Work.

1.4 QUALITY ASSURANCE

A. Fire-Resistance-Rated Assemblies: For fire-resistance-rated assemblies, provide materials and construction identical to those tested in assembly indicated according to ASTM E 119 by an independent testing agency.

B. STC-Rated Assemblies: For STC-rated assemblies, provide materials and construction identical to those tested in assembly indicated according to ASTM E 90 and classified according to ASTM E 413 by an independent testing agency.

C. Mockups: Before beginning gypsum board installation, install mockups of at least 100 sq. ft. in surface area to demonstrate aesthetic effects and set quality standards for materials and execution.

1. Install mockups for the following:

a. Each level of gypsum board finish indicated for use in exposed locations.
b. Each texture finish indicated.

2. Apply or install final decoration indicated, including painting and wallcoverings, on exposed surfaces for review of mockups.
3. Simulate finished lighting conditions for review of mockups.
4. Approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.5 STORAGE AND HANDLING

A. Store materials inside under cover and keep them dry and protected against damage from weather, condensation, direct sunlight, construction traffic, and other causes. Stack panels flat to prevent sagging.

1.6 PROJECT CONDITIONS

A. Environmental Limitations: Comply with ASTM C 840 requirements or gypsum board manufacturer's written recommendations, whichever are more stringent.
B. Do not install interior products until installation areas are enclosed and conditioned.
C. Do not install panels that are wet, those that are moisture damaged, and those that are mold damaged.

1. Indications that panels are wet or moisture damaged include, but are not limited to, discoloration, sagging, or irregular shape.
2. Indications that panels are mold damaged include, but are not limited to, fuzzy or splotchy surface contamination and discoloration.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Fire-Resistance-Rated Assemblies: For fire-resistance-rated assemblies, provide materials and construction identical to those tested in assembly indicated according to ASTM E 119 by an independent testing agency.

B. STC-Rated Assemblies: For STC-rated assemblies, provide materials and construction identical to those tested in assembly indicated according to ASTM E 90 and classified according to ASTM E 413 by an independent testing agency.

2.2 GYPSUM BOARD, GENERAL

A. Size: Provide in maximum lengths and widths available that will minimize joints in each area and that correspond with support system indicated.

2.3 INTERIOR GYPSUM BOARD

A. General: Complying with ASTM C 36/C 36M or ASTM C 1396/C 1396M, as applicable to type of gypsum board indicated and whichever is more stringent.

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

a. Standard gypsum board products

1) American Gypsum Co.
2) BPB America Inc.
3) G-P Gypsum.
4) Lafarge North America Inc.
5) National Gypsum Company.
6) PABCO Gypsum.
7) Temple.
8) USG Corporation.

B. Regular Type:

1. Thickness: 5/8 inch .
2. Long Edges: Tapered or Tapered and featured (rounded or beveled) for prefilling.
3. Moisture resistant type where indicated.

C. Ceiling Type: Moisture resistant manufactured to have more sag resistance than regular-type gypsum board.

1. Thickness: 5/8 inch .
2. Long Edges: Tapered.

D. Type C:

1. Thickness: 5/8 inch.
2. Long Edges: Tapered.

2.4 TRIM ACCESSORIES

A. Interior Trim: ASTM C 1047.

1. Material: Galvanized or aluminum-coated steel sheet, Rolled zinc or Plastic.
2. Shapes:

a. Cornerbead.

b. Bullnose bead.
c. LC-Bead: J-shaped; exposed long flange receives joint compound.
d. L-Bead: L-shaped; exposed long flange receives joint compound.
e. U-Bead: J-shaped; exposed short flange does not receive joint compound.
f. Expansion (control) joint.
g. Curved-Edge Cornerbead: With notched or flexible flanges.

2.5 JOINT TREATMENT MATERIALS

A. General: Comply with ASTM C 475/C 475M.

B. Joint Tape:

1. Interior Gypsum Wallboard: Paper.

C. Joint Compound for Interior Gypsum Wallboard: For each coat use formulation that is compatible with other compounds applied on previous or for successive coats.

1. Prefilling: At open joints, rounded or beveled panel edges, and damaged surface areas, use setting-type taping compound.
2. Embedding and First Coat: For embedding tape and first coat on joints, fasteners, and trim flanges, use drying-type, all-purpose compound.
3. Fill Coat: For second coat, use drying-type, all-purpose compound.
4. Finish Coat: For third coat, use drying-type, all-purpose compound.

2.6 AUXILIARY MATERIALS

A. General: Provide auxiliary materials that comply with referenced installation standards and manufacturer's written recommendations.

B. Steel Drill Screws: ASTM C 1002, unless otherwise indicated.

1. Use screws complying with ASTM C 954 for fastening panels to steel members from 0.033 to 0.112 inch thick.

C. Sound Attenuation Blankets: ASTM C 665, Type I (blankets without membrane facing) produced by combining thermosetting resins with mineral fibers manufactured from glass, slag wool, or rock wool.

1. Fire-Resistance-Rated Assemblies: Comply with mineral-fiber requirements of assembly.

D. Acoustical Sealant: As specified in Division 07 Section "Joint Sealants."

E. Thermal Insulation: As specified in Division 07 Section "Thermal Insulation."

2.7 TEXTURE FINISHES

A. Primer: As recommended by textured finish manufacturer.

B. Aggregate Finish: Water-based, job-mixed, aggregated, drying-type texture finish for spray application.

1. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, the following:

a. G-P Gypsum; Georgia-Pacific Ceiling Textures/Vermiculite.
b. USG Corporation; SHEETROCK Wall and Ceiling Spray Texture (Aggregated).

2. Texture: Light spatter.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine areas and substrates, with Installer present, and including welded hollow-metal frames and framing, for compliance with requirements and other conditions affecting performance.
B. Examine panels before installation. Reject panels that are wet, moisture damaged, and mold damaged.
C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 APPLYING AND FINISHING PANELS, GENERAL

A. Comply with ASTM C 840.
B. Install ceiling panels across framing to minimize the number of abutting end joints and to avoid abutting end joints in central area of each ceiling. Stagger abutting end joints of adjacent panels not less than one framing member.
C. Install panels with face side out. Butt panels together for a light contact at edges and ends with not more than 1/16 inch of open space between panels. Do not force into place.
D. Locate edge and end joints over supports, except in ceiling applications where intermediate supports or gypsum board back-blocking is provided behind end joints. Do not place tapered edges against cut edges or ends. Stagger vertical joints on opposite sides of partitions. Do not make joints other than control joints at corners of framed openings.
E. Form control and expansion joints with space between edges of adjoining gypsum panels.
F. Cover both faces of support framing with gypsum panels in concealed spaces (above ceilings, etc.), except in chases braced internally.

1. Unless concealed application is indicated or required for sound, fire, air, or smoke ratings, coverage may be accomplished with scraps of not less than 8 sq. ft. in area.
2. Fit gypsum panels around ducts, pipes, and conduits.
3. Where partitions intersect structural members projecting below underside of floor/roof slabs and decks, cut gypsum panels to fit profile formed by structural members; allow 1/4- to 3/8-inch- wide joints to install sealant.

G. Isolate perimeter of gypsum board applied to non-load-bearing partitions at structural abutments, except floors. Provide 1/4- to 1/2-inch- wide spaces at these locations, and trim edges with edge trim where edges of panels are exposed. Seal joints between edges and abutting structural surfaces with acoustical sealant.
H. Attachment to Steel Framing: Attach panels so leading edge or end of each panel is attached to open (unsupported) edges of stud flanges first.
I. STC-Rated Assemblies: Seal construction at perimeters, behind control joints, and at openings and penetrations with a continuous bead of acoustical sealant. Install acoustical sealant at both faces of partitions at perimeters and through penetrations. Comply with ASTM C 919 and with manufacturer's written recommendations for locating edge trim and closing off sound-flanking paths around or through assemblies, including sealing partitions above acoustical ceilings.

3.3 APPLYING INTERIOR GYPSUM BOARD

A. Install interior gypsum board in the following locations:

1. Regular Type: Vertical surfaces, unless otherwise indicated.
2. Type C: Where required for specific fire-resistance-rated assembly indicated.
3. Ceiling Type: Ceiling surfaces.

B. Single-Layer Application:

1. On ceilings, apply gypsum panels before wall/partition board application to greatest extent possible and at right angles to framing, unless otherwise indicated.
2. On partitions/walls, apply gypsum panels horizontally (perpendicular to framing), unless otherwise indicated or required by fire-resistance-rated assembly, and minimize end joints.

    a. Stagger abutting end joints not less than one framing member in alternate courses of panels.
    b. At stairwells and other high walls, install panels horizontally, unless otherwise indicated or required by fire-resistance-rated assembly.

3. On Z-furring members, apply gypsum panels vertically (parallel to framing) with no end joints. Locate edge joints over furring members.
4. Fastening Methods: Apply gypsum panels to supports with steel drill screws.

3.4 INSTALLING TRIM ACCESSORIES

A. General: For trim with back flanges intended for fasteners, attach to framing with same fasteners used for panels. Otherwise, attach trim according to manufacturer's written instructions.
B. Control Joints: Install control joints at locations indicated on Drawings and/or according to ASTM C 840 and in specific locations approved by Architect for visual effect.
C. Interior Trim: Install in the following locations:

1. Cornerbead: Use at outside corners.
2. LC-Bead: Use at exposed panel edges.
3. Curved-Edge Cornerbead: Use at curved openings.

3.5 FINISHING GYPSUM BOARD

A. General: Treat gypsum board joints, interior angles, edge trim, control joints, penetrations, fastener heads, surface defects, and elsewhere as required to prepare gypsum board surfaces for decoration. Promptly remove residual joint compound from adjacent surfaces.
B. Prefill open joints, rounded or beveled edges, and damaged surface areas.
C. Apply joint tape over gypsum board joints, except those with trim having flanges not intended for tape.
D. Gypsum Board Finish Levels: Finish panels to levels indicated below and according to ASTM C 840:

1. Level 1: Ceiling plenum areas and concealed areas.
2. Level 2: Panels that are substrate for tile.
3. Level 3: At panel surfaces that will have a heavily textured wall finish.

    a. Primer and its application to surfaces are specified in other Division 09 Sections.

4. Level 4: At panel surfaces that will be exposed to view, unless otherwise indicated.

    a. Primer and its application to surfaces are specified in other Division 09 Sections.

E. Cementitious Backer Units: Finish according to manufacturer's written instructions.

3.6 APPLYING TEXTURE FINISHES

A. Surface Preparation and Primer: Prepare and apply primer to gypsum panels and other surfaces receiving texture finishes. Apply primer to surfaces that are clean, dry, and smooth.
B. Texture Finish Application: Mix and apply finish using powered spray equipment, to produce a uniform texture matching approved mockup and free of starved spots or other evidence of thin application or of application patterns.
C. Prevent texture finishes from coming into contact with surfaces not indicated to receive texture finish by covering them with masking agents, polyethylene film, or other means. If, despite these precautions, texture finishes contact these surfaces, immediately remove droppings and overspray to prevent damage according to texture-finish manufacturer's written recommendations.

3.7 PROTECTION

A. Protect installed products from damage from weather, condensation, direct sunlight, construction, and other causes during remainder of the construction period.
B. Remove and replace panels that are wet, moisture damaged, and mold damaged.

    1. Indications that panels are wet or moisture damaged include, but are not limited to, discoloration, sagging, or irregular shape.
    2. Indications that panels are mold damaged include, but are not limited to, fuzzy or splotchy surface contamination and discoloration.

END OF SECTION 092900

SECTION 093000 - TILING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

1. Ceramic tile.
2. Stone thresholds and sills.
3. Tile backing panels.

B. Related Sections:

1. Division 07 Section "Cold Fluid-Applied Waterproofing" for waterproofing under setting beds.
2. Division 07 Section "Joint Sealants" for sealing of expansion, contraction, control, and isolation joints in tile surfaces.

1.3 DEFINITIONS

A. General: Definitions in the ANSI A108 series of tile installation standards and in ANSI A137.1 apply to Work of this Section unless otherwise specified.
B. Module Size: Actual tile size plus joint width indicated.
C. Face Size: Actual tile size, excluding spacer lugs.

1.4 PERFORMANCE REQUIREMENTS

A. Static Coefficient of Friction: For tile installed on walkway surfaces, provide products with the following values as determined by testing identical products per ASTM C 1028:

1. Level Surfaces: Minimum ≥.6
2. Ramp Surfaces: Minimum ≥.8

1.5 ACTION SUBMITTALS

A. Shop Drawings: Show locations of each type of tile and tile pattern. Show widths, details, and locations of expansion, contraction, control, and isolation joints in tile substrates and finished tile surfaces.
B. Samples for Initial Selection: For each type of tile and grout indicated. Include Samples of accessories involving color selection.
C. Samples for Verification:

1. Full-size units of each type and composition of tile and for each color and finish required. For ceramic mosaic tile in color blend patterns, provide full sheets of each color blend.

2. Assembled samples mounted on a rigid panel, with grouted joints, for each type and composition of tile and for each color and finish required. Make samples at least 12 inches square, but not fewer than 4 tiles. Use grout of type and in color or colors approved for completed Work.
3. Full-size units of each type of trim and accessory for each color and finish required.
4. Stone thresholds and sills in 6-inch lengths.
5. Metal edge strips in 6-inch lengths.

1.6 INFORMATIONAL SUBMITTALS

A. Qualification Data: For qualified Installer.
B. Master Grade Certificates: For each shipment, type, and composition of tile, signed by tile manufacturer and Installer.
C. Product Certificates: For each type of product, signed by product manufacturer.
D. Material Test Reports: For each tile-setting and -grouting product and special purpose tile.

1.7 MAINTENANCE MATERIAL SUBMITTALS

A. Furnish extra materials that match and are from same production runs as products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Tile and Trim Units: Furnish quantity of full-size units equal to 3 percent of amount installed for each type, composition, color, pattern, and size indicated.
2. Grout: Furnish quantity of grout equal to 3 percent of amount installed for each type, composition, and color indicated.

1.8 QUALITY ASSURANCE

A. Source Limitations for Tile: Obtain tile of each type and color or finish from one source or producer.

1. Obtain tile of each type and color or finish from same production run and of consistent quality in appearance and physical properties for each contiguous area.

B. Source Limitations for Setting and Grouting Materials: Obtain ingredients of a uniform quality for each mortar, adhesive, and grout component from one manufacturer and each aggregate from one source or producer.
C. Source Limitations for Other Products: Obtain each of the following products specified in this Section from a single manufacturer for each product:

1. Stone thresholds and sills.
2. Joint sealants.
3. Cementitious backer units.

D. Mockups: Build mockups to verify selections made under sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.

1. Build mockup of each type of floor tile installation.
2. Build mockup of each type of wall tile installation.
3. Build mockup of cistern tile installation.
4. Approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

E. Preinstallation Conference: Conduct conference at Project site.

1. Review requirements in ANSI A108.01 for substrates and for preparation by other trades.

1.9 DELIVERY, STORAGE, AND HANDLING

A. Deliver and store packaged materials in original containers with seals unbroken and labels intact until time of use. Comply with requirements in ANSI A137.1 for labeling tile packages.
B. Store tile and cementitious materials on elevated platforms, under cover, and in a dry location.
C. Handle tile that has temporary protective coating on exposed surfaces to prevent coated surfaces from contacting backs or edges of other units. If coating does contact bonding surfaces of tile, remove coating from bonding surfaces before setting tile.

1.10 PROJECT CONDITIONS

A. Environmental Limitations: Do not install tile until construction in spaces is complete and ambient temperature and humidity conditions are maintained at the levels indicated in referenced standards and manufacturer's written instructions.

1.11 EXTRA MATERIALS

A. Furnish extra materials that match and are from same production runs as products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Tile and Trim Units: Furnish quantity of full-size units equal to 3 percent of amount installed for each type, composition, color, pattern, and size indicated.
2. Grout: Furnish quantity of grout equal to 3 percent of amount installed for each type, composition, and color indicated.

PART 2 - PRODUCTS

2.1 PRODUCTS, GENERAL

A. ANSI Ceramic Tile Standard: Provide tile that complies with ANSI A137.1 for types, compositions, and other characteristics indicated.

1. Provide tile complying with Standard grade requirements unless otherwise indicated.

B. ANSI Standards for Tile Installation Materials: Provide materials complying with ANSI A108.02, ANSI standards referenced in other Part 2 articles, ANSI standards referenced by TCA installation methods specified in tile installation schedules, and other requirements specified.
C. Factory Blending: For tile exhibiting color variations within ranges, blend tile in factory and package so tile units taken from one package show same range in colors as those taken from other packages and match approved Samples.
D. Mounting: For factory-mounted tile, provide back- or edge-mounted tile assemblies as standard with manufacturer unless otherwise indicated.

1. Where tile is indicated for installation in wet areas, do not use back- or edge-mounted tile assemblies unless tile manufacturer specifies in writing that this type of mounting is suitable for installation indicated and has a record of successful in-service performance.

E. Factory-Applied Temporary Protective Coating: Where indicated under tile type, protect exposed surfaces of tile against adherence of mortar and grout by precoating with continuous film of petroleum paraffin wax, applied hot. Do not coat unexposed tile surfaces.

2.2 TILE PRODUCTS

A. Tile Type: Factory-mounted unglazed and glazed ceramic mosaic tile.

1. Basis-of-Design Product: Subject to compliance with requirements, provide product indicated on Drawings:
2. Composition: Vitreous or impervious natural clay or porcelain.
3. Module Size: as indicated on drawings.
4. Thickness: 1/4 inch.
5. Face: Pattern of design indicated, with cushion edges.
6. Surface: Smooth, without abrasive admixture.
7. Finish: As indicated on drawings.
8. Tile Color and Pattern: As indicated on drawings.
9. Grout Color: Match Architect's sample.
10. Trim Units: Coordinated with sizes and coursing of adjoining flat tile where applicable and matching characteristics of adjoining flat tile. Provide shapes as follows, selected from manufacturer's standard shapes:

    a. Base Cove: Cove, module size to match tile indicated on drawings.
    b. Base Cap for Thin-Set Mortar Installations: Surface bullnose, module size to match tile indicated on drawings
    c. External Corners for Thin-Set Mortar Installations: Surface bullnose, module size to match tile indicated on drawings.
    d. Internal Corners: Cove, module size to match tile indicated on drawings.
    e. Internal Corners: Field-butted square corners. For coved base and cap, use angle pieces designed to fit with stretcher shapes.
    f. Tapered Transition Tile: Shape designed to effect transition between thickness of tile floor and adjoining floor finishes of different thickness, tapered to provide reduction in thickness from 1/2 to 1/4 inch across nominal 4-inch dimension.

B. Tile Type: Glazed wall tile and Decorative thin wall tile.

1. Basis-of-Design Product: Subject to compliance with requirements, provide product indicated on Drawings:
2. Module Size: as indicated on drawings.
3. Thickness: 5/16 inch .
4. Face: Pattern of design indicated, with manufacturer's standard edges.
5. Finish: As indicated on drawings..
6. Tile Color and Pattern: As indicated on drawings.
7. Grout Color: Match Architect's sample.
8. Mounting: Factory, back mounted.
9. Mounting: Pregrouted sheets of tiles factory assembled and grouted with manufacturer's standard white silicone rubber.
10. Trim Units: Coordinated with sizes and coursing of adjoining flat tile where applicable and matching characteristics of adjoining flat tile. Provide shapes as follows, selected from manufacturer's standard shapes:

    a. Base for Thin-Set Mortar Installations: Straight, module size to match tile indicated on drawings
    b. External Corners for Thin-Set Mortar Installations: Surface bullnose, same size as adjoining flat tile.
    c. Internal Corners: Field-butted square corners. For coved base and cap use angle pieces designed to fit with stretcher shapes.

C. Tile Type: Glass Mosaic tile for precast concrete water feature.

1. Basis-of-Design Product: Subject to compliance with requirements, provide product indicated on Drawings:
2. Module Size: 1” x 1”.
3. Thickness: 1/4 inch.
4. Face: Pattern of design indicated, with manufacturer's standard edges.
5. Finish: As indicated on drawings.
6. Tile Color and Pattern: As indicated on drawings.
7. Grout Color: Match Architect's sample.

2.3 THRESHOLDS AND SILLS

A. General: Fabricate to sizes and profiles indicated or required to provide transition between adjacent floor finishes.

1. Bevel edges at 1:2 slope, with lower edge of bevel aligned with or up to 1/16 inch above adjacent floor surface. Finish bevel to match top surface of threshold. Limit height of threshold to 1/2 inch or less above adjacent floor surface.

B. Marble Thresholds and Sills: ASTM C 503, with a minimum abrasion resistance of 10 per ASTM C 1353 or ASTM C 241 and with honed finish.

1. Description: Uniform, fine- to medium-grained white stone with gray veining.

2.4 TILE BACKING PANELS

A. Cementitious Backer Units: ANSI A118.9 or ASTM C 1325, in maximum lengths available to minimize end-to-end butt joints.

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:

a. C-Cure; C-Cure Board 990.
b. Custom Building Products; Wonderboard.
c. FinPan, Inc.; Util-A-Crete Concrete Backer Board.
d. USG Corporation; DUROCK Cement Board.

2. Thickness: 5/8 inch or as indicated.

2.5 SETTING MATERIALS

A. Latex-Portland Cement Mortar (Thin Set): ANSI A118.4.

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

a. Boiardi Products; a QEP company.
b. Bonsal American; an Oldcastle company.
c. Bostik, Inc.
d. C-Cure.
e. Custom Building Products.
f. Jamo Inc.

g. Laticrete International, Inc.
h. MAPEI Corporation.
i. Mer-Kote Products, Inc.
j. Southern Grouts & Mortars, Inc.
k. Summitville Tiles, Inc.
l. TEC; a subsidiary of H. B. Fuller Company.

2. Provide prepackaged, dry-mortar mix combined with acrylic resin or styrene-butadiene-rubber liquid-latex additive at Project site.
3. For wall applications, provide mortar that complies with requirements for nonsagging mortar in addition to the other requirements in ANSI A118.4.

2.6 GROUT MATERIALS

A. Polymer-Modified Tile Grout: ANSI A118.7.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
2. Polymer Type: Acrylic resin or styrene-butadiene rubber in liquid-latex form for addition to prepackaged dry-grout mix.

B. Grout for Pregrouted Tile Sheets: Same product used in factory to pregrout tile sheets.

2.7 ELASTOMERIC SEALANTS

A. General: Provide sealants, primers, backer rods, and other sealant accessories that comply with the following requirements and with the applicable requirements in Division 07 Section "Joint Sealants."

1. Use sealants that have a VOC content of 250 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
2. Use primers, backer rods, and sealant accessories recommended by sealant manufacturer.

B. Colors: Provide colors of exposed sealants to match colors of grout in tile adjoining sealed joints unless otherwise indicated.

C. One-Part, Mildew-Resistant Silicone Sealant: ASTM C 920; Type S; Grade NS; Class 25; Uses NT, G, A, and, as applicable to nonporous joint substrates indicated, O; formulated with fungicide, intended for sealing interior ceramic tile joints and other nonporous substrates that are subject to in-service exposures of high humidity and extreme temperatures.

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:

a. DAP Inc.; Titanium Enriched Kitchen and Bath Sealant or 100 percent Silicone Kitchen and Bath Sealant.
b. Dow Corning Corporation; Dow Corning 786.
c. GE Silicones; a division of GE Specialty Materials; Sanitary 1700.
d. Laticrete International, Inc.; Latasil Tile & Stone Sealant.
e. Pecora Corporation; Pecora 898 Sanitary Silicone Sealant.
f. Tremco Incorporated; Tremsil 600 White.

2.8 MISCELLANEOUS MATERIALS

A. Trowelable Underlayments and Patching Compounds: Latex-modified, portland cement-based formulation provided or approved by manufacturer of tile-setting materials for installations indicated.
B. Temporary Protective Coating: Product indicated below that is formulated to protect exposed surfaces of tile against adherence of mortar and grout; compatible with tile, mortar, and grout products; and easily removable after grouting is completed without damaging grout or tile.

    1. Petroleum paraffin wax, fully refined and odorless, containing at least 0.5 percent oil with a melting point of 120 to 140 deg F per ASTM D 87.

C. Tile Cleaner: A neutral cleaner capable of removing soil and residue without harming tile and grout surfaces, specifically approved for materials and installations indicated by tile and grout manufacturers.
D. Grout Sealer: Manufacturer's standard silicone product for sealing grout joints and that does not change color or appearance of grout.

    1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:

        a. Bonsal American; an Oldcastle company; Grout Sealer.
        b. Bostik, Inc.; CeramaSeal Grout & Tile Sealer or Siloxane 220.
        c. C-Cure; Penetrating Sealer 978.
        d. Custom Building Products; Surfaceguard or Grout and Tile Sealer.
        e. Jamo Inc.; Matte Finish or Penetrating Sealer.
        f. MAPEI Corporation; KER 003, Silicone Spray Sealer for Cementitious Tile Grout or 004, Keraseal Penetrating Sealer for Unglazed Grout and Tile.
        g. Southern Grouts & Mortars, Inc.; Silicone Grout Sealer.
        h. Summitville Tiles, Inc.; SL-15, Invisible Seal Penetrating Grout and Tile Sealer.
        i. TEC; a subsidiary of H. B. Fuller Company; TA-256 Penetrating Silicone or TA-257 Silicone Grout Sealer.

2.9 MIXING MORTARS AND GROUT

A. Mix mortars and grouts to comply with referenced standards and mortar and grout manufacturers' written instructions.
B. Add materials, water, and additives in accurate proportions.
C. Obtain and use type of mixing equipment, mixer speeds, mixing containers, mixing time, and other procedures to produce mortars and grouts of uniform quality with optimum performance characteristics for installations indicated.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions where tile will be installed, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of installed tile.

    1. Verify that substrates for setting tile are firm, dry, clean, free of coatings that are incompatible with tile-setting materials including curing compounds and other substances that contain soap, wax, oil, or silicone; and comply with flatness tolerances required by ANSI A108.01 for installations indicated.
    2. Verify that concrete substrates for tile floors installed with adhesives or thin-set mortar comply with surface finish requirements in ANSI A108.01 for installations indicated.

a. Verify that surfaces that received a steel trowel finish have been mechanically scarified.
b. Verify that protrusions, bumps, and ridges have been removed by sanding or grinding.

3. Verify that installation of grounds, anchors, recessed frames, electrical and mechanical units of work, and similar items located in or behind tile has been completed.
4. Verify that joints and cracks in tile substrates are coordinated with tile joint locations; if not coordinated, adjust joint locations in consultation with Architect.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Fill cracks, holes, and depressions in concrete substrates for tile floors installed with adhesives or thin-set mortar with trowelable leveling and patching compound specifically recommended by tile-setting material manufacturer.
B. Blending: For tile exhibiting color variations, verify that tile has been factory blended and packaged so tile units taken from one package show same range of colors as those taken from other packages and match approved Samples. If not factory blended, either return to manufacturer or blend tiles at Project site before installing.
C. Field-Applied Temporary Protective Coating: If indicated under tile type or needed to prevent grout from staining or adhering to exposed tile surfaces, precoat them with continuous film of temporary protective coating, taking care not to coat unexposed tile surfaces.

3.3 TILE INSTALLATION

A. Comply with TCA's "Handbook for Ceramic Tile Installation" for TCA installation methods specified in tile installation schedules. Comply with parts of the ANSI A108 Series "Specifications for Installation of Ceramic Tile" that are referenced in TCA installation methods, specified in tile installation schedules, and apply to types of setting and grouting materials used.

1. For the following installations, follow procedures in the ANSI A108 Series of tile installation standards for providing 95 percent mortar coverage:

a. Tile floors in wet areas.
b. Tile floors composed of tiles 8 by 8 inches or larger.
c. Tile floors composed of rib-backed tiles.

B. Extend tile work into recesses and under or behind equipment and fixtures to form complete covering without interruptions unless otherwise indicated. Terminate work neatly at obstructions, edges, and corners without disrupting pattern or joint alignments.
C. Accurately form intersections and returns. Perform cutting and drilling of tile without marring visible surfaces. Carefully grind cut edges of tile abutting trim, finish, or built-in items for straight aligned joints. Fit tile closely to electrical outlets, piping, fixtures, and other penetrations so plates, collars, or covers overlap tile.
D. Jointing Pattern: Lay tile in grid pattern unless otherwise indicated. Lay out tile work and center tile fields in both directions in each space or on each wall area. Lay out tile work to minimize the use of pieces that are less than half of a tile. Provide uniform joint widths unless otherwise indicated.

1. For tile mounted in sheets, make joints between tile sheets same width as joints within tile sheets so joints between sheets are not apparent in finished work.
2. Where adjoining tiles on floor, base, walls, or trim are specified or indicated to be same size, align joints.

3. Where tiles are specified or indicated to be whole integer multiples of adjoining tiles on floor, base, walls, or trim, align joints unless otherwise indicated.

E. Joint Widths: Unless otherwise indicated, install tile with the following joint widths:

1. Ceramic Mosaic Tile: 1/16 inch.
2. Paver Tile: 3/8 inch.
3. Glazed Wall Tile: 1/16 inch.
4. Decorative Thin Wall Tile: 1/16 inch.

F. Lay out tile wainscots to dimensions indicated or to next full tile beyond dimensions indicated.

G. Expansion Joints: Provide expansion joints and other sealant-filled joints, including control, contraction, and isolation joints, where indicated. Form joints during installation of setting materials, mortar beds, and tile. Do not saw-cut joints after installing tiles.

1. Where joints occur in concrete substrates, locate joints in tile surfaces directly above them.
2. Prepare joints and apply sealants to comply with requirements in Division 07 Section "Joint Sealants."

H. Stone Thresholds and Sills: Install stone thresholds in same type of setting bed as adjacent floor unless otherwise indicated.

1. At locations where mortar bed (thickset) would otherwise be exposed above adjacent floor finishes, set thresholds in latex-portland cement mortar (thin set).
2. Do not extend cleavage membrane, waterproofing or crack isolation membrane under thresholds set in latex-portland cement mortar. Fill joints between such thresholds and adjoining tile set on cleavage membrane, waterproofing or crack isolation membrane with elastomeric sealant.

I. Grout Sealer: Apply grout sealer to grout joints in tile floors according to grout-sealer manufacturer's written instructions. As soon as grout sealer has penetrated grout joints, remove excess sealer and sealer from tile faces by wiping with soft cloth.

3.4 TILE BACKING PANEL INSTALLATION

A. Install cementitious backer units and treat joints according to ANSI A108.11 and manufacturer's written instructions for type of application indicated. Use latex-portland cement mortar for bonding material unless otherwise directed in manufacturer's written instructions.

3.5 WATERPROOFING INSTALLATION

A. Install waterproofing to comply with ANSI A108.13 and manufacturer's written instructions to produce waterproof membrane of uniform thickness and bonded securely to substrate.

B. Do not install tile or setting materials over waterproofing until waterproofing has cured and been tested to determine that it is watertight.

3.6 CLEANING AND PROTECTING

A. Cleaning: On completion of placement and grouting, clean all ceramic tile surfaces so they are free of foreign matter.

1. Remove latex-portland cement grout residue from tile as soon as possible.

2. Clean grout smears and haze from tile according to tile and grout manufacturer's written instructions but no sooner than 10 days after installation. Use only cleaners recommended by tile and grout manufacturers and only after determining that cleaners are safe to use by testing on samples of tile and other surfaces to be cleaned. Protect metal surfaces and plumbing fixtures from effects of cleaning. Flush surfaces with clean water before and after cleaning.
3. Remove temporary protective coating by method recommended by coating manufacturer and that is acceptable to tile and grout manufacturer. Trap and remove coating to prevent drain clogging.

B. Protect installed tile work with kraft paper or other heavy covering during construction period to prevent staining, damage, and wear. If recommended by tile manufacturer, apply coat of neutral protective cleaner to completed tile walls and floors.
C. Prohibit foot and wheel traffic from tiled floors for at least seven days after grouting is completed.
D. Before final inspection, remove protective coverings and rinse neutral protective cleaner from tile surfaces.

3.7 INTERIOR TILE INSTALLATION SCHEDULE

A. Interior Floor Installations, Concrete Subfloor:

1. Tile Installation F122: Thin-set mortar on waterproof membrane; TCA F122.

a. Tile Type: floor tile.
b. Thin-Set Mortar: Latex- portland cement mortar.
c. Grout: Polymer-modified unsanded grout.

B. Interior Wall Installations, Masonry or Concrete:

1. Tile Installation W202: Thin-set mortar; TCA W202.

a. Tile Type: wall tile.
b. Thin-Set Mortar: Latex- portland cement mortar.
c. Grout: Polymer-modified unsanded grout.

C. Interior Wall Installations, Metal Studs or Furring:

1. Tile Installation W244: Thin-set mortar on cementitious backer units or fiber cement underlayment; TCA W244.

a. Tile Type: wall tile.
b. Thin-Set Mortar: Latex- portland cement mortar.
c. Grout: Polymer-modified unsanded grout.

END OF SECTION 093000

SECTION 095113 - ACOUSTICAL PANEL CEILINGS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes acoustical panels and exposed suspension systems for ceilings.
B. Related Sections include the following:

1. Division 07 Section "Joint Sealants" for sealing joints at adjacent materials.

C. Products furnished, but not installed under this Section, include anchors, clips, and other ceiling attachment devices to be cast in concrete at ceilings.

1.3 DEFINITIONS

A. LR: Light Reflectance coefficient.
B. NRC: Noise Reduction Coefficient.

1.4 SUBMITTALS

A. Product Data: For each type of product indicated.
B. Samples for Initial Selection: For components with factory-applied color finishes.
C. Samples for Verification: For each component indicated and for each exposed finish required, prepared on Samples of size indicated below.

1. Acoustical Panel: Set of 6-inch- square Samples of each type, color, pattern, and texture.
2. Exposed Suspension System Members, Moldings, and Trim: Set of 12-inch- long Samples of each type, finish, and color.

D. Qualification Data: For testing agency.
E. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, for each acoustical panel ceiling.
F. Research/Evaluation Reports: For each acoustical panel ceiling and components and anchor and fastener type.
G. Maintenance Data: For finishes to include in maintenance manuals.

1.5 QUALITY ASSURANCE

A. 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 a single manufacturer.

B. Fire-Test-Response Characteristics: Provide acoustical panel ceilings that comply with the following requirements:

1. Surface-Burning Characteristics: Provide acoustical panels with the following surface-burning characteristics complying with ASTM E 1264 for Class A materials as determined by testing identical products per ASTM E 84:

a. Smoke-Developed Index: 450 or less.

C. Mockups: Build mockups to verify selections made under sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.

1. Approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Deliver acoustical panels, suspension system components, and accessories to Project site in original, unopened packages and store them in a fully enclosed, conditioned space where they will be protected against damage from moisture, humidity, temperature extremes, direct sunlight, surface contamination, and other causes.
B. Before installing acoustical panels, permit them to reach room temperature and a stabilized moisture content.
C. Handle acoustical panels carefully to avoid chipping edges or damaging units in any way.

1.7 PROJECT CONDITIONS

A. Environmental Limitations: Do not install acoustical panel ceilings until spaces are enclosed and weatherproof, wet work in spaces is complete and dry, work above ceilings is complete, and ambient temperature and humidity conditions are maintained at the levels indicated for Project when occupied for its intended use.

1. Pressurized Plenums: Operate ventilation system for not less than 48 hours before beginning acoustical panel ceiling installation.

1.8 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.

1.9 EXTRA MATERIALS

A. Furnish extra materials described below that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Acoustical Ceiling Panels: Full-size panels equal to 2.0 percent of quantity of each type installed.
2. Suspension System Components: Quantity of each exposed component equal to 2.0 percent of quantity of each type installed.

PART 2 - PRODUCTS

2.1 ACOUSTICAL PANELS, GENERAL

A. Recycled Content: Provide acoustical panels with recycled content such that postconsumer recycled content plus one-half of preconsumer recycled content constitutes a minimum of 10 percent by weight.

B. Acoustical Panel: Provide manufacturer's panels of configuration indicated that comply with ASTM E 1264 classifications as designated by types, patterns, acoustical ratings, and light reflectances, unless otherwise indicated.

1. Mounting Method for Measuring NRC: Type E-400; plenum mounting in which face of test specimen is 15-3/4 inches away from test surface per ASTM E 795.

C. Acoustical Panel Colors and Patterns: Match appearance characteristics indicated for each product type.

1. Where appearance characteristics of acoustical panels are indicated by referencing pattern designations in ASTM E 1264 and not manufacturers' proprietary product designations, provide products selected by Architect from each manufacturer's full range that comply with requirements indicated for type, pattern, color, light reflectance, acoustical performance, edge detail, and size.

D. 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 D 3273 and evaluated according to ASTM D 3274 or ASTM G 21.

2.2 ACOUSTICAL PANELS FOR ACOUSTICAL PANEL CEILING

A. Basis-of-Design Product: Subject to compliance with requirements, provide the product indicated on Drawings or a comparable product by one of the following:

1. Armstrong World Industries, Inc.
2. BPB USA
3. Chicago Metallic Corporation
4. Ecophon CertainTeed, Inc.
5. Tectum Inc.
6. USG Interiors, Inc.

B. Classification: Provide panels complying with ASTM E 1264 for type, form, and pattern as follows:

1. Type and Form: Type III, mineral base with painted finish; Form 2, water felted.
2. Pattern: E (lightly textured).

C. Color: As selected from manufacturer's full range or as indicated on Drawings.
D. LR: Not less than 0.75 except where color selection is black.
E. NRC: Not less than 0.50.
F. Edge/Joint Detail: Square edge and tegular.
G. Thickness: 5/8 inch.
H. Modular Size: 24 by 24 inches.

2.3 METAL SUSPENSION SYSTEMS, GENERAL

A. Metal Suspension System Standard: Provide manufacturer's standard direct-hung metal suspension systems of types, structural classifications, and finishes indicated that comply with applicable requirements in ASTM C 635.
B. Finishes and Colors, General: Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes. Provide manufacturer's standard factory-applied finish for type of system indicated.
C. Attachment Devices: Size for five times the design load indicated in ASTM C 635, Table 1, "Direct Hung," unless otherwise indicated.

1. Anchors in Concrete: Anchors of type and material indicated below, with holes or loops for attaching hangers of type indicated and with capability to sustain, without failure, a load equal to five times that imposed by ceiling construction, as determined by testing per ASTM E 488 or ASTM E 1512 as applicable, conducted by a qualified testing and inspecting agency.

a. Type: Postinstalled expansion or Postinstalled bonded anchors.
b. Corrosion Protection: Carbon-steel components zinc plated to comply with ASTM B 633, Class Fe/Zn 5 for Class SC 1 service condition.

D. Wire Hangers, Braces, and Ties: Provide wires complying with the following requirements:

1. Zinc-Coated, Carbon-Steel Wire: ASTM A 641/A 641M, Class 1 zinc coating, soft temper.
2. Size: Select wire diameter so its stress at 3 times hanger design load (ASTM C 635, Table 1, "Direct Hung") will be less than yield stress of wire, but provide not less than 0.135-inch-diameter wire.

2.4 METAL SUSPENSION SYSTEM FOR ACOUSTICAL PANEL CEILING

A. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, the following:

1. Armstrong World Industries, Inc.
2. BPB USA
3. Chicago Metallic Corporation
4. Ecophon CertainTeed, Inc.
5. USG Interiors, Inc.

B. Narrow-Face, Capped, Double-Web, Steel Suspension System: Main and cross runners roll formed from cold-rolled steel sheet, prepainted, electrolytically zinc coated, or hot-dip galvanized according to ASTM A 653/A 653M, not less than G30 (Z90) coating designation, with prefinished 9/16-inch- (15-mm-) wide metal caps on flanges.

1. Structural Classification: Heavy-duty system.
2. End Condition of Cross Runners: Override (stepped) type.
3. Face Design: Flat, flush.
4. Cap Material: Steel or aluminum cold-rolled sheet.
5. Cap Finish: Painted in color as selected from manufacturer's full range or natural finish for aluminum.

2.5 METAL EDGE MOLDINGS AND TRIM

A. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, the following:
B. Products: Subject to compliance with requirements, provide one of the following:

1. Armstrong World Industries, Inc.
2. BPB USA
3. Chicago Metallic Corporation

4. Fry Reglet Corporation
5. Gordon, Inc.
6. USG Interiors, Inc.

C. Roll-Formed, Sheet-Metal Edge Moldings and Trim: Type and profile indicated or, if not indicated, manufacturer's standard moldings for edges and penetrations; formed from sheet metal of same material, finish, and color as that used for exposed flanges of suspension system runners.

1. Provide manufacturer's standard edge moldings that fit acoustical panel edge details and suspension systems indicated and that match width and configuration of exposed runners, unless otherwise indicated.
2. For circular penetrations of ceiling, provide edge moldings fabricated to diameter required to fit penetration exactly.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, including structural framing to which acoustical panel ceilings attach or abut, with Installer present, for compliance with requirements specified in this and other Sections that affect ceiling installation and anchorage and with requirements for installation tolerances and other conditions affecting performance of acoustical panel ceilings.

1. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Measure each ceiling area and establish layout of acoustical panels to balance border widths at opposite edges of each ceiling. Avoid using less-than-half-width panels at borders, and comply with layout shown on reflected ceiling plans.

3.3 INSTALLATION

A. General: Install acoustical panel ceilings to comply with ASTM C 636 and seismic design requirements indicated, per manufacturer's written instructions and CISCA's "Ceiling Systems Handbook."
B. Suspend ceiling hangers from building's structural members and as follows:

1. Install hangers plumb and free from contact with insulation or other objects within ceiling plenum that are not part of supporting structure or of ceiling suspension system.
2. Splay hangers only where required to miss obstructions; offset resulting horizontal forces by bracing, countersplaying, or other equally effective means.
3. 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.
4. 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.
5. Do not support ceilings directly from permanent metal forms or floor deck. Fasten hangers to cast-in-place hanger inserts, postinstalled mechanical or adhesive anchors, or power-actuated fasteners that extend through forms into concrete.

6. 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.
7. Do not attach hangers to steel deck tabs.
8. Do not attach hangers to steel roof deck. Attach hangers to structural members.
9. Space hangers not more than 48 inches o.c. along each member supported directly from hangers, unless otherwise indicated; provide hangers not more than 8 inches from ends of each member.
10. 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. Install edge moldings and trim of type indicated at perimeter of acoustical ceiling area and where necessary to conceal edges of acoustical panels.

1. Apply acoustical sealant in a continuous ribbon concealed on back of vertical legs of moldings before they are installed.
2. Screw attach moldings to substrate at intervals not more than 16 inches o.c. 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.
3. Do not use exposed fasteners, including pop rivets, on moldings and trim.

E. Install suspension system runners so they are square and securely interlocked with one another. Remove and replace dented, bent, or kinked members.

F. 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.

1. For square-edged panels, install panels with edges fully hidden from view by flanges of suspension system runners and moldings.
2. Paint cut edges of panel remaining exposed after installation; match color of exposed panel surfaces using coating recommended in writing for this purpose by acoustical panel manufacturer.

3.4 CLEANING

A. Clean exposed surfaces of acoustical panel ceilings, including trim, edge moldings, and suspension system members. Comply with manufacturer's written instructions for cleaning and touchup of minor finish damage. Remove and replace ceiling components that cannot be successfully cleaned and repaired to permanently eliminate evidence of damage.

END OF SECTION 095113

SECTION 096513 - RESILIENT BASE AND ACCESSORIES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

1. Resilient base.
2. Resilient stair accessories.
3. Resilient molding accessories.

B. Related Sections:

1. Division 09 Section "Resilient Sheet Flooring" for resilient sheet floor coverings.
2. Division 09 Section "Resilient Tile Flooring" for resilient floor tile.
3. Division 09 Section "Resilient Athletic Flooring" for resilient floor coverings for use in athletic-activity or support areas.

1.3 SUBMITTALS

A. Product Data: For each type of product indicated.
B. Samples for Initial Selection: For each type of product indicated.
C. Samples for Verification: For each type of product indicated, in manufacturer's standard-size Samples but not less than 12 inches long, of each resilient product color, texture, and pattern required.
D. Product Schedule: For resilient products. Use same designations indicated on Drawings.

1.4 QUALITY ASSURANCE

A. Fire-Test-Response Characteristics: As determined by testing identical products according to ASTM E 648 or NFPA 253 by a qualified testing agency.

1. Critical Radiant Flux Classification: Class I, not less than 0.45 W/sq. cm.

B. Mockups: Provide resilient products with mockups specified in other Sections.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Store resilient products and installation materials in dry spaces protected from the weather, with ambient temperatures maintained within range recommended by manufacturer, but not less than 50 deg F or more than 90 deg F .

1.6 PROJECT CONDITIONS

A. Maintain ambient temperatures within range recommended by manufacturer, but not less than 70 deg F or more than 95 deg F, in spaces to receive resilient products during the following time periods:

1. 48 hours before installation.
2. During installation.
3. 48 hours after installation.

B. Until Substantial Completion, maintain ambient temperatures within range recommended by manufacturer, but not less than 55 deg F or more than 95 deg F.

C. Install resilient products after other finishing operations, including painting, have been completed.

1.7 EXTRA MATERIALS

A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Furnish not less than 10 linear feet for every 500 linear feet or fraction thereof, of each type, color, pattern, and size of resilient product installed.

PART 2 - PRODUCTS

2.1 RESILIENT BASE (STANDARD)

A. Resilient Base:

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

a. Armstrong World Industries, Inc.
b. Burke Mercer Flooring Products; Division of Burke Industries, Inc.
c. Johnsonite. (Basis of Design)
d. Musson, R. C. Rubber Co.
e. Roppe Corporation, USA.

B. Resilient Base Standard: ASTM F 1861.

1. Material Requirement: Type TP (rubber, thermoplastic).
2. Manufacturing Method: Group I (solid, homogeneous).
3. Style: Cove (base with toe) and Straight (flat or toeless).
4. Minimum Thickness: 0.125 inch.
5. Height: 6 inches.
6. Lengths: Coils in manufacturer's standard length.
7. Outside Corners: Preformed.
8. Inside Corners: Job formed or preformed.
9. Finish: As selected by Architect from manufacturer's full range.
10. Colors: 33 - Ink.

2.2 RESILIENT BASE (CONTOUR)

A. Resilient Base:

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

    a. Armstrong World Industries, Inc.
    b. Burke Mercer Flooring Products; Division of Burke Industries, Inc.
    c. Johnsonite (Mandalay – Basis of Design).
    d. Musson, R. C. Rubber Co.
    e. Roppe Corporation, USA.

B. Resilient Base Standard: ASTM F 1861.

1. Material Requirement: Type TP (rubber, thermoplastic).
2. Manufacturing Method: Group I (solid, homogeneous).
3. Style: Contoured.
4. Thickness: 3/8 inch.
5. Height: 4 1/2 inches.
6. Lengths: Manufacturer's standard 8 foot lengths.
7. Outside Corners: Premitered.
8. Inside Corners: Job formed or premitered.
9. Finish: As selected by Architect from manufacturer's full range.
10. Color: 33 - Ink.

2.3 RESILIENT MOLDING ACCESSORY

A. Resilient Molding Accessory:

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

    a. Armstrong World Industries, Inc.
    b. Burke Mercer Flooring Products; Division of Burke Industries, Inc.
    c. Johnsonite.
    d. Musson, R. C. Rubber Co.
    e. Roppe Corporation, USA.

B. Description: Nosing for carpet, Nosing for resilient floor covering, Reducer strip for resilient floor covering, Joiner for tile and carpet and Transition strips.
C. Material: Rubber.
D. Profile and Dimensions: As required for each condition.
E. Colors and Patterns: As selected by Architect from full range of industry colors.

2.4 INSTALLATION MATERIALS

A. Trowelable Leveling and Patching Compounds: Latex-modified, portland cement based or blended hydraulic-cement-based formulation provided or approved by manufacturer for applications indicated.
B. Adhesives: Water-resistant type recommended by manufacturer to suit resilient products and substrate conditions indicated.

1. Use adhesives that comply with the following limits for VOC content when calculated according to 40 CFR 59, Subpart D (EPA Method 24):

a. Cove Base Adhesives: Not more than 50 g/L.
b. Rubber Floor Adhesives: Not more than 60 g/L.

C. Stair-Tread-Nose Filler: Two-part epoxy compound recommended by resilient tread manufacturer to fill nosing substrates that do not conform to tread contours.
D. Floor Polish: Provide protective liquid floor polish products as recommended by resilient stair tread manufacturer.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, with Installer present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the Work.
B. Verify that finishes of substrates comply with tolerances and other requirements specified in other Sections and that substrates are free of cracks, ridges, depressions, scale, and foreign deposits that might interfere with adhesion of resilient products.
C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Prepare substrates according to manufacturer's written instructions to ensure adhesion of resilient products.
B. Concrete Substrates for Resilient Stair Treads and Accessories: Prepare according to ASTM F 710.

1. Verify that substrates are dry and free of curing compounds, sealers, and hardeners.
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.
4. Moisture Testing: Perform tests recommended by manufacturer and as follows. Proceed with installation only after substrates pass testing.

    a. Perform anhydrous calcium chloride test, ASTM F 1869. Proceed with installation only after substrates have maximum moisture-vapor-emission rate of 3 lb of water/1000 sq. ft. in 24 hours.

C. Fill cracks, holes, and depressions in substrates with trowelable leveling and patching compound and remove bumps and ridges to produce a uniform and smooth substrate.
D. Do not install resilient products until they are same temperature as the space where they are to be installed.

1. Move resilient products and installation materials into spaces where they will be installed at least 48 hours in advance of installation.

E. Sweep and vacuum clean substrates to be covered by resilient products immediately before installation.

3.3 RESILIENT BASE INSTALLATION

A. Comply with manufacturer's written instructions for installing resilient base.

B. Apply resilient base to walls, columns, pilasters, casework and cabinets in toe spaces, and other permanent fixtures in rooms and areas where base is required.
C. Install resilient base in lengths as long as practicable without gaps at seams and with tops of adjacent pieces aligned.
D. Tightly adhere resilient base to substrate throughout length of each piece, with base in continuous contact with horizontal and vertical substrates.
E. Do not stretch resilient base during installation.
F. On masonry surfaces or other similar irregular substrates, fill voids along top edge of resilient base with manufacturer's recommended adhesive filler material.
G. Preformed Corners: Install preformed corners before installing straight pieces.
H. Job-Formed Corners:

1. Inside Corners: Use straight pieces of maximum lengths possible.

3.4 RESILIENT ACCESSORY INSTALLATION

A. Comply with manufacturer's written instructions for installing resilient accessories.
B. Resilient Stair Accessories:

1. Use stair-tread-nose filler to fill nosing substrates that do not conform to tread contours.
2. Tightly adhere to substrates throughout length of each piece.
3. For treads installed as separate, equal-length units, install to produce a flush joint between units.

C. Resilient Molding Accessories: Butt to adjacent materials and tightly adhere to substrates throughout length of each piece. Install reducer strips at edges of carpet and resilient floor covering that would otherwise be exposed.

3.5 CLEANING AND PROTECTION

A. Comply with manufacturer's written instructions for cleaning and protection of resilient products.
B. Perform the following operations immediately after completing resilient product installation:

1. Remove adhesive and other blemishes from exposed surfaces.
2. Sweep and vacuum surfaces thoroughly.
3. Damp-mop surfaces to remove marks and soil.

C. Protect resilient products from mars, marks, indentations, and other damage from construction operations and placement of equipment and fixtures during remainder of construction period.
D. Floor Polish: Remove soil, visible adhesive, and surface blemishes from resilient stair treads before applying liquid floor polish.

1. Apply two coat(s).

E. Cover resilient products until Substantial Completion.

END OF SECTION 096513

SECTION 096723 – SEAMLESS RESINOUS FLOORING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

1. High-performance resinous flooring systems.
2. Integral cove base.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product indicated. Include manufacturer's technical data, application instructions, and recommendations for each resinous flooring component required.
B. Samples for Initial Selection: For each type of exposed finish required.
C. Samples for Verification: For each resinous flooring system required, 6 inches square, applied to a rigid backing by Installer for this Project.
D. Product Schedule: For resinous flooring. Use same designations indicated on Drawings.

1.4 INFORMATIONAL SUBMITTALS

A. Installer Certificates: Signed by manufacturer certifying that installers comply with specified requirements.
B. Material Certificates: For each resinous flooring component, from manufacturer.
C. Material Test Reports: For each resinous flooring system.

1.5 CLOSEOUT SUBMITTALS

A. Maintenance Data: For resinous flooring to include in maintenance manuals.

1.6 QUALITY ASSURANCE

A. Installer Qualifications: Manufacturer's authorized representative who is trained and approved for installation of flooring systems required for this Project.

1. Engage an installer who is certified in writing by resinous flooring manufacturer as qualified to apply resinous flooring systems indicated.

B. Source Limitations: Obtain primary resinous flooring materials, including primers, resins, hardening agents, grouting coats, and topcoats, from single source from single manufacturer. Provide secondary materials, including patching and fill material, joint sealant, and repair materials, of type and from source recommended by manufacturer of primary materials.

C. Mockups: Apply mockups to verify selections made under sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.

1. Apply full-thickness mockups on 48-inch- square floor area selected by Architect.

a. Include 48-inch length of integral cove base with inside and outside corner.

2. Simulate finished lighting conditions for Architect's review of mockups.
3. Approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

D. Preinstallation Conference: Conduct conference at Project site.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials in original packages and containers, with seals unbroken, bearing manufacturer's labels indicating brand name and directions for storage and mixing with other components.

1.8 PROJECT CONDITIONS

A. Environmental Limitations: Comply with resinous flooring manufacturer's written instructions for substrate temperature, ambient temperature, moisture, ventilation, and other conditions affecting resinous flooring application.
B. Lighting: Provide permanent lighting or, if permanent lighting is not in place, simulate permanent lighting conditions during resinous flooring application.
C. Close spaces to traffic during resinous flooring application and for not less than 24 hours after application unless manufacturer recommends a longer period.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

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

1. American Hi-Tech Flooring Company.
2. Atlas Minerals & Chemicals, Inc.; Polymer Flooring Division.
3. BASF Construction Chemicals, Inc.; BASF Building Systems.
4. ChemMasters.
5. Crawford Laboratories Inc.; Florock.
6. Crossfield Products Corp.; Dex-O-Tex.
7. Dur-A-Flex, Inc.
8. Epoxy Systems, Inc.
9. International Coatings Inc.
10. Marbelite International Corp.
11. PPG Industries, Inc.
12. Sherwin-Williams Company; General Polymers.
13. Stonhard, Inc.
14. Tnemec Company, Inc.

2.2 MATERIALS

A. VOC Content of Liquid-Applied Flooring Components: Mot more than 100 g/L when calculated according to 40 CFR 59, Subpart D (EPA Method 24):

2.3 HIGH-PERFORMANCE RESINOUS FLOORING

A. Resinous Flooring: Abrasion-, impact- and chemical-resistant, high-performance-aggregate-filled, resin-based, monolithic floor surfacing designed to produce a seamless floor and integral cove base.

B. System Characteristics:

1. Color and Pattern: As selected by Architect from manufacturer's full range.
2. Wearing Surface: Textured for slip resistance.
3. Overall System Thickness: 3/16 inch.

C. Body Coats:

1. Formulation Description: High solids.
2. Application Method: Self-leveling slurry with broadcast aggregates.

    a. Thickness of Coats: 3/16 inch.
    b. Number of Coats: One.

3. Aggregates: Colored quartz (ceramic-coated silica).

D. Topcoat: Sealing or finish coats.

1. Resin: Epoxy.
2. Formulation Description: High solids.
3. Type: Pigmented.
4. Finish: Matte.
5. Number of Coats: One.

E. System Physical Properties: Provide resinous flooring system with the following minimum physical property requirements when tested according to test methods indicated:

1. Compressive Strength: 6000psi per ASTM C 579.
2. Tensile Strength: 1500psi per ASTM C 307.
3. Flexural Modulus of Elasticity: 2500psi per ASTM C 580.
4. Impact Resistance: No chipping, cracking, or delamination and not more than 1/16-inch permanent indentation per MIL-D-3134.
5. Resistance to Elevated Temperature: No slip or flow of more than 1/16 inch per MIL-D-3134.
6. Flammability: Self-extinguishing per ASTM D 635.
7. Hardness: Shore D per ASTM D 2240.

F. System Chemical Resistance: Test specimens of cured resinous flooring system are unaffected when tested according to ASTM D 543, Procedure A, for immersion or ASTM C 267.

2.4 ACCESSORIES

A. Primer: Type recommended by manufacturer for substrate and body coats indicated.

1. Formulation Description: Water based.

B. Reinforcing Membrane: Flexible resin formulation that is recommended by manufacturer for substrate and primer and body coats indicated and that prevents substrate cracks from reflecting through resinous flooring.

1. Formulation Description: 100 percent solids. Provide fiberglass scrim embedded in reinforcing membrane.

C. Patching and Fill Material: Resinous product of or approved by resinous flooring manufacturer and recommended by manufacturer for application indicated.

D. Floor Sealer: Provide a concrete slab sealer to prevent moisture from migrating up to finish as required or recommended by the manufacturer.

PART 3 - EXECUTION

3.1 PREPARATION

A. General: Prepare and clean substrates according to resinous flooring manufacturer's written instructions for substrate indicated. Provide clean, dry substrate for resinous flooring application.

B. Concrete Substrates: Provide sound concrete surfaces free of laitance, glaze, efflorescence, curing compounds, form-release agents, dust, dirt, grease, oil, and other contaminants incompatible with resinous flooring.

1. Roughen concrete substrates as follows:

a. Shot-blast surfaces with an apparatus that abrades the concrete surface, contains the dispensed shot within the apparatus, and recirculates the shot by vacuum pickup.

2. Repair damaged and deteriorated concrete according to resinous flooring manufacturer's written instructions.
3. Verify that concrete substrates are dry and moisture-vapor emissions are within acceptable levels according to manufacturer's written instructions and one of the three methods listed below.

a. Perform anhydrous calcium chloride test, ASTM F 1869. Proceed with application of resinous flooring only after substrates have maximum moisture-vapor-emission rate of 3 lb of water/1000 sq. ft. of slab area in 24 hours.
b. Perform plastic sheet test, ASTM D 4263. Proceed with application only after testing indicates absence of moisture in substrates.
c. Perform relative humidity test using in situ probes, ASTM F 2170. Proceed with installation only after substrates have a maximum 75 percent relative humidity level measurement.

4. Alkalinity and Adhesion Testing: Verify that concrete substrates have pH within acceptable range. Perform tests recommended by manufacturer. Proceed with application only after substrates pass testing.

C. Resinous Materials: Mix components and prepare materials according to resinous flooring manufacturer's written instructions.

D. Use patching and fill material to fill holes and depressions in substrates according to manufacturer's written instructions.

E. Treat control joints and other nonmoving substrate cracks to prevent cracks from reflecting through resinous flooring according to manufacturer's written instructions.

F. Floor Sealer: Provide a concrete slab sealer to prevent moisture from migrating up to finish as required or recommended by the manufacturer.

3.2 APPLICATION

A. General: Apply components of resinous flooring system according to manufacturer's written instructions to produce a uniform, monolithic wearing surface of thickness indicated.

1. Coordinate application of components to provide optimum adhesion of resinous flooring system to substrate, and optimum intercoat adhesion.
2. Cure resinous flooring components according to manufacturer's written instructions. Prevent contamination during application and curing processes.
3. At substrate expansion and isolation joints, comply with resinous flooring manufacturer's written instructions.

B. Apply primer over prepared substrate at manufacturer's recommended spreading rate.

C. Apply reinforcing membrane to entire substrate surface.

D. Integral Cove Base: Apply cove base mix to wall surfaces before applying flooring. Apply according to manufacturer's written instructions and details including those for taping, mixing, priming, troweling, sanding, and topcoating of cove base. Round internal and external corners.

1. Integral Cove Base: 4 inches high with stainless steel or aluminum “J” termination screed.

E. Apply self-leveling slurry body coats in thickness indicated for flooring system.

1. Broadcast aggregates at rate recommended by manufacturer and, after resin is cured, remove excess aggregates to provide surface texture indicated.

F. Apply grout coat, of type recommended by resinous flooring manufacturer, to fill voids in surface of final body coat and to produce wearing surface indicated.

G. Apply topcoats in number indicated for flooring system and at spreading rates recommended in writing by manufacturer.

3.3 FIELD QUALITY CONTROL

A. Material Sampling: Owner may at any time and any number of times during resinous flooring application require material samples for testing for compliance with requirements.

1. Owner may engage an independent testing agency to take samples of materials being used. Material samples will be taken, identified, sealed, and certified in presence of Contractor.
2. Testing agency will test samples for compliance with requirements, using applicable referenced testing procedures or, if not referenced, using testing procedures listed in manufacturer's product data.

3. If test results show applied materials do not comply with specified requirements, pay for testing, remove noncomplying materials, prepare surfaces coated with unacceptable materials, and reapply flooring materials to comply with requirements.

3.4 PROTECTION

A. Protect resinous flooring from damage and wear during the remainder of construction period. Use protective methods and materials, including temporary covering, recommended in writing by resinous flooring manufacturer.

END OF SECTION 096723

SECTION 099113 - EXTERIOR PAINTING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes surface preparation and the application of paint systems on the following exterior substrates:

1. Concrete.
2. Concrete masonry units (CMU).
3. Steel.
4. Galvanized metal.
5. Wood.
6. Exterior portland cement (stucco).

B. Related Sections include the following:

1. Division 05 Sections for shop priming of metal substrates with primers specified in this Section.
2. Division 06 Sections for shop priming carpentry with primers specified in this Section.
3. Division 09 Section "Interior Painting" for surface preparation and the application of paint systems on interior substrates.
4. Division 09 Section “High-Performance Coatings” for all exposed steel on the exterior of the building envelope.

1.3 DEFINITIONS

A. Gloss Level 1: Not more than 5 units at 60 degrees and 10 units at 85 degrees, according to ASTM D 523.
B. Gloss Level 3: 10 to 25 units at 60 degrees and 10 to 35 units at 85 degrees, according to ASTM D 523.
C. Gloss Level 4: 20 to 35 units at 60 degrees and not less than 35 units at 85 degrees, according to ASTM D 523.
D. Gloss Level 5: 35 to 70 units at 60 degrees, according to ASTM D 523.
E. Gloss Level 6: 70 to 85 units at 60 degrees, according to ASTM D 523.
F. Gloss Level 7: More than 85 units at 60 degrees, according to ASTM D 523.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product. Include preparation requirements and application instructions.
B. Samples for Initial Selection: For each type of topcoat product.
C. Samples for Verification: For each type of paint system and each color and gloss of topcoat.

1. Submit Samples on rigid backing, 8 inches (200 mm) square.

2. Step coats on Samples to show each coat required for system.
3. Label each coat of each Sample.
4. Label each Sample for location and application area.

D. Product List: For each product indicated, include the following:

1. Cross-reference to paint system and locations of application areas. Use same designations indicated on Drawings and in schedules.
2. Printout of current "MPI Approved Products List" for each product category specified, with the proposed product highlighted.
3. VOC content.

1.5 QUALITY ASSURANCE

A. MPI Standards:

1. Products: Complying with MPI standards indicated and listed in "MPI Approved Products List."
2. Preparation and Workmanship: Comply with requirements in "MPI Architectural Painting Specification Manual" for products and paint systems indicated.

B. Mockups: Apply benchmark samples of each paint system indicated and each color and finish selected to verify preliminary selections made under sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.

1. Architect will select one surface to represent surfaces and conditions for application of each paint system specified in Part 3.

a. Vertical and Horizontal Surfaces: Provide samples of at least 100 sq. ft.
b. Other Items: Architect will designate items or areas required.

2. Final approval of color selections will be based on benchmark samples.

a. If preliminary color selections are not approved, apply additional benchmark samples of additional colors selected by Architect at no added cost to Owner.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Store materials not in use in tightly covered containers in well-ventilated areas with ambient temperatures continuously maintained at not less than 45 deg F .

1. Maintain containers in clean condition, free of foreign materials and residue.
2. Remove rags and waste from storage areas daily.

1.7 PROJECT CONDITIONS

A. Apply paints only when temperature of surfaces to be painted and ambient air temperatures are between 50 and 95 deg F .
B. Do not apply paints in snow, rain, fog, or mist; when relative humidity exceeds 85 percent; at temperatures less than 5 deg F above the dew point; or to damp or wet surfaces.

1.8 EXTRA MATERIALS

A. Furnish extra materials described below that are from same production run (batch mix) as materials applied and that are packaged for storage and identified with labels describing contents.

1. Quantity: Furnish an additional 5 percent, but not less than 1 gal. of each material and color applied.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

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

1. Sherwin-Williams Company (The). (Basis of Design and paint systems)
2. Benjamin Moore & Co.
3. Coronado Paint.
4. Duron, Inc.
5. Flex Bon Paints.
6. ICI Paints.
7. M.A.B. Paints.
8. Porter Paints.
9. PPG Architectural Finishes, Inc.

2.2 PAINT, GENERAL

A. MPI Standards: Provide products that comply with MPI standards indicated and that are listed in its "MPI Approved Products List."
B. Material Compatibility:

1. Provide materials for use within each paint system that are compatible with one another and substrates indicated, under conditions of service and application as demonstrated by manufacturer, based on testing and field experience.
2. For each coat in a paint system, provide products recommended in writing by manufacturers of topcoat for use in paint system and on substrate indicated.

C. VOC Content: Provide materials that comply with VOC limits of authorities having jurisdiction.
D. Colors: As selected by Architect from manufacturer's full range.

2.3 BLOCK FILLERS

A. Block Filler, Latex, Interior/Exterior: MPI #4.

1. SW-PreRite Int/Ext. Block Filler, B25W25

2.4 PRIMERS/SEALERS

A. Primer, Alkali Resistant, Water Based: MPI #3.

1. SW-Loxon Concrete & Masonry Primer, A24W8300 Series

B. Wood-Knot Sealer: Sealer recommended in writing by topcoat manufacturer for exterior use in paint system indicated.

2.5 METAL PRIMERS

A. Primer, Alkyd, Anti-Corrosive for Metal: MPI #79.

1. SW-Kem Kromik Universal Metal Primer, B50 Series

B. Primer, Galvanized: As recommended in writing by topcoat manufacturer.

1. SW-DTM Acrylic Primer-Finish, B66W1 Series

2.6 WOOD PRIMERS

A. Primer, Latex for Exterior Wood: MPI #6.

1. SW-Exterior Latex Wood Primer, B42W8041

2.7 WATER-BASED PAINTS

A. Latex, Exterior Semi-Gloss (Gloss Level 3): MPI #11.

1. SW-A-100 Exterior Gloss Latex, A8W16 Series

B. Light Industrial Coating, Exterior, Water Based, Gloss (Gloss Level 6): MPI #164.

1. SW-Sher-Cryl HPA Gloss, B66W311

2.8 TEXTURED AND HIGH-BUILD COATINGS

A. Primer for Textured Coating, Latex, Flat: As recommended in writing by topcoat manufacturer.

1. SW-Loxon Concrete & Masonry Primer, A24W8300 Series

B. Intermediate Coat for Textured Coating, Latex, Flat: As recommended in writing by topcoat manufacturer.

C. Textured Coating, Latex, Flat: MPI #42.

1. SW-Ultra Crete Textured Masonry Topcoat, A44 Series

D. Primer for Latex, Exterior, High Build: As recommended in writing by topcoat manufacturer.

1. SW-Loxon XP Exterior Flat Latex, A24 Series

E. Intermediate Coat for Latex, Exterior, High Build: As recommended in writing by topcoat manufacturer.

F. Latex, Exterior, High Build: MPI #40.

1. SW-Loxon XP Exterior Flat Latex, A24 Series

2.9 FLOOR COATINGS

A. Sealer, Water Based, for Concrete Floors: MPI #99.

1. SW-H&C Concrete & Masonry Waterbased Sealer, 150.043054

B. Floor Paint, Latex, Low Gloss (Maximum Gloss Level 3): MPI #60.

1. SW-ArmorSeal Tred Plex WB Floor Coating, B90W111 Series

2.10 SOURCE QUALITY CONTROL

A. Testing of Paint Materials: Owner reserves the right to invoke the following procedure:

1. Owner may engage the services of a qualified testing agency to sample paint materials. Contractor will be notified in advance and may be present when samples are taken. If paint materials have already been delivered to Project site, samples may be taken at Project site. Samples will be identified, sealed, and certified by testing agency.
2. Testing agency will perform tests for compliance with product requirements.
3. Owner may direct Contractor to stop applying paints if test results show materials being used do not comply with product requirements. Contractor shall remove noncomplying paint materials from Project site, pay for testing, and repaint surfaces painted with rejected materials. Contractor will be required to remove rejected materials from previously painted surfaces prior to repainting with complying materials.

B.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates and conditions, with Applicator present, for compliance with requirements for maximum moisture content and other conditions affecting performance of work.
B. Maximum Moisture Content of Substrates: When measured with an electronic moisture meter as follows:

1. Concrete: 12 percent.
2. Masonry (Clay and CMU): 12 percent.
3. Wood: 15 percent.
4. Portland Cement Plaster: 12 percent.
5. Gypsum Board: 12 percent.

C. Portland Cement Plaster Substrates: Verify that plaster is fully cured.
D. Verify suitability of substrates, including surface conditions and compatibility with existing finishes and primers.
E. Proceed with coating application only after unsatisfactory conditions have been corrected.

1. Application of coating indicates acceptance of surfaces and conditions.

3.2 PREPARATION

A. Comply with manufacturer's written instructions and recommendations in "MPI Architectural Painting Specification Manual" applicable to substrates and paint systems indicated.

B. Remove hardware, covers, plates, and similar items already in place that are removable and are not to be painted. If removal is impossible because of size or weight of item, provide surface-applied protection before surface preparation and painting.

1. After completing painting operations, use workers skilled in the trades involved to reinstall items that were removed. Remove surface-applied protection if any.
2. Do not paint over labels of independent testing agencies or equipment name, identification, performance rating, or nomenclature plates.

C. Clean substrates of substances that could impair bond of paints, including dirt, oil, grease, and incompatible paints and encapsulants.

1. Remove incompatible primers and reprime substrate with compatible primers as required to produce paint systems indicated.

D. Concrete Substrates: Remove release agents, curing compounds, efflorescence, and chalk. Do not paint surfaces if moisture content or alkalinity of surfaces to be painted exceeds that permitted in manufacturer's written instructions.
E. Masonry Substrates: Remove efflorescence and chalk. Do not paint surfaces if moisture content or alkalinity of surfaces to be painted exceeds that permitted in manufacturer's written instructions.
F. Steel Substrates: Remove rust and loose mill scale. Clean using methods recommended in writing by paint manufacturer.
G. Shop-Primed Steel Substrates: Clean field welds, bolted connections, and abraded areas of shop paint, and paint exposed areas with the same material as used for shop priming to comply with SSPC-PA 1 for touching up shop-primed surfaces.
H. Galvanized-Metal Substrates: Remove grease and oil residue from galvanized sheet metal fabricated from coil stock by mechanical methods to produce clean, lightly etched surfaces that promote adhesion of subsequently applied paints.
I. Aluminum Substrates: Remove loose surface oxidation.
J. Wood Substrates:

1. Scrape and clean knots, and apply coat of knot sealer before applying primer.
2. Sand surfaces that will be exposed to view, and dust off.
3. Prime edges, ends, faces, undersides, and backsides of wood.
4. After priming, fill holes and imperfections in the finish surfaces with putty or plastic wood filler. Sand smooth when dried.

K. Plaster Substrates: Do not begin paint application until plaster is fully cured and dry.
L. Plastic Trim Fabrication Substrates: Remove dust, dirt, and other foreign material that might impair bond of paints to substrates.

3.3 APPLICATION

A. Apply paints according to manufacturer's written instructions.

1. Use applicators and techniques suited for paint and substrate indicated.
2. Paint surfaces behind movable items same as similar exposed surfaces. Before final installation, paint surfaces behind permanently fixed items with prime coat only.

B. Tint each undercoat a lighter shade to facilitate identification of each coat if multiple coats of same material are to be applied. Tint undercoats to match color of topcoat, but provide sufficient difference in shade of undercoats to distinguish each separate coat.
C. If undercoats or other conditions show through topcoat, apply additional coats until cured film has a uniform paint finish, color, and appearance.

D. Apply paints to produce surface films without cloudiness, spotting, holidays, laps, brush marks, roller tracking, runs, sags, ropiness, or other surface imperfections. Cut in sharp lines and color breaks.

E. Painting Fire Suppression, Plumbing, HVAC, Electrical, Communication, and Electronic Safety and Security Work:

1. Unless specifically noted otherwise in the specific Specification Sections above, paint the following work where exposed to view: Where painting is covered in other Specification Sections, coordinate with Construction Manager / General Contractor for determination of which subcontractor is to provide coatings.

a. Equipment, including panelboards and switch gear.
b. Uninsulated metal piping.
c. Uninsulated plastic piping.
d. Pipe hangers and supports.
e. Metal conduit.
f. Plastic conduit.
g. Tanks that do not have factory-applied final finishes.

3.4 FIELD QUALITY CONTROL

A. Testing of Paint Materials: Owner reserves the right to invoke the following procedure at any time and as often as Owner deems necessary during the period when paints are being applied:

1. Owner will engage the services of a qualified testing agency to sample paint materials being used. Samples of material delivered to Project site will be taken, identified, sealed, and certified in presence of Contractor.
2. Testing agency will perform tests for compliance of paint materials with product requirements.
3. Owner may direct Contractor to stop applying paints if test results show materials being used do not comply with product requirements. Contractor shall remove noncomplying-paint materials from Project site, pay for testing, and repaint surfaces painted with rejected materials. Contractor will be required to remove rejected materials from previously painted surfaces if, on repainting with complying materials, the two paints are incompatible.

3.5 CLEANING AND PROTECTION

A. At end of each workday, remove rubbish, empty cans, rags, and other discarded materials from Project site.

B. After completing paint application, clean spattered surfaces. Remove spattered paints by washing, scraping, or other methods. Do not scratch or damage adjacent finished surfaces.

C. Protect work of other trades against damage from paint application. Correct damage to work of other trades by cleaning, repairing, replacing, and refinishing, as approved by Architect, and leave in an undamaged condition.

D. At completion of construction activities of other trades, touch up and restore damaged or defaced painted surfaces.

3.6 EXTERIOR PAINTING SCHEDULE

A. Concrete Substrates, Nontraffic Surfaces:

1. Latex System:

a. Prime Coat: Latex, exterior, matching topcoat.

1) SW-Loxon Concrete & Masonry Primer, A24W8300 Series

b. Intermediate Coat: Latex, exterior, matching topcoat.

1) SW-A-100 Exterior Satin Latex, A82W510 Series

c. Topcoat: Latex, exterior, low sheen (Gloss Level 3-4), MPI #15.

1) SW-A-100 Exterior Satin Latex, A82W510 Series

2. High-Build Latex System: MPI EXT 3.1L, applied to form dry film thickness of not less than 10 mils .

a. Prime Coat: Alkali-resistant primer or as recommended in writing by topcoat manufacturer.

1) SW-Loxon XP Exterior Flat Latex, A24 Series

b. Intermediate Coat: High-build latex (exterior)
c. Topcoat: High-build latex (exterior).

1) SW-Loxon XP Exterior Flat Latex, A24 Series

B. CMU Substrates:

1. Latex System:

a. Prime Coat: Block filler, latex, interior/exterior, MPI #4.

1) SW-PrepRite Int/Ext. Block Filler, B25W25

b. Intermediate Coat: Latex, exterior, matching topcoat.

1) SW-A-100 Exterior Satin Latex, A82W510 Series

c. Topcoat: Latex, exterior, low sheen (Gloss Level 3-4), MPI #15.

1) SW-A-100 Exterior Satin Latex, A82W510 Series

2. Latex over Alkali-Resistant Primer System:

a. Prime Coat: Primer, alkali resistant, water based, MPI #3.

1) SW-Loxon Concrete & Masonry Primer, A24W8300 Series

b. Intermediate Coat: Latex, exterior, matching topcoat.

1) SW-A-100 Exterior Satin Latex, A82W510 Series

c. Topcoat: Latex, exterior, low sheen (Gloss Level 3-4), MPI #15.

1) SW-A-100 Exterior Satin Latex, A82W510 Series

3. High-Build Latex System: MPI EXT 4.2K, applied to form dry film thickness of not less than 10 mils .

a. Prime Coat: Alkali-resistant primer or as recommended in writing by topcoat manufacturer.

1) SW-Loxon XP Exterior Flat Latex, A24 Series

b. Intermediate Coat: High-build latex (exterior)
c. Topcoat: High-build latex (exterior).

1) SW-Loxon XP Exterior Flat Latex, A24 Series

C. Steel Substrates:

1. Water-Based Light Industrial Coating System:

a. Prime Coat: Shop primer specified in Division 05 Section where substrate is specified.
b. Intermediate Coat: Light industrial coating, exterior, water based, matching topcoat.

1) SW-Sher-Cryl HPA Gloss, B66W311 Series

c. Topcoat: Light industrial coating, exterior, water based, semi-gloss (Gloss Level 5), MPI #163.

1) SW-Sher-Cryl HPA Gloss, B66W311 Series

D. Galvanized-Metal Substrates:

1. Water-Based Light Industrial Coating System:

a. Prime Coat: Primer, galvanized metal[, as recommended in writing by topcoat manufacturer for exterior use on galvanized-metal substrates with topcoat indicated].

1) SW-Sher-Cryl HPA Gloss, B66W311 Series

b. Intermediate Coat: Light industrial coating, exterior, water based, matching topcoat.
c. Topcoat: Light industrial coating, exterior, water based, semi-gloss (Gloss Level 5), MPI #163.

1) SW-Sher-Cryl HPA Gloss, B66W311 Series

E. Wood Substrates: Including wood trim, architectural woodwork and wood-based panel products.

1. Latex System:

a. Prime Coat: Primer, latex for exterior wood, MPI #6.

1) SW-Exterior Latex Wood Primer, B42W8041

b. Intermediate Coat: Latex, exterior, matching topcoat.

1) SW-A-100 Exterior Gloss Latex, A8W16 Series

c. Topcoat: Latex, exterior semi-gloss (Gloss Level 5), MPI #11.

1) SW-A-100 Exterior Gloss Latex, A8W16 Series

F. Plastic Trim Fabrication Substrates:

1. Latex System:

a. Prime Coat: Primer, bonding, water based, MPI #17.

1) SW-Adhesion Primer, B51W8050

b. Intermediate Coat: Latex, exterior, matching topcoat.

1) SW-A-100 Exterior Gloss Latex, A8W16 Series

c. Topcoat: Latex, exterior semi-gloss (Gloss Level 5), MPI #11.

1) SW-A-100 Exterior Gloss Latex, A8W16 Series

G. Stucco Substrates:

1. Latex System:

a. Prime Coat: Latex, exterior, matching topcoat.

1) SW-Loxon Concrete & Masonry Primer, A24W8300 Series

b. Intermediate Coat: Latex, exterior, matching topcoat.

1) SW-A-100 Exterior Satin Latex, A82W510 Series

c. Topcoat: Latex, exterior, low sheen (Gloss Level 3-4), MPI #15.

1) SW-A-100 Exterior Satin Latex, A82W510 Series

2. High-Build Latex System: Dry film thickness not less than 10 mils (0.25 mm).

a. Prime Coat: As recommended in writing by topcoat manufacturer.

1) SW-Loxon XP Exterior Flat Latex, A24 Series

b. Intermediate Coat: As recommended in writing by topcoat manufacturer.
c. Topcoat: Latex, exterior, high build, MPI #40.

1) SW-Loxon XP Exterior Flat Latex, A24 Series

END OF SECTION 099113

SECTION 099123 - INTERIOR PAINTING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes surface preparation and the application of paint systems on the following interior substrates:

1. Concrete.
2. Concrete masonry units (CMU).
3. Steel (Including all exposed-to-view steel structure and framing).
4. Galvanized metal (Including exposed-to-view metal deck and steel roof framing).
5. Wood.
6. Gypsum board.
7. Plaster.

B. Related Requirements:

1. Division 05 Sections for shop priming of metal substrates.
2. Division 06 Sections for shop priming carpentry with primers specified in this Section.
3. Division 08 Sections for factory priming steel doors with primers specified in this Section.
4. Division 08 Sections for factory finishing wood doors.
5. Division 09 Section "Exterior Painting" for surface preparation and the application of paint systems on exterior substrates.
6. Division 09 Section “High Performance Costings” for all exposed steel on the exterior of the building envelope.

1.3 DEFINITIONS

A. Gloss Level 1: Not more than 5 units at 60 degrees and 10 units at 85 degrees, according to ASTM D 523.
B. Gloss Level 2: Not more than 10 units at 60 degrees and 10 to 35 units at 85 degrees, according to ASTM D 523.
C. Gloss Level 3: 10 to 25 units at 60 degrees and 10 to 35 units at 85 degrees, according to ASTM D 523.
D. Gloss Level 4: 20 to 35 units at 60 degrees and not less than 35 units at 85 degrees, according to ASTM D 523.
E. Gloss Level 5: 35 to 70 units at 60 degrees, according to ASTM D 523.
F. Gloss Level 6: 70 to 85 units at 60 degrees, according to ASTM D 523.
G. Gloss Level 7: More than 85 units at 60 degrees, according to ASTM D 523.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product. Include preparation requirements and application instructions.
B. Samples for Initial Selection: For each type of topcoat product.

C. Samples for Verification: For each type of paint system and in each color and gloss of topcoat.

1. Submit Samples on rigid backing, 8 inches square.
2. Step coats on Samples to show each coat required for system.
3. Label each coat of each Sample.
4. Label each Sample for location and application area.

D. Product List: For each product indicated, include the following:

1. Cross-reference to paint system and locations of application areas. Use same designations indicated on Drawings and in schedules.
2. VOC content.

1.5 MAINTENANCE MATERIAL SUBMITTALS

A. Furnish extra materials, from the same product run, that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Paint: 5 percent, but not less than 1 gal. of each material and color applied.

1.6 QUALITY ASSURANCE

A. Mockups: Apply benchmark samples of each paint system indicated and each color and finish selected to verify preliminary selections made under sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.

1. Architect will select one surface to represent surfaces and conditions for application of each paint system specified in Part 3.
    a. Wall and Ceiling Surfaces: Provide samples of at least 100 sq. ft.
    b. Exposed-to-view structural surfaces: Provide samples of at least 100 sq. ft.
    c. Other Items: Architect will designate items or areas required.
2. Apply benchmark samples after permanent lighting and other environmental services have been activated.
3. Final approval of color selections will be based on benchmark samples.
    a. If preliminary color selections are not approved, apply additional benchmark samples of additional colors selected by Architect at no added cost to Owner.
4. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
5. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Store materials not in use in tightly covered containers in well-ventilated areas with ambient temperatures continuously maintained at not less than 45 deg F .

1. Maintain containers in clean condition, free of foreign materials and residue.
2. Remove rags and waste from storage areas daily.

1.8 FIELD CONDITIONS

A. Apply paints only when temperature of surfaces to be painted and ambient air temperatures are between 50 and 95 deg F.
B. Do not apply paints when relative humidity exceeds 85 percent; at temperatures less than 5 deg F above the dew point; or to damp or wet surfaces.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

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

1. Sherwin-Williams Company (The). (Basis of Design and paint systems)
2. Benjamin Moore & Co.
3. Color Wheel Paints & Coatings.
4. Coronado Paint.
5. Duron, Inc.
6. Flex Bon Paints.
7. ICI Paints.
8. M.A.B. Paints.
9. Porter Paints.
10. PPG Architectural Finishes, Inc.

2.2 PAINT, GENERAL

A. MPI Standards: Provide products that comply with MPI standards indicated and that are listed in its "MPI Approved Products List."
B. Material Compatibility:

1. Provide materials for use within each paint system that are compatible with one another and substrates indicated, under conditions of service and application as demonstrated by manufacturer, based on testing and field experience.
2. For each coat in a paint system, provide products recommended in writing by manufacturers of topcoat for use in paint system and on substrate indicated.

C. VOC Content: Products shall comply with VOC limits of authorities having jurisdiction and, for interior paints and coatings applied at Project site, the following VOC limits, exclusive of colorants added to a tint base, when calculated according to 40 CFR 59, Subpart D (EPA Method 24). VOC content shall also meet requirements as noted above.

1. Flat Paints and Coatings: 50 g/L.
2. Non-Flat Paints and Coatings: 150 g/L.
3. Dry-Fog (Powder-Coat) Coatings: 400 g/L.
4. Primers, Sealers, and Undercoaters: 200 g/L.
5. Anticorrosive and Antirust Paints Applied to Ferrous Metals: 250 g/L.
6. Zinc-Rich Industrial Maintenance Primers: 340 g/L.
7. Pretreatment Wash Primers: 420 g/L.
8. Floor Coatings: 100 g/L.

D. Colors: As selected by Architect from manufacturer's full range.

1. 25 percent of surface area will be painted with deep tones.

2.3 BLOCK FILLERS

A. Block Filler, Latex, Interior/Exterior: MPI #4. SW-PreRite Int/Ext. Block Filler, B25W25

2.4 PRIMERS/SEALERS

A. Primer Sealer, Latex, Interior: MPI #50. SW-ProMar 200 Int. Latex Primer, B28W8200
B. Primer, Alkali Resistant, Water Based: MPI #3. SW-Loxon Concrete & Masonry Primer, A24W8300 Series
C. Primer, Latex, for Interior Wood: MPI #39. SW-PreRite ProBlock Latex Primer Sealer, B51W20

2.5 METAL PRIMERS

A. Primer, Rust-Inhibitive, Water Based: MPI #107. SW-Pro Industrial Pro-Cryl Universal Primer, B66W00310
B. Primer, Galvanized, Water Based: MPI #134. SW- DTM Acrylic Primer-Finish, B66W1 Series

2.6 WATER-BASED PAINTS

A. Latex, Interior, (Gloss Level 2): MPI #44. SW-ProMar 200 Int. Latex Eg-Shel, B20W2251 Series
B. Latex, Interior, Semi-Gloss, (Gloss Level 5): MPI #54. SW-ProGreen 200 Int. Latex Semi-Gloss, B31W00651 Series
C. Latex, Interior, Gloss, (Gloss Level 6, except minimum gloss of 65 units at 60 degrees): MPI #114. SW-Pro Industrial Mult-Surface Acrylic Gloss, B66W00501 Series
D. Light Industrial Coating, Interior, Water Based, Semi-Gloss (Gloss Level 5): MPI #153. SW-Pro Industrial Pre-Catalyzed Waterbased Epoxy Semi-Gloss, K46W00151 Series
E. Textured Coating, Latex, Flat: MPI #42. SW-UltraCrete Textured Masonry Topcoat, A44 Series
F. Intermediate Coat for Textured Coating, Latex, Flat: As recommended in writing by topcoat manufacturer. SW-Loxon Concrete & Masonry Primer, A24W8300 Series
G. Primer for Textured Coating, Latex, Flat: As recommended in writing by topcoat manufacturer. SW-Loxon Concrete & Masonry Primer, A24W8300 Series

2.7 TEXTURED COATING

A. Primer for Textured Coating, Latex, Flat: As recommended in writing by topcoat manufacturer. SW-Loxon Concrete & Masonry Primer, A24W8300 Series
B. Intermediate Coat for Textured Coating, Latex, Flat: As recommended in writing by topcoat manufacturer. SW-Loxon Concrete & Masonry Primer, A24W8300 Series
C. Textured Coating, Latex, Flat: MPI #42. SW-UltraCrete Textured Masonry Topcoat, A44 Series

2.8 DRY FOG/FALL COATINGS

A. Dry Fall, Water Based, for Galvanized Steel, Flat (Gloss Level 3): MPI #133. SW-Waterborne Acrylic Dryfall, B42 Series

2.9 FLOOR COATINGS

A. Stain, Interior, for Concrete Floors: MPI #58. SW-H&C Silicone Acrylic Concrete Sealer, 10.10401
B. Sealer, Water Based, for Concrete Floors: MPI #99. SW-H&C Concrete & Masonry Waterproofing Sealer, 150.043054

C. Floor Paint, Latex, Low Gloss (Maximum Gloss Level 3): MPI #60. SW-ArmorSeal Tred Plex WB Floor Coating, B90W111 Series

2.10 SOURCE QUALITY CONTROL

A. Testing of Paint Materials: Owner reserves the right to invoke the following procedure:

1. Owner may engage the services of a qualified testing agency to sample paint materials. Contractor will be notified in advance and may be present when samples are taken. If paint materials have already been delivered to Project site, samples may be taken at Project site. Samples will be identified, sealed, and certified by testing agency.
2. Testing agency will perform tests for compliance with product requirements.
3. Owner may direct Contractor to stop applying paints if test results show materials being used do not comply with product requirements. Contractor shall remove noncomplying paint materials from Project site, pay for testing, and repaint surfaces painted with rejected materials. Contractor will be required to remove rejected materials from previously painted surfaces prior to repainting with complying materials.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates and conditions, with Applicator present, for compliance with requirements for maximum moisture content and other conditions affecting performance of work.
B. Maximum Moisture Content of Substrates: When measured with an electronic moisture meter as follows:

1. Concrete: 12 percent.
2. Masonry (Clay and CMU): 12 percent.
3. Wood: 15 percent.
4. Gypsum Board: 12 percent.
5. Plaster: 12 percent.

C. Gypsum Board Substrates: Verify that finishing compound is sanded smooth.
D. Plaster Substrates: Verify that plaster is fully cured.
E. Verify suitability of substrates, including surface conditions and compatibility with existing finishes and primers.
F. Proceed with coating application only after unsatisfactory conditions have been corrected.

1. Application of coating indicates acceptance of surfaces and conditions.

3.2 PREPARATION

A. Comply with manufacturer's written instructions and recommendations in "MPI Architectural Painting Specification Manual" applicable to substrates indicated.
B. Remove hardware, covers, plates, and similar items already in place that are removable and are not to be painted. If removal is impossible because of size or weight of item, provide surface-applied protection before surface preparation and painting.

1. After completing painting operations, use workers skilled in the trades involved to reinstall items that were removed. Remove surface-applied protection if any.

C. Clean substrates of substances that could impair bond of paints, including dirt, oil, grease, and incompatible paints and encapsulants.

1. Remove incompatible primers and reprime substrate with compatible primers as required to produce paint systems indicated.

D. Concrete Substrates: Remove release agents, curing compounds, efflorescence, and chalk. Do not paint surfaces if moisture content or alkalinity of surfaces to be painted exceeds that permitted in manufacturer's written instructions.
E. Concrete Masonry Substrates: Remove efflorescence and chalk. Do not paint surfaces if moisture content or alkalinity of surfaces to be painted exceeds that permitted in manufacturer's written instructions.
F. Steel Substrates: Remove rust and loose mill scale. Clean using methods recommended in writing by paint manufacturer.
G. Galvanized-Metal Substrates: Remove grease and oil residue from galvanized sheet metal fabricated from coil stock by mechanical methods to produce clean, lightly etched surfaces that promote adhesion of subsequently applied paints.
H. Aluminum Substrates: Remove surface oxidation.
I. Wood Substrates:

1. Scrape and clean knots, and apply coat of knot sealer before applying primer.
2. Sand surfaces that will be exposed to view, and dust off.
3. Prime edges, ends, faces, undersides, and backsides of wood.
4. After priming, fill holes and imperfections in the finish surfaces with putty or plastic wood filler. Sand smooth when dried.

J. Gypsum Board Substrates: Do not begin paint application until finishing compound is dry and sanded smooth.
K. Plaster Substrates: Do not begin paint application until plaster is fully cured and dry.

3.3 APPLICATION

A. Apply paints according to manufacturer's written instructions.

1. Use applicators and techniques suited for paint and substrate indicated.
2. Paint surfaces behind movable equipment and furniture same as similar exposed surfaces. Before final installation, paint surfaces behind permanently fixed equipment or furniture with prime coat only.
3. Paint front and backsides of access panels, removable or hinged covers, and similar hinged items to match exposed surfaces.
4. Do not paint over labels of independent testing agencies or equipment name, identification, performance rating, or nomenclature plates.
5. Primers specified in painting schedules may be omitted on items that are factory primed or factory finished if acceptable to topcoat manufacturers.

B. Tint each undercoat a lighter shade to facilitate identification of each coat if multiple coats of same material are to be applied. Tint undercoats to match color of topcoat, but provide sufficient difference in shade of undercoats to distinguish each separate coat.
C. If undercoats or other conditions show through topcoat, apply additional coats until cured film has a uniform paint finish, color, and appearance.
D. Apply paints to produce surface films without cloudiness, spotting, holidays, laps, brush marks, roller tracking, runs, sags, ropiness, or other surface imperfections. Cut in sharp lines and color breaks.
E. Painting Fire Suppression, Plumbing, HVAC, Electrical, Communication, and Electronic Safety and Security Work:

1. Unless specifically noted otherwise in the specific Specification Sections above, paint the following work where exposed to view: Where painting is covered in other Specification Sections, coordinate with Construction Manager / General Contractor for determination of which subcontractor is to provide coatings.

a. Equipment, including panelboards and switch gear.
b. Uninsulated metal piping.
c. Uninsulated plastic piping.
d. Uninsulated ductwork and equipment
e. Pipe hangers and supports.
f. Metal conduit.
g. Plastic conduit.
h. Tanks that do not have factory-applied final finishes.
i. Duct, equipment, and pipe insulation having cotton or canvas insulation covering or other paintable jacket material.

2. Unless specifically noted otherwise in the specific Specification Sections above, paint the following work where exposed to view: Where painting is covered in other Specification Sections, coordinate with Construction Manager / General Contractor for determination of which subcontractor is to provide coatings.

a. Equipment, including panelboards.
b. Uninsulated metal piping.
c. Uninsulated plastic piping.
d. Uninsulated ductwork and equipment
e. Pipe hangers and supports.
f. Metal conduit.
g. Plastic conduit.
h. Duct, equipment, and pipe insulation having cotton or canvas insulation covering or other paintable jacket material.
i. Other items as directed by Architect.

3. Paint portions of internal surfaces of metal ducts, without liner, behind air inlets and outlets that are visible from occupied spaces.

3.4 FIELD QUALITY CONTROL

A. Dry Film Thickness Testing: Owner may engage the services of a qualified testing and inspecting agency to inspect and test paint for dry film thickness.

1. Contractor shall touch up and restore painted surfaces damaged by testing.
2. If test results show that dry film thickness of applied paint does not comply with paint manufacturer's written recommendations, Contractor shall pay for testing and apply additional coats as needed to provide dry film thickness that complies with paint manufacturer's written recommendations.

3.5 CLEANING AND PROTECTION

A. At end of each workday, remove rubbish, empty cans, rags, and other discarded materials from Project site.
B. After completing paint application, clean spattered surfaces. Remove spattered paints by washing, scraping, or other methods. Do not scratch or damage adjacent finished surfaces.
C. Protect work of other trades against damage from paint application. Correct damage to work of other trades by cleaning, repairing, replacing, and refinishing, as approved by Architect, and leave in an undamaged condition.
D. At completion of construction activities of other trades, touch up and restore damaged or defaced painted surfaces.

3.6 INTERIOR PAINTING SCHEDULE

A. Concrete Substrates, Nontraffic Surfaces:

1. Latex System:
    a. Prime Coat: Latex, interior, matching topcoat. MPI #3 SW-Loxon Concrete & Masonry Primer, A24W8300 Series
    b. Intermediate Coat: Latex, interior, matching topcoat. MPI #52 SW-ProGreen 200 Int. Eg-Shel, B20W00651 Series
    c. Topcoat: Latex, interior, (Gloss Level 3), MPI #52. SW- ProGreen 200 Int. Eg-Shel, B20W00651 Series

B. Concrete Substrates, Traffic Surfaces:
1. Latex Floor Enamel System:
    a. Prime Coat: Floor paint, latex, low gloss (maximum Gloss Level 3), MPI #60. SW-ArmorSeal Tred Plex WB Floor Coating, B90W111 Series
    b. Intermediate Coat: Floor paint, latex, low gloss (maximum Gloss Level 3), MPI #60. SW-ArmorSeal Tred Plex WB Floor Coating, B90W111 Series
    c. Topcoat: Floor paint, latex, low gloss (maximum Gloss Level 3), MPI #60. SW-ArmorSeal Tred Plex WB Floor Coating, B90W111 Series.
2. Concrete Stain System:
    a. First Coat: Stain, interior, for concrete floors, MPI #58. SW- H&C Silicone Acrylic Concrete Stain, 10.10401
    b. Topcoat: Stain, interior, for concrete floors, MPI #58. SW-H&C Silicone Acrylic Concrete Stain, 10.10401

C. CMU Substrates:
1. Latex System:
    a. Block Filler: Block filler, latex, interior/exterior, MPI #4. SW-PrepRite Int/Ext. Block Filler, B25W25
    b. Intermediate Coat: Latex, interior, matching topcoat. SW-ProGreen 200 Int. Eg-Shel, B20W00651 Series
    c. Topcoat: Latex, interior, (Gloss Level 3), MPI #52. SW-ProGreen 200 Int. Eg-Shel B20W00651 Series

D. Steel Substrates:
1. Latex over Alkyd Primer System:
    a. Prime Coat: Primer, alkyd, anti-corrosive, for metal, MPI #79 or primer, alkyd, quick dry, for metal, MPI #76. SW-KemKromik Universal Metal Primer, B50 Series
    b. Prime Coat: Shop primer specified in Division 05 Section where substrate is specified.
    c. Intermediate Coat: Latex, interior, matching topcoat. SW-ProGreen 200 Int. Latex Semi-Gloss B31W200651 Series
    d. Topcoat: Latex, interior, semi-gloss, (Gloss Level 5), MPI #54. SW-ProGreen 200 Int. Latex Semi-Gloss B31W200651 Series
2. Water-Based Dry-Fall System: MPI INT 5.1C.
    a. Prime Coat: Alkyd anticorrosive metal primer. (SW B50Z series) MPI #79 SW-KemKromik Universal Metal Primer, B50 Series
    b. Topcoat: Waterborne dry fall. (SW B42W1) MPI #133 SW-Waterborne Acrylic Dryfall, B42 Series

E. Galvanized-Metal Substrates:
1. Water-Based Dry-Fall System: MPI INT 5.3H.

a. Prime Coat: Primer, alkyd, anti-corrosive, for metal, MPI #79 or primer, alkyd, quick dry, for metal, MPI #76. SW-KemKromik Universal Metal Primer, B50 Series
b. Prime Coat: Shop primer specified in Division 05 Section where substrate is specified.
c. Topcoat: Dry fall, water based, for galvanized steel, flat (Gloss Level 1), MPI #133. SW-Waterborne Acrylic Dryfall, B42 Series

F. Wood Substrates: Including wood trim and wood-based panel products.

1. Latex System:

a. Prime Coat: Primer, latex, for interior wood, MPI #39.
SW-PrepRite ProBlock Latex Primer Sealer, B51W20
b. Intermediate Coat: Latex, interior, matching topcoat. MPI #52
SW-ProGreen 200 Int. Latex Eg-Shel, B20W00651
c. Topcoat: Latex, interior, (Gloss Level 3), MPI #52.
SW-ProGreen 200 Int. Latex Eg-Shel, B20W00651

G. Gypsum Board or Plaster Substrates:

1. Latex System:

a. Prime Coat: Primer sealer, latex, interior, MPI #50.
SW-ProMar 200 Int. Latex Primer, B28W8200
b. Intermediate Coat: Latex, interior, matching topcoat.
SW-ProGreen 200 Int. Latex Eg-Shel B20W00651
c. Topcoat: Latex, interior, (Gloss Level 3), MPI #52.
SW-ProGreen 200 Int. Latex Eg-Shel B20W00651

END OF SECTION 099123

SECTION 099600 - HIGH-PERFORMANCE COATINGS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section includes surface preparation and application of high-performance coating systems on the following substrates:

1. Exterior Substrates:

a. Steel - exposed structural members at the Home Locker Building and Dugouts only.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product indicated. Include preparation requirements and application instructions.

B. Samples for Initial Selection: For each type of topcoat product indicated.

C. Samples for Verification: For each type of coating system and in each color and gloss of topcoat indicated.

1. Submit Samples on rigid backing, 8 inches square.
2. Step coats on Samples to show each coat required for system.
3. Label each Sample to indicate product used for each coat, location and application area.

D. Product List: For each product indicated, include the following:

1. Cross-reference to paint system and locations of application areas. Use same designations indicated on Drawings and in schedules.
2. VOC content.

1.4 MAINTENANCE MATERIAL SUBMITTALS

A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Coatings: 5 percent, but not less than 1 gallon of each material and color applied.

1.5 QUALITY ASSURANCE

A. Mockups: Apply mockups of each coating system indicated to verify preliminary selections made under sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.

1. Architect will select one surface to represent surfaces and conditions for application of each coating system specified in Part 3.

a. All Items: Architect will designate items or areas required.

2. Final approval of color selections will be based on mockups.

a. If preliminary color selections are not approved, apply additional mockups of additional colors selected by Architect at no added cost to Owner.

3. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
4. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Store materials not in use in tightly covered containers in well-ventilated areas with ambient temperatures continuously maintained at not less than 45° F.

1. Maintain containers in clean condition, free of foreign materials and residue.
2. Remove rags and waste from storage areas daily.

1.7 FIELD CONDITIONS

A. Apply coatings only when temperature of surfaces to be coated and surrounding air temperatures are between 50° and 95° F, or as allowed by product manufacturer's recommendations.

B. Do not apply coatings when relative humidity exceeds 85 percent; at temperatures less than 5° F above the dew point; or to damp or wet surfaces, or as allowed by product manufacturer's recommendations.

C. Do not apply exterior coatings in snow, rain, fog, or mist.

1.8 WARRANTY

A. The completed fluoropolymer coating systems shall be guaranteed by the manufacturer against cracking, checking, peeling and/or delamination, chalking, fading and loss of gloss for a period of fifteen (15) years from the date of application. Warranty for fluoropolymer systems utilizing organic zinc rich moisture cured urethane primer shall also cover corrosion of ferrous metal substrates. The material warranty shall be a manufacturer's standard document; no special or job specific warranty provisions will be accepted or considered equal to a standard product warranty. Warranty conditions shall be expressed in the following terms:

1. Fade (Color Change): DE Hunter Units per ASTM D 2244.
2. Gloss: Units as measured by a gloss meter referencing ASTM D 523-89 with 60 degree geometry.
3. Chalk: Rating as per ASTM D 4214, Method A.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Basis of Design:

1. Tnemec Company, Inc., 6800 Corporate Drive, Kansas City, MO 64120
2. RD Coatings USA, 167 Avon Street, Stratford, CT 06615
3. Sherwin Williams
4. PPG Architectural Coatings

B. Substitutions:

1. The basis of design products are specified as the standard of quality by which any substitution submittals shall be evaluated.
2. No substitution submittal which alters the generic chemistry of the components that makeup the specified systems, the total number of coats to be applied, or the total dry film thickness of the installed systems will be approved.
3. Substitution submittals shall include all pertinent product data, independent test reports, product samples and side by side comparisons of the substitution to the specified products in order to be considered complete for evaluation by the Architect. Side by side comparisons must address each specified standardized performance test method as listed in under Part 2, and must demonstrate equal or better results when compared to the basis of design. Incomplete submittals will not be evaluated.
4. Substitution submittals must be received by the Architect not later than ten (10) business days prior to the date set for receipt of bids. No extension of the bid date shall be considered to accommodate evaluation of a late substitution submittal.

2.2 HIGH-PERFORMANCE COATINGS, GENERAL

A. Performance Standards: Provide products of equal or better performance characteristics to the basis of design products as listed in this Section.

B. Material Compatibility:

1. Provide materials for use within each coating system that are compatible with one another and substrates indicated, under conditions of service and application as demonstrated by manufacturer, based on testing and field experience.
2. For each coat in a coating system, provide products recommended in writing by manufacturers of topcoat for use in coating system and on substrate indicated.
3. Provide products of same manufacturer for each coat in a coating system.

C. Low-Emitting Materials: Interior coatings shall comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."

D. Colors: As selected by Architect from manufacturer's full range

2.3 METAL PRIMERS

A. Aromatic Polyurethane, Organic, Zinc Rich

Tnemec Series 90G-1K97 Tneme-Zinc

1. Formulation Description: Single component, organic, zinc rich, moisture cured urethane
2. Performance Criteria:
   a. Adhesion: ASTM D 3359 (Method B – 5 mm Crosshatch)/ASTM D 4541 (Method B, Type II)/ASTM D 4541 (Method E, Type V)
   b. Flexibility & Elongation: ASTM D 522
   c. Humidity: ASTM D 4585 – 15,000 Hours
   d. Immersion: ASTM D 870 – Two years continuous immersion in tap water, 2,000 hours continuous immersion in deionized water at 140° F.
   e. Impact: ASTM D 2794
   f. Prohesion: ASTM G 85 – 9,000 Hours
   g. Salt Spray (Fog): ASTM B 117 – 20,000 Hours
   h. Zinc Pigment Content (by weight in cured film): 83%

Sherwin Williams Corothane 1 Galvapac 1K Zinc Primer

1. Formulation Description: Organic, zinc rich, moisture cured urethane
2. Performance Criteria:
   a. Adhesion: ASTM D 3359 (Method B – 5 mm Crosshatch)/ASTM D 4541 (Method B, Type II)/ASTM D 4541 (Method E, Type V)
   b. Flexibility & Elongation: ASTM D 522
   c. Humidity: ASTM D 4585 – 4,000 Hours
   d. Immersion: ASTM D 870 – Five years continuous immersion in tap water.
   e. Impact: ASTM G14
   f. Salt Spray (Fog): ASTM B 117 – 5,000 Hours

2.4 ACRYLIC COATINGS

A. Mastic Waterborne Acrylic

Tnemec Series 118 Uni-Bond Mastic

1. Formulation Description: Single component, high-build, rust preventive, waterborne, elastomeric, acrylic dryfall.
2. Performance Criteria:
   a. Volume Solids: 55.0% +/- 2.0%
   b. VOC Content: 31 grams/liter
   c. Temperature Resistance (Dry): Continuous 170°F, Intermittent 200°F

B. Styrene Acrylic Dispersion, Elastomeric Membrane Primer

1. RD E Deck
2. Formulation Description: Single component, waterborne, elastomeric waterproofing membrane
3. Performance Criteria:
   a. Volume Solids: 55.0% to 57.0%
   b. VOC Content: 7.0 grams/liter
   c. Temperature Resistance (Dry): Continuous 175° F
   d. Cure Time: 1-3 hours to touch, 3-12 hours to recoat (varies with ambient conditions)

C. Aggregate-filled Elastomeric Acrylic Membrane

1. RD E Deck Slurry
2. Formulation Description: Single component, acrylic polymer elastomeric waterproofing membrane wear coat
3. Performance Criteria:
   a. Volume Solids: 58.0 to 60.0%
   b. VOC Content: 45.0 grams/liter
   c. Cure Time: 2 hours to touch; 24 hours to recoat (varies with ambient conditions)

D. Waterproof Elastomeric Wall Coating

1. RD ElastoFlex
2. Formulation Description: Waterborne, single component, acrylic elastomeric coating
3. Performance Criteria:
   a. Volume Solids: 80.0%
   b. VOC Content: 7.0 grams/liter
   c. Cure Time: 3-6 hours to touch, 4-24 hours to recoat (varies with ambient conditions)

E. Acrylic Polyurethane, Satin

1. RD Monograff
2. Formulation Description: Single component, low VOC, waterborne acrylic polyurethane deck membrane finish coat
3. Performance Criteria:
   a. Volume Solids: 35.0% +/- 2.0%
   b. VOC Content: 70 grams/liter
   c. Cure Time: 1-3 hours to touch, minimum 3 hours to recoat (varies with ambient conditions)

2.5 COATING SYSTEM ACCESSORY PRODUCTS

A. Caulking

RD AcryKit
1. Single component, waterborne acrylic dispersion
2. Performance Criteria:
   a. VOC Content: 0.0 g/L
   b. Cure Time: 30 minutes to touch, 24 hours to final cure.
   c. Temperature Resistance: 175° F

B. Reinforcing Fleece

RD Fleece, Woven
1. 100% Polyamide reinforcement mesh for the bridge of active cracks as part of a complete waterproof coating system.
2. Performance Criteria:
   a. Weight: 1.33-1.47 ounces per square yard
   b. per square yard

2.6 EPOXY COATINGS

A. Epoxy, High-Build, Low Gloss:

Tnemec Series 66 Hi-Build Epoxoline

1. Formulation Description: Polyamide Epoxy
2. Performance Criteria:
   a. Abrasion: ASTM D 4060 (CS-17 Wheel, 1,000 gram load) – 1,000 Cycles
   b. Adhesion: ASTM D 4541 (Type II Fixed Alignment Adhesion Tester)/ASTM D 4541 (Type V Self Aligning Adhesion Tester)
   c. Hardness: ASTM D 3363 (Pencil)
   d. Humidity: ASTM D 4585 – 4,500 Hours
   e. Immersion: ASTM D 870 – Four Years Exposure
   f. Prohesion: ASTM G 85 – 5,000 Hours
   g. Salt Spray: ASTM B 117 – 10,900 Hours
   h. Surface Burning Characteristics: ASTM E 84 – NFPA No. 101, Class A

Sherwin Williams Macropoxy 646, Fast Cure Epoxy

1. Formulation Description: Polyamide Epoxy
2. Performance Criteria:
   a. Abrasion: ASTM D 4060 (CS-17 Wheel, 1,000 gram load) – 1,000 Cycles
   b. Adhesion: ASTM D 4541 (Type II Fixed Alignment Adhesion Tester)/ASTM D 4541 (Type V Self Aligning Adhesion Tester)
   c. Hardness: ASTM D 3363 (Pencil)
   d. Humidity: ASTM D 4585 – 6,000 Hours
   e. Immersion: ASTM D 870 – One Year Exposure
   f. Salt Spray: ASTM B 117 – 6,500 Hours
   g. Surface Burning Characteristics: ASTM E 84 – NFPA No. 255

2.7 FLUOROPOLYMER COATINGS

A. Fluoropolymer Topcoat, Gloss

Tnemec Series 1070 Fluoronar

1. Formulation Description: Advanced Thermoset Solution Fluoropolymer
2. Performance Criteria:
   a. Abrasion: ASTM D 4060 (CS-17 Wheel, 1,000 gram load) – 1,000 Cycles
   b. Adhesion: ASTM D 4541 (Method B, Type II Tester)/ASTM D 4541 (Method E, Type V Tester)
   c. Carbon Arc Weathering: ASTM G 153 – 5,500 Hours
   d. Cleanability: MIL-PRF 85285D, Section 4.6.13
   e. Exterior Exposure: ASTM D 1014 (AAMA 2604-98)/ASTM D 4141 (Method C, EMMAQUA) – 3,500 MJ/m^2
   f. Flexibility & Elongation: ASTM D 522 (Method A, Conical Mandrel)/ASTM D 522 (Method B, Cylindrical Mandrel)
   g. Hardness: ASTM D 3363
   h. Humidity: ASTM D 4585 – 3,000 Hours
   i. Impact: ASTM D 2794
   j. QUV Exposure: ASTM D 4587 (UVA-340 Bulbs, Cycle 4: 8 Hours UV/4 Hours Condensation) – 25,000 Hours
   k. Salt Spray: ASTM B 117 – 10,000 Hours
   l. Xenon Arc Weathering: ASTM D 6695 – 8,000 Hours

B. Fluoropolymer Topcoat, Satin

Tnemec Series 1072 Fluoronar

1. Formulation Description: Advanced Thermoset Solution Fluoropolymer
2. Performance Criteria:
   a. Abrasion: ASTM D 4060 (CS-17 Wheel, 1,000 gram load) – 1,000 Cycles
   b. Adhesion: ASTM D 4541 (Method B, Type II Tester)/ASTM D 4541 (Method E, Type V Tester)
   c. Cleanability: MIL-PRF 85285D, Section 4.6.13
   d. Exterior Exposure: ASTM D 4141 (Method C, EMMAQUA) – 3,500 MJ/m^2
   e. Flexibility & Elongation: ASTM D 522 (Method A, Conical Mandrel)/ASTM D 522 (Method B, Cylindrical Mandrel)
   f. Hardness: ASTM D 3363
   g. Humidity: ASTM D 4585 – 2,000 Hours
   h. Impact: ASTM D 2794
   i. QUV Exposure: ASTM D 4587 (UVA-340 Bulbs, Cycle 4: 8 Hours UV/4 Hours Condensation) – 10,000 Hours
   j. Xenon Arc Weathering: ASTM D 6695 – 8,000 Hours

C. Fluoropolymer Topcoat, High Gloss
   Sherwin Williams Fluorokem Fluoropolymer Urethane
1. Formulation Description: Fluoropolymer Urethane
2. Performance Criteria:
   a. Adhesion: ASTM D 4541
   b. Exterior Exposure: ASTM D4141
   c. Flexibility & Elongation: ASTM D 522
   d. Hardness: ASTM D 3363
   e. Humidity: ASTM D 4585 – 5,000 Hours
   f. Impact: ASTM G14
   g. Accelerated Weathering QUV Exposure: ASTM D 4587 (UVA-15,000 Hours
   h. Salt Spray: ASTM B 117 – 5,000 Hours

2.8 SOURCE QUALITY CONTROL

A. Testing of Coating Materials: Owner reserves the right to invoke the following procedure:

1. Owner may engage the services of a qualified testing agency to sample coating materials. Contractor will be notified in advance and may be present when samples are taken. If coating materials have already been delivered to Project site, samples may be taken at Project site. Samples will be identified, sealed, and certified by testing agency.
2. Testing agency will perform tests for compliance with product requirements.
3. Owner may direct Contractor to stop applying paints if test results show materials being used do not comply with product requirements. Contractor shall remove noncomplying coating materials from Project site, pay for testing, and recoat surfaces coated with rejected materials. Contractor will be required to remove rejected materials from previously coated surfaces if, on recoating with complying materials, the two coatings are incompatible.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates and conditions, with Applicator present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the Work.

1. Maximum Moisture Content of Substrates: When measured with an electronic moisture meter as follows:

    a. Concrete: 12 percent.

B. Verify suitability of substrates, including surface conditions and compatibility with existing finishes and primers.

C. Proceed with coating application only after unsatisfactory conditions have been corrected.

1. Beginning coating application constitutes Contractor's acceptance of substrates and conditions.

3.2 PREPARATION

A. Comply with manufacturer's written instructions and recommendations applicable to substrates indicated.

B. Remove hardware, covers, plates, and similar items already in place that are removable and are not to be painted. If removal is impractical or impossible because of size or weight of item, provide surface-applied protection before surface preparation and painting.

1. After completing painting operations, use workers skilled in the trades involved to reinstall items that were removed. Remove surface-applied protection.

C. Clean substrates of substances that could impair bond of coatings, including dust, dirt, oil, grease, and incompatible paints and encapsulants.

1. Remove incompatible primers and reprime substrate with compatible primers or apply tie coat as required to produce coating systems indicated.

D. Concrete Substrates: Remove release agents, curing compounds, efflorescence, and chalk. Do not coat surfaces if moisture content or alkalinity of surfaces to be coated exceeds that permitted in manufacturer's written instructions.

1. Clean surfaces with pressurized water. Use minimum 4,000 PSI equipment fitted with 0° oscillating tip.

E. Steel Substrates: Remove rust, loose mill scale, and shop primer if any. Clean using methods recommended in writing by paint manufacturer, but not less than the following where indicated in Part 3:

1. SSPC-SP 1, “Solvent Cleaning”
2. SSPC-SP 2, “Hand Tool Cleaning”
3. SSPC-SP 3, “Power Tool Cleaning”
4. SSPC-SP 6, “Commercial Blast Cleaning”
5. SSPC-SP 11, "Power Tool Cleaning to Bare Metal"
6. SSPC-SP 12, “Surface Preparation and Cleaning of Steel and Other Hard Materials by High and Ultra-High Pressure Water Jetting Prior to Recoating

F. Galvanized-Metal Substrates: Remove grease and oil residue from galvanized sheet metal by mechanical methods to produce clean, lightly etched surfaces that promote adhesion of subsequently applied coatings referencing the following standard:

1. SSPC-SP-WJ4, “Water Jet Cleaning of Metals – Light Cleaning”

G. Aluminum Substrates: Remove loose surface oxidation.

1. SSPC-SP-WJ4, “Water Jet Cleaning of Metals – Light Cleaning”

3.3 APPLICATION

A. Apply high-performance coatings according to manufacturer's written instructions and recommendations.

1. Use applicators and techniques suited for coating and substrate indicated.
2. Coat surfaces behind movable equipment and furniture same as similar exposed surfaces. Before final installation, coat surfaces behind permanently fixed equipment or furniture with prime coat only.
3. Coat back sides of access panels, removable or hinged covers, and similar hinged items to match exposed surfaces.
4. Do not apply coatings over labels of independent testing agencies or equipment name, identification, performance rating, or nomenclature plates.

B. Tint each undercoat a lighter shade to facilitate identification of each coat if multiple coats of the same material are to be applied. Tint undercoats to match color of finish coat, but provide sufficient difference in shade of undercoats to distinguish each separate coat.

C. If undercoats or other conditions show through final coat, apply additional coats until cured film has a uniform coating finish, color, and appearance.

D. Apply coatings to produce surface films without cloudiness, spotting, holidays, laps, brush marks, runs, sags, ropiness, or other surface imperfections. Produce sharp glass lines and color breaks.

3.4 FIELD QUALITY CONTROL

A. Dry Film Thickness Testing: Owner may engage the services of a qualified testing and inspecting agency to inspect and test coatings for dry film thickness.

1. Contractor shall touch up and restore coated surfaces damaged by testing.
2. If test results show that dry film thickness of applied coating does not comply with coating manufacturer's written recommendations, Contractor shall pay for testing and apply additional coats as needed to provide dry film thickness that complies with coating manufacturer's written recommendations.

3.5 CLEANING AND PROTECTION

A. At end of each workday, remove rubbish, empty cans, rags, and other discarded materials from Project site.

B. After completing coating application, clean spattered surfaces. Remove spattered coatings by washing, scraping, or other methods. Do not scratch or damage adjacent finished surfaces.

C. Protect work of other trades against damage from coating operation. Correct damage by cleaning, repairing, replacing, and recoating, as approved by Architect, and leave in an undamaged condition.

D. At completion of construction activities of other trades, touch up and restore damaged or defaced coated surfaces.

3.6 EXTERIOR HIGH-PERFORMANCE COATING SCHEDULE

A. Concrete, elevated horizontal surfaces:

1. Elastomeric acrylic deck membrane:

a. Surface Preparation:
   1) Clean concrete referencing SSPC SP-13.
   2) Pressure wash using minimum 3,500 PSI equipment fitted with 0° oscillating tip.
   3) Surfaces must be clean, dry and free of contaminants.
b. Control/Construction Joints: Fill saw-cut control/construction joints between columns on the second level concrete walkways using RD AcryKit sealant
c. Detail Coat: RD E Deck and polyester fleece detail applied at all deck edges. Mesh detail shall extend 4” onto deck and 4” onto face of vertical surface below. Brush or roll E Deck into mesh to fully encapsulate.
d. Prime Coat: RD E Deck diluted 10% with clean potable water applied over entire deck at 6.0 to 8.0 mils DFT.
e. Intermediate Coat: RD E Deck Slurry applied over entire surface at 18.0 to 20.0 mils DFT.
f. Topcoat: RD Monograff applied over entire surface at 1.5 to 2.0 mils DFT.
g. Warranty: Five year limited material.

B. Existing Steel With Galvanized Coating

Tnemec System:

1. Acrylic Mastic/Fluoropolymer System:

a. Surface Preparation: SSPC SP-12 to a Visual Surface Preparation Condition of WJ-4. Use minimum 3,500 PSI pressure washing equipment fitted with 0° oscillating tip. Surfaces must be clean, dry and free of contaminants.
b. Prime Coat: Tnemec Series 118 Uni-Bond Mastic applied at 6.0 to 8.0 mils DFT.
c. Topcoat: Tnemec Series 1072 Fluoronar applied at 2.0 to 3.0 mils DFT.
d. Warranty: Fifteen (15) year color fade, chalk and loss of gloss.

Sherwin Williams System:

2. Epoxy/Fluoropolymer System:

a. Surface Preparation: SSPC SP-12 to a Visual Surface Preparation Condition of WJ-4. Use minimum 3,500 PSI pressure washing equipment fitted with 0° oscillating tip. Surfaces must be clean, dry and free of contaminants.
b. Prime Coat: B58W00610 - Macropoxy 646 Fast Cure Epoxy Part A Mill White (tinted to Approved Color) applied at 5.0 to 10.0 mils DFT.
c. Prime Coat: B58W00600 - Macropoxy 646 Fast Cure Epoxy Part B Hardener (tinted to Approved Color) applied at 5.0 to 10.0 mils DFT.

d. Topcoat: B65W00550 - FluoroKem Fluoropolymer Urethane Part A Extra White (Tinted to Approved Color) applied at 2.0 to 3.0 mils DFT.
e. Topcoat: B65V00550 - FluoroKem Fluoropolymer Urethane Part B Hardener (Tinted to Approved Color) applied at 2.0 to 3.0 mils DFT.
f. Warranty: Fifteen (15) year color fade, chalk and loss of gloss.

C. Existing Steel Without Galvanized Coating

Tnemec System:

1. OZR MCU/Epoxy/Fluoropolymer System:

a. Surface Preparation: Abrasive blast referencing SSPC-SP 6 “Commercial Blast Cleaning” to achieve a uniform 1.0 mil angular surface profile.
b. Prime Coat: Tnemec Series 90G-1K97 Tneme-Zinc applied at 2.5 to 3.5 mils DFT.
c. Intermediate Coat: Tnemec Series 66 Hi-Build Epoxoline applied at 4.0 to 6.0 mils DFT.
d. Topcoat: Tnemec Series 1070 Fluoronar applied at 2.0 to 3.0 mils DFT.
e. Warranty: Fifteen (15) year corrosion, color fade, chalk, and loss of gloss.

Sherwin Williams System:

2. Epoxy/Fluoropolymer System:
a. Surface Preparation: Abrasive blast referencing SSPC-SP 6 “Commercial Blast Cleaning” to achieve a uniform 1.0 mil angular surface profile.
b. Prime Coat: B65G00011 - Corothane 1 Galvapac One Pack Zinc Primer Gray applied at 3.0 to 4.0 mils DFT.
c. Intermediate Coat: B58W00610 - Macropoxy 646 Fast Cure Epoxy Part A Mill White (tinted to Approved Color) applied at 5.0 to 10.0 mils DFT.
d. Intermediate Coat: B58W00600 - Macropoxy 646 Fast Cure Epoxy Part B Hardener (tinted to Approved Color) applied at 5.0 to 10.0 mils DFT.
e. Topcoat: B65W00550 - FluoroKem Fluoropolymer Urethane Part A Extra White (Tinted to Approved Color) applied at 2.0 to 3.0 mils DFT.
f. Topcoat: B65V00550 - FluoroKem Fluoropolymer Urethane Part B Hardener (Tinted to Approved Color) applied at 2.0 to 3.0 mils DFT.
g. Warranty: Fifteen (15) year corrosion, color fade, chalk, and loss of gloss.

END OF SECTION 099600

SECTION 101400 – PLAQUE SIGNAGE

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes the following:

1. Plaque (refer to attached plaque sketch).

B. Related Sections include the following:

1. Division 01 Section "Temporary Facilities and Controls" for temporary Project identification signs and for temporary information and directional signs.

1.3 DEFINITIONS

A. ADA-ABA Accessibility Guidelines: U.S. Architectural & Transportation Barriers Compliance Board's "Americans with Disabilities Act (ADA) Accessibility Guidelines for Buildings and Facilities; Architectural Barriers Act (ABA) Accessibility Guidelines."

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product indicated.
B. Shop Drawings: Show fabrication and installation details for signs.

1. Show sign mounting heights, locations of supplementary supports to be provided by others, and accessories.
2. Provide message list, typestyles, graphic elements, including tactile characters and Braille, and layout for each sign.

C. Samples for Initial Selection: Manufacturer's color charts consisting of actual units or sections of units showing the full range of colors available for the following:

1. Aluminum.

D. Samples for Verification: For each of the following products and for the full range of color, texture, and sign material indicated, of sizes indicated:

1. Plaque Casting: 6 inches square including border.
2. Aluminum: For each form, finish, and color, on 6-inch- long sections of extrusions and squares of sheet at least 4 by 4 inches .
3. Accessories: Manufacturer's full-size unit.

1.5 INFORMATIONAL SUBMITTALS

A. Qualification Data: For Installer and fabricator.
B. Warranty: Special warranty specified in this Section.

1.6 CLOSEOUT SUBMITTALS

A. Maintenance Data: For signs to include in maintenance manuals.

1.7 QUALITY ASSURANCE

A. Installer Qualifications: An employer of workers trained and approved by manufacturer.
B. Fabricator Qualifications: Shop that employs skilled workers who custom-fabricate products similar to those required for this Project and whose products have a record of successful in-service performance.
C. Source Limitations for Signs: Obtain each sign type indicated from one source from a single manufacturer.
D. Regulatory Requirements: Comply with applicable provisions in ADA-ABA Accessibility Guidelines.
E. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

1.8 PROJECT CONDITIONS

A. Weather Limitations: Proceed with installation only when existing and forecasted weather conditions permit installation of signs in exterior locations to be performed according to manufacturers' written instructions and warranty requirements.
B. Field Measurements: Verify locations by field measurements before fabrication and indicate measurements on Shop Drawings.

1.9 COORDINATION

A. Coordinate placement of anchorage devices with templates for installing signs.

1.10 WARRANTY

A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of signs that fail in materials or workmanship within specified warranty period.

1. Failures include, but are not limited to, the following:

a. Deterioration of metal and finishes beyond normal weathering.

2. Warranty Period: Five years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Aluminum Castings: ASTM B 26/B 26M, of alloy and temper recommended by sign manufacturer for casting process used and for use and finish indicated.
B. Aluminum Sheet and Plate: ASTM B 209 , alloy and temper recommended by aluminum producer and finisher for type of use and finish indicated, and with at least the strength and durability properties of Alloy 5005-H32.
C. Aluminum Extrusions: ASTM B 221 , alloy and temper recommended by aluminum producer and finisher for type of use and finish indicated, and with at least the strength and durability properties of Alloy 6063-T5.

2.2 PLAQUES

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

1. Advance Corporation; Braille-Tac Division.
2. A. R. K. Ramos.
3. Gemini Incorporated.
4. Matthews International Corporation; Bronze Division.
5. Metal Arts; Div. of L&H Mfg. Co.
6. Mills Manufacturing Company.
7. Nelson-Harkins Industries.
8. Southwell Company (The).

B. Cast Plaques: Provide castings free of pits, scale, sand holes, and other defects, as follows:

1. Plaque Material: Aluminum.

    a. 18 inches wide x 24 inches high

2. Background Texture: Manufacturer's standard pebble texture.
3. Border Style: Square, polished.
4. Mounting: Concealed studs, noncorroding for substrates encountered.
5. Text and graphics for plaque to be camera ready as provided by the Architect.

2.3 ACCESSORIES

A. Anchors and Inserts: Provide nonferrous-metal or hot-dip galvanized anchors and inserts for exterior installations and elsewhere as required for corrosion resistance. Use toothed steel or lead expansion-bolt devices for drilled-in-place concrete and masonry anchors. Furnish inserts, as required, to be set into concrete or masonry work.
B. Bolts: Provide stainless steel bolts, washers and nuts for through-bolting metal panels or steel supports.

2.4 FABRICATION

A. General: Provide manufacturer's standard signs of configurations indicated.

1. Welded Connections: Comply with AWS standards for recommended practices in shop welding. Provide welds behind finished surfaces without distortion or discoloration of exposed side. Clean exposed welded surfaces of welding flux and dress exposed and contact surfaces.
2. Conceal fasteners if possible; otherwise, locate fasteners where they will be inconspicuous.

2.5 FINISHES, GENERAL

A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.
B. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.
C. Appearance of Finished Work: Variations in appearance of abutting or adjacent pieces are acceptable if they are within one-half of the range of approved Samples. Noticeable variations in the same piece are not acceptable. Variations in appearance of other components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

2.6 ALUMINUM FINISHES

A. Clear Anodic Finish: Manufacturer's standard Class 1 clear anodic coating, 0.018 mm or thicker, over a nonspecular as fabricated mechanical finish, complying with AAMA 611.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of work.
B. Verify that items, including anchor inserts, are sized and located to accommodate signs.
C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. Locate signs and accessories where indicated, using mounting methods of types described and complying with manufacturer's written instructions.

    1. Install signs level, plumb, and at heights indicated, with sign surfaces free of distortion and other defects in appearance.

B. Cast-Metal Plaques: Mount plaques using standard fastening methods to comply with manufacturer's written instructions for type of wall surface indicated.

    1. Concealed Mounting: Mount plaques by inserting threaded studs into tapped lugs on back of plaque. Set in predrilled holes filled with quick-setting cement.

3.3 CLEANING AND PROTECTION

A. After installation, clean soiled sign surfaces according to manufacturer's written instructions. Protect signs from damage until acceptance by Owner.

END OF SECTION 101400

SECTION 101423 - PANEL SIGNAGE

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

1. Interior Room-identification signs – one per room door.

B. Related Requirements:

1. Section 101426 "Monument Signage" for freestanding signs.

1.3 DEFINITIONS

A. Accessible: In accordance with the accessibility standard.

1.4 COORDINATION

A. Furnish templates for placement of sign-anchorage devices embedded in permanent construction by other installers.

1.5 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Shop Drawings: For panel signs.

1. Include fabrication and installation details and attachments to other work.
2. Show sign mounting heights, locations of supplementary supports to be provided by others, and accessories.
3. Show message list, typestyles, graphic elements, including raised characters and Braille, and layout for each sign at least half size.

C. Samples for Initial Selection: For each type of sign assembly, exposed component, and exposed finish.

1. Include representative Samples of available typestyles and graphic symbols.

D. Samples for Verification: For each type of sign assembly showing all components and with the required finish(es), in manufacturer's standard size unless otherwise indicated and as follows:

1. Room-Identification Signs: Full-size Sample.

2. Variable Component Materials: Full-size Sample of each base material, character (letter, number, and graphic element) in each exposed color and finish not included in Samples above.
3. Exposed Accessories: Full-size Sample of each accessory type.

E. Sign Schedule: Use same designations specified or indicated on Drawings or in a sign schedule.

1.6 INFORMATIONAL SUBMITTALS

A. Qualification Data: For Installer and manufacturer.
B. Sample Warranty: For special warranty.

1.7 CLOSEOUT SUBMITTALS

A. Maintenance Data: For signs to include in maintenance manuals.

1.8 QUALITY ASSURANCE

A. Installer Qualifications: An entity that employs installers and supervisors who are trained and approved by manufacturer.

1.9 FIELD CONDITIONS

A. Field Measurements: Verify locations of anchorage devices and electrical service embedded in permanent construction by other installers by field measurements before fabrication, and indicate measurements on Shop Drawings.

1.10 WARRANTY

A. Special Warranty: Manufacturer agrees to repair or replace components of signs that fail in materials or workmanship within specified warranty period.

1. Failures include, but are not limited to, the following:

a. Deterioration of finishes beyond normal weathering.
b. Deterioration of embedded graphic image.
c. Separation or delamination of sheet materials and components.

2. Warranty Period: Five years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Accessibility Standard: Comply with applicable provisions in the U.S. Architectural & Transportation Barriers Compliance Board's ADA-ABA Accessibility Guidelines for Buildings and Facilities and ICC A117.1 for signs.

2.2 SIGNS

A. Manufacturers: Subject to compliance with requirements, provide products by the following:

1. Vista System.

B. Room-Identification Sign: Sign with smooth, uniform surfaces; with message and characters having uniform faces, sharp corners, and precisely formed lines and profiles; and as follows:

1. Basis-of-Design Product: Vista MCFT-WF or as indicated on Drawings.
2. 6” x 6” with changeable text/content.
3. Opaque Insert Sheet: Photopolymer insert sheet.
4. Transparent Insert Sheet: Printable, clear, replaceable information insert.
5. ADA Insert Sheet: ADA Compliant sign with raised letters and Braille on a clear non-glare plastic cover insert
6. Sign-Panel Perimeter: Finish edges smooth.
7. Frame: Aluminum.

a. Material Thickness: As required.
b. Frame Depth: Convex-curved frame to receive removable face sheet and changeable subsurface graphics.
c. Changeable graphic sheets removable by suction cup tool.
d. Finish and Color: As selected by Architect from manufacturer's full range.

8. Mounting: Manufacturer's standard method for substrates indicated.
9. Text and Typeface: Accessible raised characters and Braille typeface as selected by Architect from manufacturer's full range and variable content as scheduled. Finish raised characters to contrast with background color, and finish Braille to match background color.

2.3 PANEL-SIGN MATERIALS

A. Aluminum Extrusions: ASTM B 221, alloy and temper recommended by aluminum producer and finisher for type of use and finish indicated.
B. Acrylic Sheet: ASTM D 4802, category as standard with manufacturer for each sign, (UV filtering).

2.4 ACCESSORIES

A. Fasteners and Anchors: Manufacturer's standard as required for secure anchorage of signage, noncorrosive and compatible with each material joined, and complying with the following:

1. Use concealed fasteners and anchors unless indicated to be exposed.
2. Inserts: Furnish inserts to be set by other trades into concrete or masonry work.

B. Adhesives: As recommended by sign manufacturer and with a VOC content of 70 g/L or less for adhesives used inside the weatherproofing system and applied on-site when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
C. Two-Face Tape: Manufacturer's standard high-bond, foam-core tape, 0.045 inch thick, with adhesive on both sides.

2.5 FABRICATION

A. General: Provide manufacturer's standard sign assemblies according to requirements indicated.

1. Preassemble signs and assemblies in the shop to greatest extent possible. Disassemble signs and assemblies only as necessary for shipping and handling limitations. Clearly mark units for reassembly and installation; apply markings in locations concealed from view after final assembly.
2. Mill joints to a tight, hairline fit. Form assemblies and joints exposed to weather to resist water penetration and retention.
3. Comply with AWS for recommended practices in welding and brazing. Provide welds and brazes behind finished surfaces without distorting or discoloring exposed side. Clean exposed welded and brazed connections of flux, and dress exposed and contact surfaces.
4. Conceal connections if possible; otherwise, locate connections where they are inconspicuous.
5. Internally brace signs for stability and for securing fasteners.
6. Provide rebates, lugs, and brackets necessary to assemble components and to attach to existing work. Drill and tap for required fasteners. Use concealed fasteners where possible; use exposed fasteners that match sign finish.

B. Subsurface-Applied Graphics: Apply graphics to back face of clear face-sheet material to produce precisely formed image. Image shall be free of rough edges.

C. Shop- and Subsurface-Applied Vinyl: Align vinyl film in final position and apply to surface. Firmly press film from the middle outward to obtain good bond without blisters or fishmouths.

D. Signs with Changeable Message Capability: Fabricate signs to allow insertion of changeable messages as follows:

1. For snap-in changeable inserts beneath removable face sheet, furnish one suction or other device to assist in removing face sheet. Furnish initial changeable insert. Subsequent changeable inserts are by Owner Furnish two blank inserts for each sign for Owner's use.
2. For frame to hold changeable sign panel, fabricate frame without burrs or constrictions that inhibit function. Furnish initial sign panel. Subsequent changeable sign panels are by Owner.

E. Brackets: Fabricate brackets, fittings, and hardware for bracket-mounted signs to suit sign construction and mounting conditions indicated. Modify manufacturer's standard brackets as required.

1. Aluminum Brackets: Factory finish brackets with baked-enamel or powder-coat finish to match sign-background color unless otherwise indicated.

2.6 GENERAL FINISH REQUIREMENTS

A. Appearance of Finished Work: Noticeable variations in same piece are not acceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

B. Organic, Anodic, and Chemically Produced Finishes: Apply to formed metal after fabrication but before applying contrasting polished finishes on raised features unless otherwise indicated.

2.7 ALUMINUM FINISHES

A. Powder-Coat Finish: AAMA 2603 except with a minimum dry film thickness of 1.5 mils . Comply with coating manufacturer's written instructions for cleaning, conversion coating, and applying and baking finish.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of signage work.
B. Verify that sign-support surfaces are within tolerances to accommodate signs without gaps or irregularities between backs of signs and support surfaces unless otherwise indicated.
C. Verify that anchor inserts are correctly sized and located to accommodate signs.
D. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. General: Install signs using mounting methods indicated and according to manufacturer's written instructions.

1. Install signs level, plumb, true to line, and at locations and heights indicated, with sign surfaces free of distortion and other defects in appearance.
2. Install signs so they do not protrude or obstruct according to the accessibility standard.
3. Before installation, verify that sign surfaces are clean and free of materials or debris that would impair installation.

B. Room-Identification Signs and Other Accessible Signage: Install in locations on walls as indicated and according to accessibility standard.

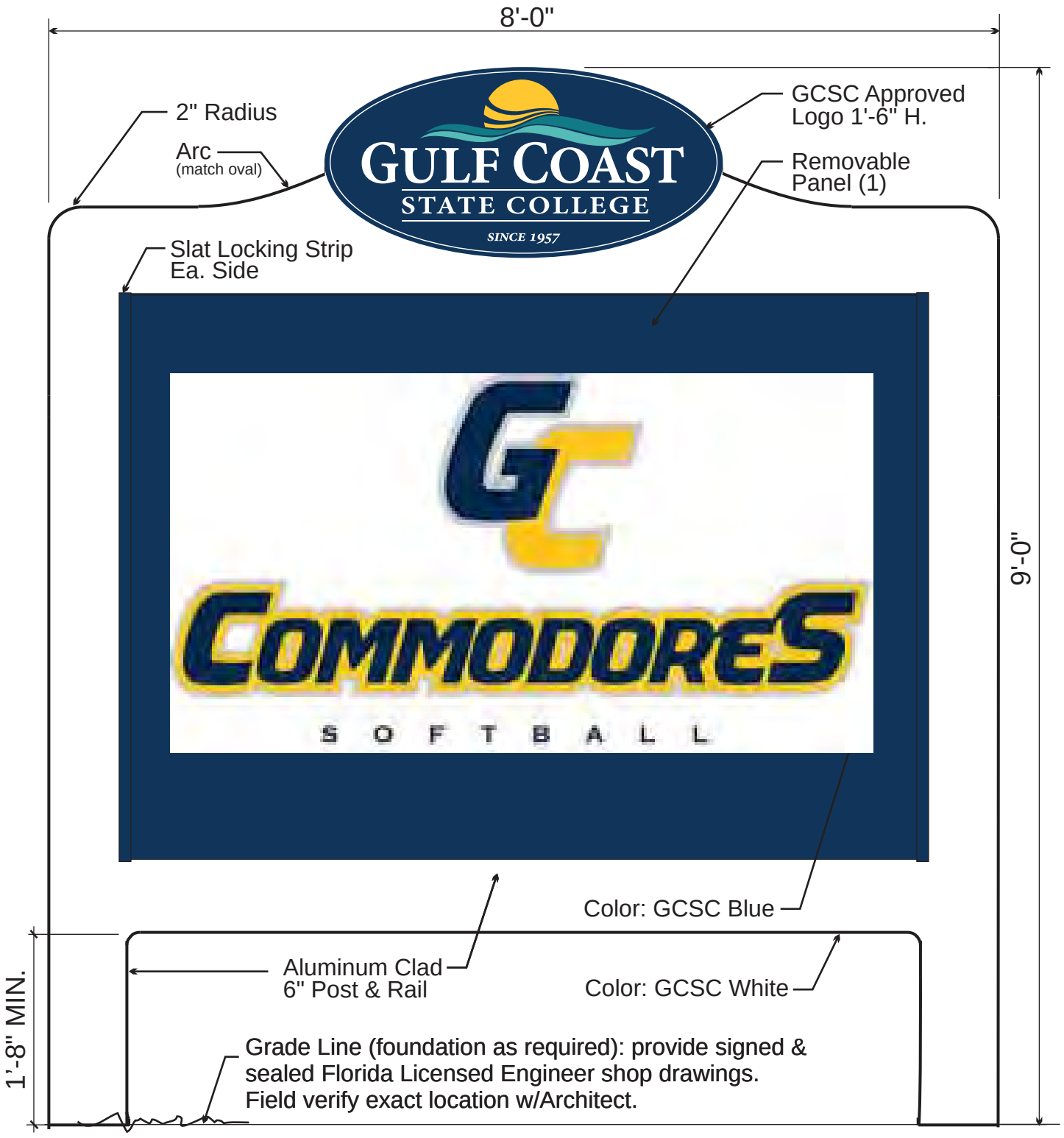
C. Mounting Methods:

1. Brackets: Remove loose debris from substrate surface and install backbar or bracket supports in position so that signage is correctly located and aligned.
2. Shim-Plate Mounting: Provide 1/8-inch- thick, concealed aluminum shim plates with predrilled and countersunk holes, at locations indicated, and where other direct mounting methods are impractical. Attach plate with fasteners and anchors suitable for secure attachment to substrate.

3.3 ADJUSTING AND CLEANING

A. Remove and replace damaged or deformed signs and signs that do not comply with specified requirements. Replace signs with damaged or deteriorated finishes or components that cannot be successfully repaired by finish touchup or similar minor repair procedures.
B. Remove temporary protective coverings and strippable films as signs are installed.
C. On completion of installation, clean exposed surfaces of signs according to manufacturer's written instructions, and touch up minor nicks and abrasions in finish. Maintain signs in a clean condition during construction and protect from damage until acceptance by Owner.

END OF SECTION 101423



8' x 9' East Face Double Sided Monument Directional Sign Non-Illuminated

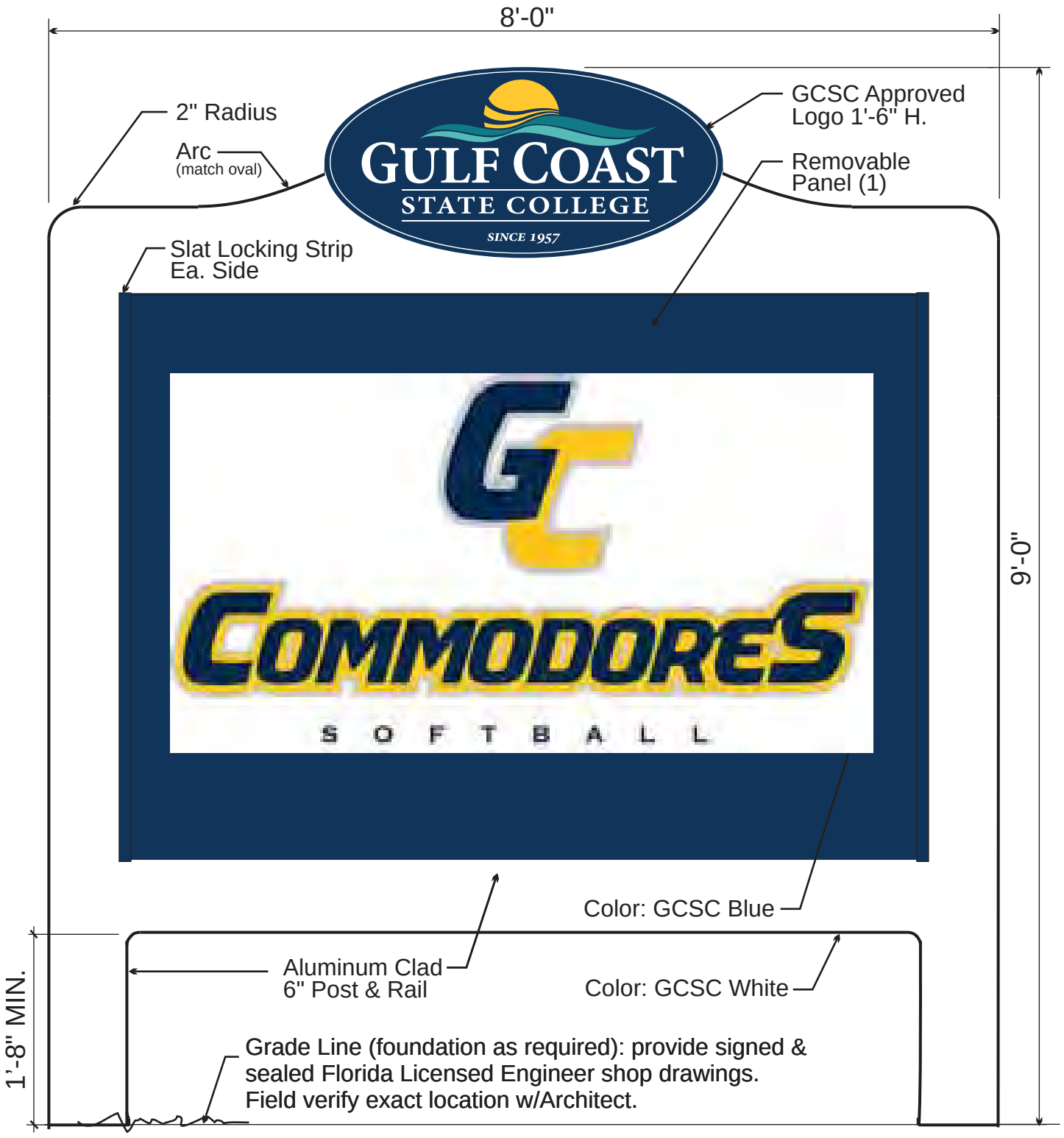
Project:

Bid No. ITB#6-2016/2017

GCSC SOFTBALL COMPLEX PROJECT

Sign/Drawing No.

MS-1A



8' x 9' West Face Double Sided Monument Directional Sign Non-Illuminated

Project:

Bid No. ITB#6-2016/2017

GCSC SOFTBALL COMPLEX PROJECT

Sign/Drawing No.

MS-1B

8' x 6' South Face Double Sided Monument Directional Sign Non-Illuminated

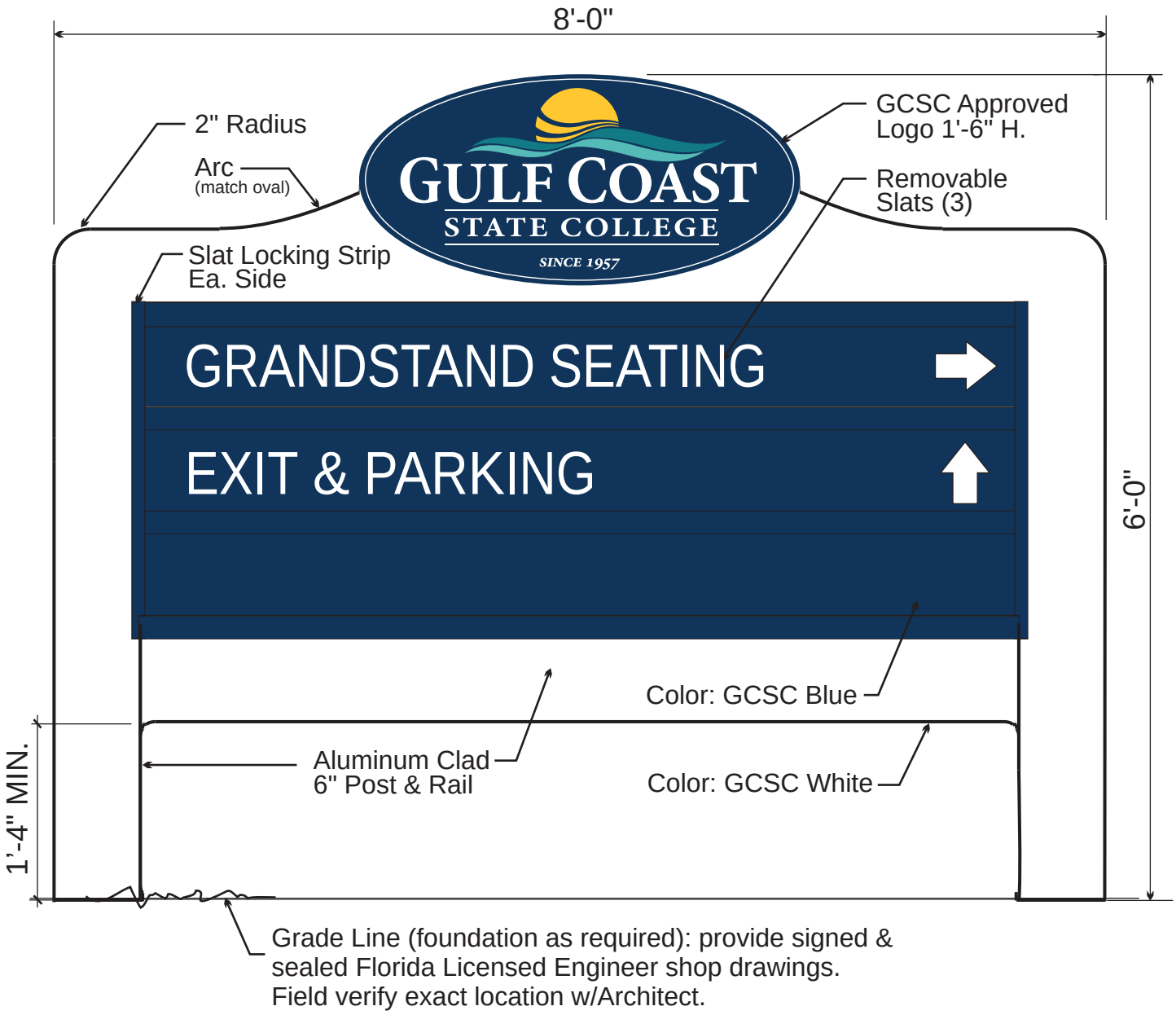
Project:

Bid No. ITB#6-2016/2017

GCSC SOFTBALL COMPLEX PROJECT

Sign/Drawing No.

MS-2A



8' x 6' North Face Double Sided Monument Directional Sign Non-Illuminated

Project:

Bid No. ITB#6-2016/2017

GCSC SOFTBALL COMPLEX PROJECT

Sign/Drawing No.

MS-2B

SECTION 101426 - MONUMENT SIGNAGE

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

1. Non-internally illuminated exterior monument signs.

B. Related Requirements:

1. Section 033000 "Cast-in-Place Concrete" for concrete foundations, concrete fill in postholes, and setting anchor bolts in concrete foundations for signs.
2. Section 101423 "Panel Signage" for wall-mounted interior sign panels.
3. Section 101429 “Pylon Signage” for exterior internally illuminated property identification signage.

1.3 COORDINATION

A. Furnish templates and tolerance information for placement of sign-anchorage devices embedded in permanent construction by other installers.
B. Furnish templates for placement of electrical service embedded in permanent construction by other installers.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product.
B. Shop Drawings: For monument signage.

1. Include fabrication and installation details and attachments to other work.
2. Show sign mounting heights, locations of supplementary supports to be provided by others, and accessories.
3. Show message list, typestyles, graphic elements, and layout for each sign at least half size.
4. Show locations of electrical service connections where required.
5. Include diagrams for power, signal, and control wiring.

C. Samples for Initial Selection: For each type of sign assembly, exposed component, and exposed finish.

1. Include representative Samples of available typestyles and graphic symbols.

D. Samples for Verification: For each type of sign assembly, showing all components and with the required finish(es), in manufacturer's standard size unless otherwise indicated and as follows:

1. Monument Signs: Full-size Sample.
2. Variable Component Materials: Full-size Sample of each base material, character or graphic element, in each exposed color and finish not included in other Samples.
3. Exposed Accessories: Full-size Sample of each accessory type.

E. Sign Schedule: Use same designations specified or indicated on Drawings or in a sign schedule.

F. Delegated-Design Submittal: For signs indicated in "Performance Requirements" Article.

1. Include structural analysis calculations for signs indicated to comply with design loads; signed and sealed by the qualified professional engineer responsible for their preparation.

1.5 INFORMATIONAL SUBMITTALS

A. Qualification Data: For Installer and manufacturer.
B. Sample Warranty: For special warranty.

1.6 CLOSEOUT SUBMITTALS

A. Maintenance Data: For signs to include in maintenance manuals.

1.7 QUALITY ASSURANCE

A. Installer Qualifications: An entity that employs installers and supervisors who are trained and approved by manufacturer.

1.8 FIELD CONDITIONS

A. Field Measurements: Verify locations of anchorage devices and electrical service embedded in permanent construction by other installers by field measurements before fabrication, and indicate measurements on Shop Drawings.

1.9 WARRANTY

A. Special Warranty: Manufacturer agrees to repair or replace components of signs that fail in materials or workmanship within specified warranty period.

1. Failures include, but are not limited to, the following:

a. Deterioration of finishes beyond normal weathering.
b. Deterioration of embedded graphic image.
c. Separation or delamination of sheet materials and components.

2. Warranty Period: Five years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Delegated Design: Engage a qualified professional engineer, as defined in Section 014000 "Quality Requirements," to design sign structure and anchorage of pylon sign type(s) to withstand design loads.

B. Thermal Movements: For exterior signs, allow for thermal movements from ambient and surface temperature changes.

1. Temperature Change: 120 deg F , ambient; 180 deg F , material surfaces.

C. Accessibility Standard: Comply with applicable provisions in the U.S. Architectural & Transportation Barriers Compliance Board's ADA-ABA Accessibility Guidelines for Buildings and Facilities and ICC A117.1 for signs.

2.2 MONUMENT SIGNS

A. Monument Sign: Sign with smooth, uniform surfaces and support assembly; with message and characters having uniform faces, sharp corners, and precisely formed lines and profiles; and as follows:

1. Product:

a. Types as indicated on Drawings.
b. Types as indicated in Sepcification.

2. Solid-Sheet Sign Panels, Returns, and Back: Aluminum sheet with finish specified in "Sign-Panel-Face Finish and Applied Graphics" Subparagraph below and as follows:

a. Thickness: Manufacturer's standard for size of sign.
b. Cutout Characters: Sign face to receive acrylic graphics raised on the sign panel.

3. Hollow-Box Sign Frame: Entire perimeter framed with formed-aluminum sheet or extruded-aluminum, hollow-box-type frame with vertical edges attached to supports with aluminum fittings. Close top and bottom edges of panels with manufacturer's standard welded seams or extrusions.
4. Sign-Frame Mounting: Between posts supports As indicated.
5. Multiple-Message Bars and Inserts: Fixed message bars capable of receiving changeable messages in the form of slide-in, acrylic-sheet changeable inserts.
6. Sign-Panel-Face Finish and Applied Graphics:

a. Powder-Coat Finish and Graphics: Manufacturer's standard, in color as selected by Architect from manufacturer's full range.

7. Text and Typeface: typeface as selected by Architect from manufacturer's full range and variable content as scheduled.

2.3 MATERIALS

A. Aluminum Sheet and Plate: ASTM B 209 , alloy and temper recommended by aluminum producer and finisher for type of use and finish indicated.

B. Paints and Coatings for Sheet Materials: Inks, dyes, and paints that are recommended by manufacturer for optimum adherence to surface and are UV and water resistant for colors and exposure indicated.

2.4 ACCESSORIES

A. Fasteners and Anchors: Manufacturer's standard as required for secure anchorage of signage, noncorrosive and compatible with each material joined, and complying with the following:

1. Use concealed fasteners and anchors unless indicated to be exposed.
2. For exterior exposure, furnish stainless-steel devices unless otherwise indicated.
3. Exposed Metal-Fastener Components, General:

    a. Fabricated from same basic metal and finish of fastened metal unless otherwise indicated.
    b. Fastener Heads: For nonstructural connections, use oval countersunk screws and bolts with tamper-resistant, Allen-head slots unless otherwise indicated.

4. Inserts: Furnish inserts to be set by other trades into concrete or masonry work.

B. Bituminous Paint: Cold-applied asphalt emulsion complying with ASTM D 1187.

C. Anchoring Materials:

1. Nonshrink, Nonmetallic Grout: Factory-packaged, nonstaining, noncorrosive, nongaseous grout complying with ASTM C 1107/C 1107M. Provide grout specifically recommended by manufacturer for interior and exterior applications.
2. Anchoring Cement: Factory-packaged, nonshrink, nonstaining, hydraulic-controlled expansion cement formulation for mixing with water at Project site to create pourable anchoring, patching, and grouting compound.

    a. Water-Resistant Product: At exterior locations, provide formulation that is resistant to erosion from water exposure without needing protection by a sealer or waterproof coating and that is recommended by manufacturer for exterior use.

2.5 FABRICATION

A. General: Provide manufacturer's standard sign assemblies according to requirements indicated.

1. Preassemble signs in the shop to greatest extent possible. Disassemble signs only as necessary for shipping and handling limitations. Clearly mark units for reassembly and installation, in locations concealed from view after final assembly.
2. Mill joints to tight, hairline fit. Form joints exposed to weather to resist water penetration and retention.
3. Comply with AWS for recommended practices in welding and brazing. Provide welds and brazes behind finished surfaces without distorting or discoloring exposed side. Clean exposed welded and brazed joints of flux, and dress exposed and contact surfaces.
4. Conceal fasteners and anchors unless indicated to be exposed; locate exposed fasteners where they will be inconspicuous.
5. Internally brace signs for stability and for securing fasteners.

B. Sign Message Panels: Construct sign-panel surfaces to be smooth and to remain flat under installed conditions within a tolerance of plus or minus 1/16 inch measured diagonally from corner to corner.

1. Coordinate dimensions and attachment methods to produce message panels with closely fitting joints. Align edges and surfaces with one another in the relationship indicated.

2. Increase panel thickness or reinforce with concealed stiffeners or backing materials as needed to produce surfaces without distortion, buckles, warp, or other surface deformations.
3. Continuously weld joints and seams unless other methods are indicated; grind, fill, and dress welds to produce smooth, flush, exposed surfaces with welds invisible after final finishing.

C. Post Fabrication: Fabricate posts designed to withstand wind pressure indicated for Project location and of lengths required for installation method indicated for each sign. Detail anchorage so that water can drain out of assembly without obstruction. Drill holes in post base for anchor-bolt connection. Provide anchor bolts of size required for connecting base to concrete foundations.

1. Internal Frames: Manufacturer's standard internal steel framing system and anchorage, modified as required for Project requirements. Provide welded construction. Cut, drill, and tap units to receive hardware, bolts, and similar items.

a. Hot-dip galvanize steel framing system after fabrication according to ASTM A 123/A 123M.

2.6 GENERAL FINISH REQUIREMENTS

A. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.
B. Appearance of Finished Work: Noticeable variations in same piece are not acceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.
C. Organic, Anodic, and Chemically Produced Finishes: Apply to formed metal after fabrication but before applying contrasting polished finishes on raised features unless otherwise indicated.

2.7 ALUMINUM FINISHES

A. Powder-Coat Finish: AAMA 2603 except with a minimum dry film thickness of 1.5 mils . Comply with coating manufacturer's written instructions for cleaning, conversion coating, and applying and baking finish.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of signage work.
B. Verify that sign-support surfaces are within tolerances to accommodate signs.
C. Verify that anchor inserts are correctly sized and located to accommodate signs.
D. Verify that electrical service is correctly sized and located to accommodate signs.
E. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. General: Install signs using installation methods indicated and according to manufacturer's written instructions.

1. Install signs level, plumb, and at locations and heights indicated, with sign surfaces free of distortion and other defects in appearance.
2. Install signs so they do not protrude or obstruct according to accessibility standard.
3. Before installation, verify that sign components are clean and free of materials or debris that would impair installation.
4. Corrosion Protection: Coat concealed surfaces of exterior aluminum in contact with grout, concrete, masonry, wood, or dissimilar metals, with a heavy coat of bituminous paint.

3.3 INSTALLING POSTS

A. Vertical Tolerance: Set posts plumb within a tolerance of 1/16 inch in 3 feet.
B. Attachment with Preset Anchor Bolts: Set post base in position over anchor bolts projecting from concrete foundation, shim and support pylon to prevent movement, place washers and nuts, and tighten. Fill shim space with nonshrink, nonmetallic grout, mixed and placed to comply with manufacturer's written instructions.

3.4 ADJUSTING AND CLEANING

A. Remove and replace damaged or deformed signs and signs that do not comply with specified requirements. Replace signs with damaged or deteriorated finishes or components that cannot be successfully repaired by finish touchup or similar minor repair procedures.
B. Remove temporary protective coverings and strippable films as signs are installed.
C. On completion of installation, clean exposed surfaces of signs according to manufacturer's written instructions, and touch up minor nicks and abrasions in finish. Maintain signs in a clean condition during construction and protect from damage until acceptance by Owner.

END OF SECTION 101426

SECTION 102113 - TOILET COMPARTMENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes solid-polymer units as follows:

1. Toilet Enclosures: Floor mounted, overhead braced/ceiling braced.

a. Overhead bracing shall not be used over the accessible toilet stall. The pilaster adjacent to the door openings shall be continuous from floor to ceiling and braced so that the “spreader bar” is not required. Additional tee-bracing of pilasters may be required due to ceiling heights.
b. Additional floor to ceiling pilasters shall be placed as required so that free spanning bracing bars are not required to brace any toilet stalls. Additional tee-bracing of pilasters may be required due to ceiling heights.

2. Urinal Screens: Wall hung.

B. Related Sections include the following:

1. Division 05 Section “Metal Fabrications” for bracing above the ceiling for attachment of ceiling-braced toilet stall pilasters.
2. Division 06 Section "Rough Carpentry" for blocking.
3. Division 10 "Toilet, Bath, and Laundry Accessories" for toilet tissue dispensers, grab bars, purse shelves, and similar accessories.

1.3 SUBMITTALS

A. Product Data: For each type of product indicated. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes.
B. Shop Drawings: Include plans, elevations, sections, details, and attachments to other work.

1. Show locations of cutouts for compartment-mounted toilet accessories.
2. Show location and size of above-ceiling bracing as required to support floor-to-ceiling pilasters as noted in 1.2; A; 1; a. above.

C. Samples for Verification: Of each type of color and finish required for units, prepared on 6-inch-square Samples of same thickness and material indicated for Work.

1.4 QUALITY ASSURANCE

A. Comply with requirements in CID-A-A-60003, "Partitions, Toilets, Complete."

1.5 PROJECT CONDITIONS

A. Field Measurements: Verify actual locations of walls, columns, ceilings, and other construction contiguous with toilet compartments by field measurements before fabrication and indicate measurements on Shop Drawings.
B. Field Location: Verify actual locations of toilet fixtures relative to proposed locations of toilet compartments. Indicate center lines, stub-outs and other measurements on Shop Drawings.

PART 2 - PRODUCTS

2.1 SOLID-POLYMER UNITS

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

1. Accurate Partitions Corporation.
2. Ampco.
3. Bradley Corporation; Mills Partitions.
4. Capitol Partitions, Inc.
5. Comtec Industries.
6. General Partitions Mfg. Corp.
7. Global Steel Products Corp.
8. Metpar Corp.
9. Santana Products, Inc.
10. Sanymetal; a Crane Plumbing Company.
11. Weis-Robart Partitions, Inc.

B. Color and material selections have been made by the Architect and only those companies that produce acceptable similar colors will be considered for incorporation into the Work:

1. Dark Blue.

C. Door, Panel, and Pilaster Construction: Solid, high-density polyethylene (HDPE) or polypropylene (PP) panel material, not less than 1 inch thick, seamless, with eased edges, and with homogenous color and pattern throughout thickness of material.

1. Color and Pattern: One color and pattern in each room as selected by Architect.

D. Pilaster Shoes: Manufacturer's standard design; stainless steel.
E. Brackets (Fittings):

1. Full-Height (Continuous) Type: Manufacturer's standard design; stainless steel.

F. Heat-Sink Strip: Manufacturer's standard continuous, extruded-aluminum strip fastened to exposed bottom edges of solid-polymer components to prevent burning.

2.2 ACCESSORIES

A. Hardware and Accessories: Manufacturer's standard design, heavy-duty operating hardware and accessories.

1. Material: Stainless steel.

B. Overhead Bracing: Manufacturer's standard continuous, extruded-aluminum head rail with anti-grip profile and in manufacturer's standard finish.

C. Anchorages and Fasteners: Manufacturer's standard exposed fasteners of stainless steel, with theft-resistant-type heads. Provide sex-type bolts for through-bolt applications. For concealed anchors, use only stainless steel.

2.3 FABRICATION

A. Overhead-Braced Units: Provide manufacturer's standard corrosion-resistant supports, leveling mechanism, fasteners, and anchors at pilasters to suit floor conditions. Make provisions for setting and securing continuous head rail at top of each pilaster. Provide shoes at pilasters to conceal supports and leveling mechanism.

B. Ceiling Braced Pilaster Units: Provide full height pilasters as noted in 1.2; A; 1; a. above to eliminate the use of free-spanning spreader bars.

C. Floor-Anchored Units: Provide manufacturer's standard corrosion-resistant anchoring assemblies complete with threaded rods, lock washers, and leveling adjustment nuts at pilasters for structural connection to floor. Provide shoes at pilasters to conceal anchorage.

D. Doors: Unless otherwise indicated, provide 24-inch- wide in-swinging doors for standard toilet compartments and 36-inch- wide out-swinging doors with a minimum 32-inch- wide clear opening for compartments indicated to be accessible to people with disabilities.

1. Hinges: Stainless steel, center-pivoted, self-closing type of that can be adjusted to hold doors open at any angle up to 90 degrees.
2. Latch and Keeper: Stainless steel surface-mounted latch unit designed for emergency access and with combination rubber-faced door strike and keeper. Provide units that comply with accessibility requirements of authorities having jurisdiction at compartments indicated to be accessible to people with disabilities.
3. Coat Hook: Manufacturer's stainless steel combination hook and rubber-tipped bumper, sized to prevent door from hitting compartment-mounted accessories.
4. Door Bumper: Manufacturer's standard rubber-tipped bumper at out-swinging doors.
5. Door Pull: Manufacturer's stainless steel unit at out-swinging doors that complies with accessibility requirements of authorities having jurisdiction. Provide units on both sides of doors at compartments indicated to be accessible to people with disabilities.

PART 3 - EXECUTION

3.1 INSTALLATION

A. General: Comply with manufacturer's written installation instructions. Install units rigid, straight, level, and plumb. Secure units in position with manufacturer's recommended anchoring devices.

1. Maximum Clearances:

a. Pilasters and Panels: 1/2 inch
b. Panels and Walls: 1 inch

B. Overhead-Braced Units: Secure pilasters to floor and level, plumb, and tighten. Secure continuous head rail to each pilaster with not less than two fasteners. Hang doors to align tops of doors with tops of panels and adjust so tops of doors are parallel with overhead brace when doors are in closed position.

C. Ceiling-Braced Pilaster Units: Where required to eliminate free-span bracing over the accessible toilet stalls, provide Overhead-Braced Pilaster Units as herein noted. Provide structural steel angles or channels as required to brace units. Indicate all bracing and full-height pilaster units on shop drawings.

D. Floor-Anchored Units: Set pilasters with anchors penetrating not less than 2 inches into structural floor, unless otherwise indicated in manufacturer's written instructions. Level, plumb, and tighten pilasters. Hang doors and adjust so tops of doors are level with tops of pilasters when doors are in closed position.

E. Wall-Hung Urinal Screens: Attach with anchoring devices to suit supporting structure. Set units level and plumb and to resist lateral impact.

3.2 ADJUSTING

A. Hardware Adjustment: Adjust and lubricate hardware according to manufacturer's written instructions for proper operation. Set hinges on in-swinging doors to hold doors open approximately 30 degrees from closed position when unlatched. Set hinges on out-swinging doors to return doors to fully closed position.

END OF SECTION 102113

SECTION 102800 - TOILET, BATH, AND CUSTODIAL ACCESSORIES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes the following:

1. Public-use washroom accessories.
2. Private-use restrooms and showers.
3. Under lavatory guards.
4. Custodial accessories.

1.3 SUBMITTALS

A. Product Data: For each type of product indicated. Include the following:

1. Construction details and dimensions.
2. Anchoring and mounting requirements, including requirements for cutouts in other work and substrate preparation.
3. Material and finish descriptions.
4. Features that will be included for Project.
5. Manufacturer's warranty.

B. Product Schedule: Indicating types, quantities, sizes, and installation locations by room of each accessory required.

1. Identify locations using room designations indicated on Drawings.
2. Identify products using designations indicated on Drawings.

C. Maintenance Data: For toilet and bath accessories to include in maintenance manuals.

1.4 QUALITY ASSURANCE

A. Source Limitations: For products listed together in the same articles in Part 2 provide products of same manufacturer unless otherwise approved by Architect.

1.5 COORDINATION

A. Coordinate accessory locations with other work to prevent interference with clearances required for access by people with disabilities, and for proper installation, adjustment, operation, cleaning, and servicing of accessories.

B. Deliver inserts and anchoring devices set into concrete or masonry as required to prevent delaying the Work.

1.6 WARRANTY

A. Special Mirror Warranty: Manufacturer's standard form in which manufacturer agrees to replace mirrors that develop visible silver spoilage defects and that fail in materials or workmanship within specified warranty period.

1. Warranty Period: 15 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Stainless Steel: ASTM A 666, Type 304, 0.0312-inch minimum nominal thickness, unless otherwise indicated.

B. Galvanized Steel Sheet: ASTM A 653/A 653M, with G60 hot-dip zinc coating.

C. Galvanized Steel Mounting Devices: ASTM A 153/A 153M, hot-dip galvanized after fabrication.

D. Fasteners: Screws, bolts, and other devices of same material as accessory unit and tamper-and-theft resistant where exposed, and of stainless steel where concealed.

E. Mirrors: Type 430, 18-gauge stainless steel with bright polished finish.

F. ABS Plastic: Acrylonitrile-butadiene-styrene resin formulation.

2.2 PUBLIC-USE WASHROOM ACCESSORIES

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

1. A & J Washroom Accessories, Inc.
2. American Specialties, Inc.
3. Bobrick Washroom Equipment, Inc.
4. Bradley Corporation.
5. General Accessory Manufacturing Co. (GAMCO).

B. Toilet Tissue (Roll) Dispenser:

1. Single Jumbo-Roll Dispenser: Fabricate of stainless steel for mounting indicated below, size to store and dispense one 10-inch-diameter core tissue rolls. Spindle adapter to accommodate a 1-5/8” diameter core roll; convertible to 2-1/8” to 3” diameter core roll. Theft-resistant key locked door and heavy-duty one-piece spindle.

a. Mounting: Surface mounted, 16-gauge stainless steel mounting plate and concealed anchorage (Bobrick #B-2890).

C. Recessed Waste Receptacle:

1. Recessed Waste Receptacle: Fabricate of 22-gauge stainless steel Type-304, for nominal 4-inch wall depth, flange shall be drawn and beveled, one-piece, seamless construction. (Bobrick #B-3644):

a. One-piece seamless flange.

b. 12-gal capacity removable waste receptacle with key lock.
c. Rough dimensions 16 inches wide x 29-1/4 Inches high x 4 inches deep.

D. Liquid-Soap Dispenser:

1. Liquid Soap Dispenser, Deck-Mounted: Countertop/Deck-mounted piston and spout-type unit with a minimum 32-fluid-ounce capacity, polyethylene reservoir concealed below deck. Piston and 4-inch-long spout of stainless steel with brightly polished finish with chrome-plated deck escutcheon. (Bradley # 6324-68).

   a. Provide unit designed for mounting on lavatory deck.

2. Liquid Soap Dispenser, Surface Mounted: Type-304, 22-gauge stainless steel with satin finish. Body is drawn, one-piece, seamless construction. Valve shall be operable with less than 5-pounds of force. Container equipped with clear acrylic refill-indicator window, a locked hinged stainless steel lid for top filling. Capacity lot less than 40-fluid-ounces. Unit shall have concealed vandal-resistant mounting. (Bobrick #B-2111)

E. Grab Bar:

1. Stainless Steel Type: Provide grab bars with wall thickness not less than 18 gauge and as follows:

   a. Mounting and Anchor Plates: Concealed (with flange anchored by set-screws), manufacturer's standard flanges and anchorages. Configurations indicated on drawings. Provide 3-inch wide, 12-gauge steel anchor plate with tapped mounting holes for each grab bar (Bobrick Series 256).
   b. Clearance: 1-1/2-inch clearance between wall surface and inside face of bar.
   c. Gripping Surfaces: Manufacturer's standard non-slip texture.

F. Sanitary-Napkin Disposal Unit:

1. Partition-Mounted Dual Access Type: Fabricate of 22-gauge Type 304 stainless steel with seamless exposed walls, featuring two self-closing push-flap doors, stainless steel piano hinged waste receptacle on one side. (Bradley #4721-15).

   a. Capacity: 1.3-gallon.
   b. Rough Dimensions: 10-3/4 inches wide x 15-1/8 inches high.

2. Semi-Recessed Single Access Type: Fabricate of 22-gauge Type 304 stainless steel with seamless exposed walls, featuring a self-closing push-flap door, stainless steel waste receptacle. (Bradley #4722-10-15).

   a. Capacity: 1.3-gallon.
   b. Rough Dimensions: 10-3/4 inches wide x 15-1/8 inches high.

G. Mirror Unit:

1. Stainless Steel Frameless Mirror Units: Fabricate 18 gauge Type-430 stainless steel with bright polished mirror finish, with radius corners, ¼" return. Secure with six countersunk tamper-resistant, flat-head, hex-socket, stainless steel machine screws. Supply with security hex key.
2. Size: As indicated on Drawings. (Bobrick #B-942)

H. Sanitary Napkin/Tampon Vendor:

1. Recessed, push button combination napkin/tampon vendor shall be fabricated of 22-gauge Type 304 stainless steel with exposed surfaces in satin finish. Door shall be

fabricated of 18-gauge stainless steel featuring full piano hinge and push button bar for coin operation and coin return. Capacity shall permit dispensing 30 napkins and 36 tampons and be ADA compliant. (Bradley #405-45)

a. Rough Dimensions: 18-1/2 inches wide x 25-5/8 inches high.

I. Baby Changing Station (Koala Bear #KB208):

1. High density polyethylene with stainless steel pivot rod secured in a metal tube for wear resistance.
2. Gas spring mechanism for smooth open and close operation of the unit.
3. ASTM compliant and meet ADA requirements when properly mounted.
4. Bed surface containing Microban® antimicrobial reducing odor causing bacteria.

a. Unit Dimensions: 34” W x 21” H
b. Depth Closed: 4-inches
c. Extension Open: 21”
d. Shipping Weight: 20-pounds

2.3 UNDERLAVATORY GUARDS

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

1. Plumberex Specialty Products, Inc.
2. TCI Products.
3. Truebro, Inc.

B. Under Lavatory Guard:

1. Description: Insulating pipe covering for supply and drain piping assemblies that prevent direct contact with and burns from piping, and allow service access without removing coverings.
2. Material and Finish: Antimicrobial, molded-plastic, white.

2.4 CUSTODIAL ACCESSORIES

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

1. A & J Washroom Accessories, Inc.
2. American Specialties, Inc.
3. Bobrick Washroom Equipment, Inc.
4. Bradley Corporation.
5. General Accessory Manufacturing Co. (GAMCO).

B. Utility Shelf:

1. Description: With exposed edges turned down not less than 1/2 inch and supported by two triangular brackets welded to shelf underside.
2. Size: 18 inches long by 6 inches deep.
3. Material and Finish: Not less than nominal 0.05-inch- thick stainless steel, No. 4 finish (satin). (Bradley 756-18)

C. Mop and Broom Holder:

1. Description: Unit with shelf, hooks, holders, and rod suspended beneath shelf.
2. Length: 44 inches.
3. Hooks: Four.
4. Mop/Broom Holders: Five, spring-loaded, rubber hat, cam type.
5. Material and Finish: Stainless steel, No. 4 finish (satin).

    a. Shelf: Not less than nominal 0.05-inch- thick stainless steel.
    b. Rod: Approximately 1/4-inch- diameter stainless steel.

2.5 FABRICATION

A. General: Fabricate units with tight seams and joints, and exposed edges rolled. Hang doors and access panels with full-length, continuous hinges. Equip units for concealed anchorage and with corrosion-resistant backing plates.
B. Keys: Provide universal keys for internal access to accessories for servicing and resupplying. Provide minimum of six keys to Owner's representative.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install accessories according to manufacturers' written instructions, using fasteners appropriate to substrate indicated and recommended by unit manufacturer. Install units level, plumb, and firmly anchored in locations and at heights indicated.

B. Grab Bars: Install to withstand a downward load of at least 250 lbf, when tested according to method in ASTM F 446.

3.2 ADJUSTING AND CLEANING

A. Adjust accessories for unencumbered, smooth operation. Replace damaged or defective items.

B. Remove temporary labels and protective coatings.

C. Clean and polish exposed surfaces according to manufacturers written recommendations.

END OF SECTION 102800

SECTION 102810 – ELECTRIC HAND DRYERS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes the following:

1. High-speed, energy efficient electric hand dryers.

1.3 RELATED SECTIONS

A. Related Sections include the following:

1. Division 26 – Electrical supply, wiring, and other components for wiring electric hand dryers.
2. Section 061000 – Rough Carpentry: Blocking for mounting hand dryers.

1.4 SUBMITTALS

A. Product Data: For each type of product indicated. Submit under provisions of Section 013300 – Submittal Procedures. Include the following:

1. Shop Drawings; construction details and dimensions.
2. Anchoring and mounting requirements, including requirements for cutouts in other work and substrate preparation.
3. Material and finish descriptions.
4. Features that will be included for Project.
5. Manufacturer's warranty.

B. Product Schedule: Indicating types, quantities, sizes, and installation locations by room of each unit required.

1. Identify locations using room designations indicated on Drawings.
2. Identify products using designations indicated on Drawings.

C. Maintenance Data: Include maintenance and installation manuals.

1.5 QUALITY ASSURANCE

A. Hand dryer shall be NSF certified in accordance with NSF 169
B. Installation shall comply with ICC / ANSI A117.1
C. 5-year parts warranty
D. Manufacturer shall have at least 20 years experience in the manufacture of electric hand dryers.

1.6 COORDINATION

A. Coordinate locations with other work to prevent interference with clearances required for access by people with disabilities, and for proper installation, adjustment, operation, cleaning, and servicing.

1.7 WARRANTY

A. Warranty: Manufacturer's standard form in which manufacturer agrees to units that fail in materials or workmanship within specified warranty period.

1. Warranty Period: 5 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 ELECTRIC HAND DRYERS

A. Stainless Steel Finish, High Efficiency Compact Series Electric Hand Dryer
Extreme Air GXT, GXT9-SS with user defined air flow settings and integrated electric heater able to be set to ON or OFF per customer requirements.

1. Mounting: wall mounted using mounting bracket supplied by manufacturer.
2. Construction: High quality ABS plastic consistent with UL94 5VA
3. Access: Hand drying area open on bottom.
4. Finish: Stainless steel cover and front panel.
5. Operation: Infrared sensors with automatic deactivation after 30-seconds.
6. Voltage: 120 V
7. Frequency : 60 hertz
8. Wattage: 1500-800 watts adjustable
9. Amperage: 12.5 A Max.
10. Air Velocity: 19,000 – 10,000 linear feet per minute
11. Hand Drying Time: 10+ seconds adjustable
12. Rated Operating Volume: 83.69 dB
13. Dimensions: 10-1/8” w x 9-3/8” h x 5-5/8” d

PART 3 - EXECUTION

3.1 EXAMINATION

A. Do not begin installation until all substrates have been completed and fully prepared.

B. Clean surface and check that electrical and blocking are properly prepared before installation.

C. Verify minimum clearances as follows:
Compact Series Electric High Efficiency Hand Dryers
Left: 4.75”
Right: 4”

3.2 INSTALLATION

1. Install mounting bracket in accordance with manufacturer's instructions and at recommended height (37" from the top of the Compact Series dryer).
2. Install hand dryer in accordance with manufacturer's instructions.
3. Set air speed and heat option as notified by architect.
4. Confirm proper installation of hand dryer.

3.3.1 ADJUSTING AND CLEANING

A. Adjust accessories for unencumbered, smooth operation. Replace damaged or defective items.

B. Remove temporary labels and protective coatings.

C. Clean exposed surfaces according to manufacturers written recommendations.

END OF SECTION 102810

SECTION 104413 - FIRE EXTINGUISHER CABINETS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

1. Fire protection cabinets for the following:

a. Portable fire extinguishers.

B. Related Sections:

1. Division 10 Section "Signage" for directional signage to out-of-sight fire extinguishers and cabinets.
2. Division 10 Section "Fire Extinguishers."

1.3 SUBMITTALS

A. Product Data: For each type of product indicated. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for fire protection cabinets.

1. Fire Protection Cabinets: Include roughing-in dimensions, details showing mounting methods, relationships of box and trim to surrounding construction, door hardware, cabinet type, trim style, and panel style.

B. Shop Drawings: For fire protection cabinets. Include plans, elevations, sections, details, and attachments to other work.

C. Samples for Initial Selection: For each type of fire protection cabinet indicated.

D. Samples for Verification: For each type of exposed finish required, prepared on Samples of size indicated below:

1. Size: 6 by 6 inches square.

E. Product Schedule: For fire protection cabinets. Coordinate final fire protection cabinet schedule with fire extinguisher schedule to ensure proper fit and function. Use same designations indicated on Drawings.

F. Maintenance Data: For fire protection cabinets to include in maintenance manuals.

1.4 QUALITY ASSURANCE

A. Fire-Rated, Fire Protection Cabinets: Listed and labeled to comply with requirements in ASTM E 814 for fire-resistance rating of walls where they are installed.

1.5 COORDINATION

A. Coordinate size of fire protection cabinets to ensure that type and capacity of fire extinguishers indicated are accommodated.
B. Coordinate sizes and locations of fire protection cabinets with wall depths.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Cold-Rolled Steel Sheet: ASTM A 1008/A 1008M, Commercial Steel (CS), Type B.
B. Tempered Float Glass: ASTM C 1048, Kind FT, Condition A, Type I, Quality q3, 3 mm thick, Class 1 (clear).

2.2 FIRE PROTECTION CABINET

A. Cabinet Type: Suitable for fire extinguisher.

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:

a. Fire End & Croker Corporation;.
b. J. L. Industries, Inc., a division of Activar Construction Products Group;.
c. Kidde Residential and Commercial Division, Subsidiary of Kidde plc;.
d. Larsen's Manufacturing Company;.
e. Modern Metal Products, Division of Technico Inc.;.
f. Moon-American;.
g. Potter Roemer LLC;.
h. Watrous Division, American Specialties, Inc.; Insert product name or designation.

B. Cabinet Construction: Nonrated and 1-hour fire rated.

1. Fire-Rated Cabinets: Construct fire-rated cabinets with double walls fabricated from 0.0428-inch- thick, cold-rolled steel sheet lined with minimum 5/8-inch- thick, fire-barrier material. Provide factory-drilled mounting holes.

C. Cabinet Material: Steel sheet.

D. Semirecessed Cabinet: Cabinet box partially recessed in walls of sufficient depth to suit style of trim indicated; with one-piece combination trim and perimeter door frame overlapping surrounding wall surface with exposed trim face and wall return at outer edge (backbend). Provide where walls are of insufficient depth for recessed cabinets but are of sufficient depth to accommodate semirecessed cabinet installation.

1. Rolled-Edge Trim: 2-1/2-inch backbend depth.

E. Cabinet Trim Material: Steel sheet.

F. Door Material: steel sheet.

G. Door Style: Fully glazed panel with frame.

H. Door Glazing: Tempered glass.

I. Door Hardware: Manufacturer's standard door-operating hardware of proper type for cabinet type, trim style, and door material and style indicated.

1. Provide projecting door pull and friction latch.
2. Provide manufacturer's standard hinge permitting door to open 180 degrees.

J. Accessories:

1. Mounting Bracket: Manufacturer's standard steel, designed to secure fire extinguisher to fire protection cabinet, of sizes required for types and capacities of fire extinguishers indicated, with plated or baked-enamel finish.
2. Identification: Lettering complying with authorities having jurisdiction for letter style, size, spacing, and location. Locate As required by authorities having jurisdiction.

a. Identify fire extinguisher in fire protection cabinet with the words "FIRE EXTINGUISHER."

1) Location: Applied to cabinet door.
2) Application Process: Silk-screened.
3) Lettering Color: Black.
4) Orientation: Vertical.

K. Finishes:

1. Manufacturer's standard baked-enamel paint for the following:

a. Exterior of cabinet, door, and trim except for those surfaces indicated to receive another finish.
b. Interior of cabinet and door.

2. Steel: Baked enamel or powder coat.

2.3 FABRICATION

A. Fire Protection Cabinets: Provide manufacturer's standard box (tub) with trim, frame, door, and hardware to suit cabinet type, trim style, and door style indicated.

1. Weld joints and grind smooth.
2. Provide factory-drilled mounting holes.
3. Prepare doors and frames to receive locks.
4. Install door locks at factory.

B. Cabinet Doors: Fabricate doors according to manufacturer's standards, from materials indicated and coordinated with cabinet types and trim styles selected.

1. Fabricate doorframes with tubular stiles and rails and hollow-metal design, minimum 1/2 inch thick.
2. Miter and weld perimeter doorframes.

C. Cabinet Trim: Fabricate cabinet trim in one piece with corners mitered, welded, and ground smooth.

2.4 GENERAL FINISH REQUIREMENTS

A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.
B. Protect mechanical finishes on exposed surfaces of fire protection cabinets from damage by applying a strippable, temporary protective covering before shipping.
C. Finish fire protection cabinets after assembly.
D. Appearance of Finished Work: Noticeable variations in same piece are not acceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

2.5 STEEL FINISHES

A. Surface Preparation: Remove mill scale and rust, if present, from uncoated steel, complying with SSPC-SP 5/NACE No. 1, "White Metal Blast Cleaning" or SSPC-SP 8, "Pickling". After cleaning, apply a conversion coating suited to the organic coating to be applied over it.
B. Factory Prime Finish: Apply manufacturer's standard, fast-curing, lead- and chromate-free, universal primer immediately after surface preparation and pretreatment.
C. Baked-Enamel or Powder-Coat Finish: Immediately after cleaning and pretreating, apply manufacturer's standard two-coat, baked-on finish consisting of prime coat and thermosetting topcoat. Comply with coating manufacturer's written instructions for applying and baking to achieve a minimum dry film thickness of 2 mils .

    1. Color and Gloss: As selected by Architect from manufacturer's full range.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine walls and partitions for suitable framing depth and blocking where semirecessed cabinets will be installed.
B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Prepare recesses for semirecessed fire protection cabinets as required by type and size of cabinet and trim style.

3.3 INSTALLATION

A. General: Install fire protection cabinets in locations and at mounting heights indicated or, if not indicated, at heights acceptable to authorities having jurisdiction.
B. Fire Protection Cabinets: Fasten cabinets to structure, square and plumb.

    1. Fasten mounting brackets to inside surface of fire protection cabinets, square and plumb.

3.4 ADJUSTING AND CLEANING

A. Remove temporary protective coverings and strippable films, if any, as fire protection cabinets are installed unless otherwise indicated in manufacturer's written installation instructions.

B. Adjust fire protection cabinet doors to operate easily without binding. Verify that integral locking devices operate properly.
C. On completion of fire protection cabinet installation, clean interior and exterior surfaces as recommended by manufacturer.
D. Touch up marred finishes, or replace fire protection cabinets that cannot be restored to factory-finished appearance. Use only materials and procedures recommended or furnished by fire protection cabinet and mounting bracket manufacturers.
E. Replace fire protection cabinets that have been damaged or have deteriorated beyond successful repair by finish touchup or similar minor repair procedures.

END OF SECTION 104413

SECTION 104416 - FIRE EXTINGUISHERS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section includes portable, fire extinguishers and mounting brackets for fire extinguishers.
B. Related Sections:

1. Division 10 Section "Fire Extinguisher Cabinets."

1.3 SUBMITTALS

A. Product Data: For each type of product indicated. Include rating and classification, material descriptions, dimensions of individual components and profiles, and finishes for fire extinguisher and mounting brackets.
B. Product Schedule: For fire extinguishers. Coordinate final fire extinguisher schedule with fire protection cabinet schedule to ensure proper fit and function. Use same designations indicated on Drawings.
C. Operation and Maintenance Data: For fire extinguishers to include in maintenance manuals.
D. Warranty: Sample of special warranty.

1.4 QUALITY ASSURANCE

A. NFPA Compliance: Fabricate and label fire extinguishers to comply with NFPA 10, "Portable Fire Extinguishers."
B. Fire Extinguishers: Listed and labeled for type, rating, and classification by an independent testing agency acceptable to authorities having jurisdiction.

1. Provide fire extinguishers approved, listed, and labeled by FMG.

1.5 COORDINATION

A. Coordinate type and capacity of fire extinguishers with fire protection cabinets to ensure fit and function.

1.6 WARRANTY

A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace fire extinguishers that fail in materials or workmanship within specified warranty period.

1. Failures include, but are not limited to, the following:

a. Failure of hydrostatic test according to NFPA 10.

b. Faulty operation of valves or release levers.

2. Warranty Period: Six years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PORTABLE, HAND-CARRIED FIRE EXTINGUISHERS

A. Fire Extinguishers: Type, size, and capacity for each fire protection cabinet and mounting bracket indicated.

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

a. Amerex Corporation.
b. Ansul Incorporated; Tyco International Ltd.
c. Badger Fire Protection; a Kidde company.
d. Buckeye Fire Equipment Company.
e. Fire End & Croker Corporation.
f. J. L. Industries, Inc.; a division of Activar Construction Products Group.
g. Kidde Residential and Commercial Division; Subsidiary of Kidde plc.
h. Larsen's Manufacturing Company.
i. Moon-American.
j. Pem All Fire Extinguisher Corp.; a division of PEM Systems, Inc.
k. Potter Roemer LLC.
l. Pyro-Chem; Tyco Safety Products.

2. Valves: Manufacturer's standard.
3. Handles and Levers: Manufacturer's standard.
4. Instruction Labels: Include pictorial marking system complying with NFPA 10, Appendix B and bar coding for documenting fire extinguisher location, inspections, maintenance, and recharging.

B. Multipurpose Dry-Chemical Type in Aluminum Container: UL-rated 4-A:60-B:C, 10-lb nominal capacity, with monoammonium phosphate-based dry chemical in enameled-aluminum container.

2.2 MOUNTING BRACKETS

A. Mounting Brackets: Manufacturer's standard galvanized steel, designed to secure fire extinguisher to wall or structure, of sizes required for types and capacities of fire extinguishers indicated, with plated or black baked-enamel finish.

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

a. Amerex Corporation.
b. Ansul Incorporated; Tyco International Ltd.
c. Badger Fire Protection; a Kidde company.
d. Buckeye Fire Equipment Company.
e. Fire End & Croker Corporation.
f. J. L. Industries, Inc.; a division of Activar Construction Products Group.

g. Larsen's Manufacturing Company.
h. Potter Roemer LLC.

B. Identification: Lettering complying with authorities having jurisdiction for letter style, size, spacing, and location. Locate as indicated by Architect.

1. Identify bracket-mounted fire extinguishers with the words "FIRE EXTINGUISHER" in red letter decals applied to mounting surface.

a. Orientation: Vertical.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine fire extinguishers for proper charging and tagging.

1. Remove and replace damaged, defective, or undercharged fire extinguishers.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. General: Install fire extinguishers and mounting brackets in locations indicated and in compliance with requirements of authorities having jurisdiction.
B. Mounting Brackets: Fasten mounting brackets to surfaces, square and plumb, at locations indicated.

END OF SECTION 104416

SECTION 105126 - PLASTIC LOCKERS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SECTION INCLUDES

A. Fully Assembled High Density Polyethylene Lockers (in Locker Room)
B. Fully Assembled High Density Polyethylene Cubbies (in 2-Dugouts)
C. Fully Assembled High Density Polyethylene Bat Storage and Lockable Cabinets (in 2-Dugouts)
D. Fully Assembled High Density Polyethylene Custom Dugout Bench (in 2-Dugouts-see drawings)
E. Types of products in this section include the following:

1. Single-Tier Lockers (in Locker Room where indicated on drawings).
2. Wall Mounted Open Front Cubbies (in 2-Dugouts where located on drawings).
3. Custom Dugout Benches (2 as indicated on drawings)
4. Raised Concrete Base under all lockers, custom benches and storage cabinets.

1.3 RELATED SECTIONS INCLUDE THE FOLLOWING:

A. Division 033000 Section "Cast-in-place Concrete" for bases and installation.

1.4 REFERENCES

A. ADAAG - Americans with Disabilities Act, Accessibility Guidelines.

1.5 SUBMITTALS

A. Submit under provisions of 013300
B. Manufacturer's data sheets on each product to be used, including:

1. Preparation instructions and recommendations.
2. Storage and handling requirements and recommendations.
3. Installation methods.

C. Shop Drawings: Show the following:

1. Dimensioned drawings including plans, elevations, and sections to show locker locations and interfaces with adjacent substrates, closure strips, etc.
2. Details of assembly, erection, anchorage and clearance requirements.
3. Details of locker base showing mounting strip and reinforcement (minimum 2 - #3 bars).

D. Selection Samples: For each finish product specified, two complete sets of color chips representing manufacturer's full range of available colors and finishes.

1.6 DELIVERY, STORAGE & HANDLING

A. Store products in manufacturer's unopened packaging until ready for installation.
B. Protect locker finish and adjacent surfaces from damage.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

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

1. Capitol, Inc.
2. Penco Products
3. Santana
4. Columbia

B. These specifications shall be regarded as minimum; lockers constructed of other materials, or material with a core and not of solid HDPE plastic will not be acceptable.
C. Requests for substitutions will be considered in accordance with provisions of Section 008200, Article 15.
D. Provide all plastic lockers, cubbies, cabinets and custom benches from a single manufacturer.

2.2 MATERIALS

A. Sides, shelves, tops and bottoms shall be made from polymer resins formed under high pressure to solid plastic components 1/2” thick with homogeneous color.
B. Doors shall be made from polymer resins formed under high pressure to a solid plastic component 1/2” thick with homogeneous color.
C. Door frames shall be made from polymer resins formed under high pressure to a solid plastic component 1/2” thick with homogeneous color.
D. Material Testing. All solid plastic components shall resist deterioration and discoloration when subjected to the following chemicals:

1. Acetic Acid 8-% Borax
2. Hydrochloric Acid 40% Soaps
3. Ammonium Phosphate Citric Acid
4. Hydrogen Peroxide 30% Potassium Bromide
5. Acetone Caustic Soda
6. Isopropyl Alcohol Trisodium Phosphate
7. Bleach 12% Copper Chloride
8. Lactic Acid Sodium Bicarbonate
9. Ammonia Liquid Chlorine Water
10. Nicotine Urea and Urine Brine
11. Core Oils Lime
12. Sulfur Vinegar
13. (Testing in accordance with corrosion-testing procedure established by the United States Plastic Corporation)

2.3 FABRICATION

A. Continuous locker base shall be constructed of concrete. Provide a 6 inch high and 2 inch deep toe-kick.
B. Fabricate components square and rigid, with finish free from scratches and chips.
C. Lockers and cubbies shall ship fully assembled, requiring only attachment of interior accessory items. Lockers requiring assembly on site are not permitted.

D. Separate solid plastic components will be secured using perimeter dado routing to provide a continuous and solid joint that slides together for assembly.
E. Locker sides and backs shall form a one-piece unit constructed from a single and contiguous sheet of solid plastic requiring no hardware. Door Frames shall be bonded to locker bodies using plastic welding process.
F. Lockers shall be a nominal dimension of 30 inches wide, 30 inches deep and 72 inches high and in a single-tier configuration. Lockers shall have a custom fold-down seat capable of supporting 250-pounds.
G. Cubbies shall be a nominal dimension of 18 inches wide, 18 inches deep and 18 inches high.
H. Lockers with doors:

    1. Continuous spring-loaded latch mechanism shall provide a vertical finger lift that is capable of accepting a padlock and is securely fastened to the door. Latch mechanism shall be attached to the length of the door, providing a continuous security latch.
    2. Door Hinge shall be continuous stainless steel or aluminum and integrate into the full length of the door and main locker body, with no metallic knuckles or pins.
    3. Ventilation

        a. Pattern of round ventilation holes in upper and lower ranges of door

I. Coat Hooks shall be made from stainless steel to resist corrosion and attached to intermediate shelves at the locker sides using hardware supplied by the manufacturer. Provide two per opening.
J. Dugout Wall Hooks shall be made from stainless steel to resist corrosion and attached to concrete masonry walls.
K. Finish shall be slightly textured for tops, bottoms, shelves and side walls to reduce marring in the color. Doors have a slightly textured finish to reduce marring and all colors will be selected from the manufacturer’s standard colors.
L. All lockers with doors shall have a vertical lift handle that requires no pinching, twisting, grasping or lateral motion to disengage.

    1. All lockers shall include a padlock attachment.

2.4 ACCESSORIES

A. Number Plates: Provide each locker with a polished aluminum number plate, 2-1/4 inches (57 mm) wide by 1 inch (25 mm) high, with black numerals not less than 3/8 inch (9.5 mm) high; attach to face of door with two aluminum rivets.
B. Finished end panels shall be constructed of one piece of 1/2 inch thick HDPE and attached using concealed tamper resistant fasteners. Provide same material wall closures where lockers are not tight to walls.
C. Continuous Sloping Hood shall be constructed of 1/2 inch thick HDPE and attached using concealed tamper resistant fasteners.
D. Lockers to have one custom fold-down seat each capable of supporting 250-pounds.
E. Lockers to each have one clothes hanging rod and two fixed shelves.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Do not begin installation of lockers until substrates and bases have been properly installed and prepared.
B. Install lockers at the location shown in accordance with the manufacturer’s instructions for plumb, level, rigid and flush installations.

C. Anchor the units to the wall studs or masonry through the locker back and to the base. Lockers are joined side by side with non-corrosive tamper resistant fasteners.
D. Install sloping tops, filler panels and end panels fillers using concealed fasteners. Provide flush hairline joints against adjacent surfaces.
E. Attach aluminum number plates using hardware provided by the manufacturer after the lockers are in place.

3.2 ADJUSTING AND CLEANING

A. Adjust doors and latches to operate without binding. Verify that latches are operating satisfactorily.
B. Adjust built-in locks to prevent binding of dial or key and ensure smooth operation prior to substantial completion.

3.3 PROTECTION

A. Protect installed products until completion of project.

3.4 WARRANTY

A. Locker manufacturer’s limited 20-year warranty against delamination or breakage of any of the plastic components under normal use shall apply. Manufacturer’s standard limited 1 year warranty against defects in material or workmanship also applies.

END OF SECTION 105126

SECTION 107500 - FLAGPOLES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section includes ground-mounted flagpoles made from aluminum.

B. Owner-Furnished Material: Flags.

C. Related Sections:

1. Division 26 Section "Exterior Lighting" for site lighting fixtures.

1.3 PERFORMANCE REQUIREMENTS

A. Structural Performance: Flagpole assemblies, including anchorages and supports, shall withstand the effects of gravity loads, and the following loads and stresses within limits and under conditions indicated according to the following design criteria:

1. Wind Loads: 130 mph according to SEI/ASCE 7.
2. Base flagpole design on polyester flags of maximum standard size suitable for use with flagpole or flag size indicated, whichever is more stringent.

1.4 SUBMITTALS

A. Product Data: For each type of product indicated. Include construction details, material descriptions, dimensions of individual components and profiles, operating characteristics, fittings, accessories, and finishes for flagpoles.

B. Shop Drawings: For flagpoles. Include plans, elevations, details, and attachments to other work. Show general arrangement, jointing, fittings, accessories, grounding, anchoring, and support.

1. Include section, and details of foundation system for ground-mounted flagpoles.

C. Samples for Verification: For each type of exposed finish required, in manufacturer's standard sizes.

D. Delegated-Design Submittal: For flagpole assemblies indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

E. Qualification Data: For qualified professional engineer.

F. Operation and Maintenance Data: For flagpoles to include in operation and maintenance manuals.

1.5 QUALITY ASSURANCE

A. Source Limitations: Obtain each type of flagpole as complete unit, including fittings, accessories, bases, and anchorage devices, from single source from single manufacturer.

1.6 DELIVERY, STORAGE, AND HANDLING

A. General: Spiral wrap flagpoles with heavy paper and enclose in a hard fiber tube or other protective container.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

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

1. American Flagpole; a Kearney-National Inc. company.
2. Atlantic Fiberglass Products, Inc.
3. Baartol Company.
4. Concord Industries, Inc.
5. Eder Flag Manufacturing Company, Inc.
6. Ewing Flagpoles.
7. Lingo Inc.; Acme Flagpole Company Division.
8. Millerbernd Manufacturing Company.
9. Morgan-Francis; Division of Original Tractor Cab Co., Inc.
10. PLP Composite Technologies, Inc.
11. Pole-Tech Company Inc.
12. U.S. Flag & Flagpole Supply, LP.
13. USS Manufacturing Inc.

2.2 FLAGPOLES

A. Flagpole Construction, General: Construct flagpoles in one piece if possible. If more than one piece is necessary, comply with the following:

1. Fabricate shop and field joints without using fasteners, screw collars, or lead calking.
2. Provide flush hairline joints using self-aligning, snug-fitting, internal sleeves.
3. Provide self-aligning, snug-fitting joints.

B. Exposed Height: 50 feet.

C. Aluminum Flagpoles: Provide entasis-tapered flagpoles fabricated from seamless extruded tubing complying with ASTM B 241/B 241M, Alloy 6063, with a minimum wall thickness of 3/16 inches.

D. Sleeve for Aluminum Flagpole: Fiberglass or PVC pipe foundation sleeve, made to fit flagpole, for casting into concrete foundation.

1. Provide flashing collar of same material and finish as flagpole.

2.3 FITTINGS

A. Finial Ball: Manufacturer's standard flush-seam ball, sized as indicated or, if not indicated, to match flagpole-butt diameter.

1. 0.063-inch spun aluminum, finished to match flagpole.

B. Internal Halyard, Winch System: Manually operated winch with control stop device and removable handle, stainless-steel cable halyard, and concealed revolving truck assembly with plastic-coated counterweight and sling. Provide flush access door secured with cylinder lock. Finish truck assembly to match flagpole.

1. Halyard Flag Snaps: Provide two stainless-steel swivel snap hooks per halyard for each flag. Provide for two (2) flags per pole.

2.4 MISCELLANEOUS MATERIALS

A. Nonshrink, Nonmetallic Grout: Factory-packaged, nonstaining, noncorrosive, nongaseous grout complying with ASTM C 1107.

B. Drainage Material: Crushed stone, or crushed or uncrushed gravel; coarse aggregate.

C. Sand: ASTM C 33, fine aggregate.

D. Elastomeric Joint Sealant: Single-component nonsag urethane joint sealant complying with requirements in Division 07 Section "Joint Sealants" for Use NT (nontraffic) and for Use M, G, A, and, as applicable to joint substrates indicated, for Use O.

E. Bituminous Paint: Cold-applied asphalt emulsion complying with ASTM D 1187.

2.5 ALUMINUM FINISHES

A. Clear Anodic Finish: AAMA 611, AA-M12C22A41, Class I, 0.018 mm or thicker.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances, including foundation; accurate placement, pattern, orientation of anchor bolts, and other conditions affecting performance of the Work.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Prepare uncoated metal flagpoles that are set in foundation tubes by painting below-grade portions with a heavy coat of bituminous paint.

B. Foundation Excavation: Excavate to neat clean lines in undisturbed soil. Remove loose soil and foreign matter from excavation and moisten earth before placing concrete. Place and compact drainage material at excavation bottom.

C. Provide forms where required due to unstable soil conditions and for perimeter of flagpole base at grade. Secure and brace forms to prevent displacement during concreting.

D. Place concrete, as specified in Division 03 Section "Cast-in-Place Concrete." Compact concrete in place by using vibrators. Moist-cure exposed concrete for not less than seven days or use nonstaining curing compound.

E. Trowel exposed concrete surfaces to a smooth, dense finish, free of trowel marks, and uniform in texture and appearance. Provide positive slope for water runoff to perimeter of concrete base.

3.3 FLAGPOLE INSTALLATION

A. General: Install flagpoles where shown and according to Shop Drawings and manufacturer's written instructions.

B. Ground Set: Place sleeve, center, and brace to prevent displacement during concreting. Place concrete. Plumb and level sleeve and allow concrete to cure. Install flagpole, plumb, in sleeve.

C. Baseplate: Cast anchor bolts in concrete foundation. Install baseplate on washers placed over leveling nuts on anchor bolts and adjust until flagpole is plumb. After flagpole is plumb, tighten retaining nuts and fill space under baseplate solidly with nonshrink, nonmetallic grout. Finish exposed grout surfaces smooth and slope 45 degrees away from edges of baseplate.

D. Mounting Brackets and Bases: Anchor brackets and bases securely through to structural support with fasteners as indicated on Shop Drawings.

END OF SECTION 107500

COMMODORS SOFTBALL

- Overall Dimensions
  14'4" high x 36'0" wide
- Arched Accent Truss w/ Routered Aluminum Logo and Letters
  DA-1001-36
  5'0" high x 36'0" wide
  (above Scoreboard)
- Baseball Scoreboard
  BA-2026-AR-PV w/
  8x48-34-R TNMCs
  9'4" high x 36'0" wide

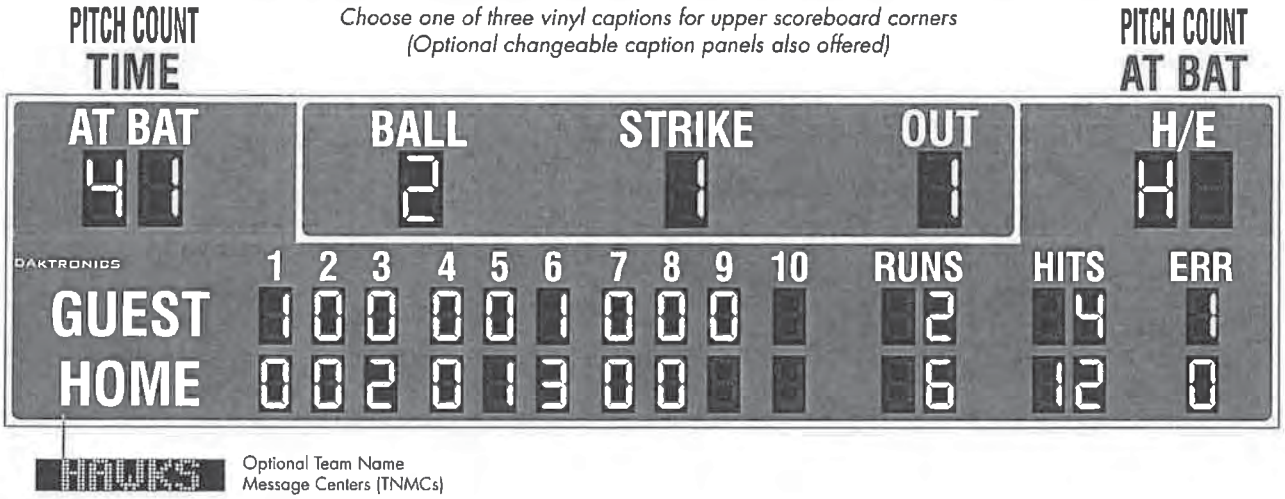
ALL DIMENSIONS ARE APPROXIMATE

GULF COAST STATE COLLEGE PANAMA CITY, FL

Do not use for design/engineering or ad copy approval.

DAKTRONICS

DAKTRONICS BA-2026 PRODUCT SPECIFICATIONS



This outdoor LED baseball/softball scoreboard displays HOME and GUEST team scores for up to 10 innings, total RUNS and HITS to 99 and ERR (errors) to nine for each team, AT BAT to 99, BALL to three, STRIKE to two, OUT to two and H/E (hit or error) with field position number for the error. Scoreboard can show TIME or PITCH COUNT instead of AT BAT, as well as AT BAT or PITCH COUNT in place of H/E. Scoreboard shown with optional striping and amber PanaView® digits.

DIMENSIONS	# OF SECTIONS	UNCRATED WEIGHT	POWER (120 VAC)
9'-4" H x 36'-0" W x 8" D (2.85 m, 10.97 m, 203 mm)	Four Total	1680 lb (762 kg)	900 Watts, 7.5 Amps
4'-4" H x 18'-0" W x 8" D (1.32 m, 5.49 m, 203 mm)	Two Top	390 lb (177 kg)	
5'-0" H x 18'-0" W x 8" D (1.52 m, 5.49 m, 203 mm)	Two Bottom	450 lb (204 kg)	

Notes:
1) Models with 240 VAC power at half the indicated amperage are also offered (International Use Only).
2) Optional TNMCs add 300 Watts to scoreboard power and 120 lb (54 kg) to weight of bottom-left scoreboard section.

DIGITS
- AT BAT, BALL, STRIKE, OUT and H/E digits are 24" (610 mm) high. All other digits are 18" (457 mm) high.
- Select all red or all amber LED digits. Scoreboard may instead have mixed LED digit colors (see DD1965467).
- Scoreboard features robust weather-sealed digits (see DD2495646).
- Digits may be dimmed for night viewing.

CAPTIONS
- HOME and GUEST captions are 15" (381 mm) high. AT BAT, BALL, STRIKE, OUT and H/E captions are 12" (305 mm) high. All other captions are 10" (254 mm) high.
- Standard captions are vinyl, applied directly to the display face.
- Optional TNMCs are 10.6" (269 mm) high.

DISPLAY COLOR
Choose from 150+ colors (from Martin Senour® paint book) at no additional cost.

CONSTRUCTION
Alcoa aluminum alloy 5052 for excellent corrosion resistance

PRODUCT SAFETY APPROVAL
ETL listed to UL Standards 48 and 1433; tested to CSA standards and CE labeled for outdoor use

OPERATING TEMPERATURES
- Display: -22 to 122° Fahrenheit (-30 to 50° Celsius)
- Console: 32 to 130° Fahrenheit (0 to 54° Celsius)

WWW.DAKTRONICS.COM E-MAIL: SALES@DAKTRONICS.COM

201 Daktronics Drive, PO Box 5128, Brookings, SD 57006
Phone: 1-800-325-8766 or 605-692-0200 Fax: 605-697-4746
DD1972163 101714 Page 1 of 7

DAKTRONICS

DAKTRONICS BA-2026 PRODUCT SPECIFICATIONS

CONTROL CONSOLE	CONTROL OPTIONS
All Sport® 5000 (see SL-03991)	***Wired (standard):*** One-pair shielded cable of 22 AWG minimum is required. A cover plate with mounted connector and standard 2" x 4" x 2" (51 mm x 102 mm x 51 mm) outlet box is provided. Connector mates with signal cable from control console.
	Wireless (optional): 2.4 GHz spread spectrum radio features 64 non-interfering channels and 8 broadcast groups (see SL-04279)

TIME CLOCK
The two-digit clock can display hours/minutes/seconds. Clock information shifts from hours to minutes to seconds as time counts down.

MOUNTING
Scoreboard is typically mounted on three or four vertical beams that require specific spacing. Hardware to mount scoreboard on three beams is included; hardware for more beams is at additional cost. Standard mounting uses I-beam clamps. Optional mounting method using angle brackets is also offered; maximum beam width is 12" (305 mm) and maximum beam depth is 22" (559 mm). Refer to attached drawings for more information on mounting methods. For mounting to horizontal beams, contact your Daktronics representative for more information.

SERVICE ACCESS
Digit panels and electronics are serviced from either the front or rear of the scoreboard.

GENERAL INFORMATION
Scoreboard provides scoring capabilities for two teams. 100% solid state electronics are housed in an all aluminum cabinet. Scoreboard is shipped in four sections. Specifications and pricing are subject to change without notice.

OPTIONS & ACCESSORIES
- Scoreboard border striping
- Striping around BALL, STRIKE and OUT digits
- TIME, AT BAT or PITCH COUNT captions on changeable panels
- Multiple caption and striping colors (see DD2101644)
- Team name caption in place of HOME *
- Team names on changeable panels *
- Programmable Team Name Message Centers (see DD1696958)
- Individual digit protective screens (see SL-04939)
- Protective netting
- Optional angle bracket mounting method
- Advertising/identification panels
- Decorative accents
- Electronic message centers and video displays in multiple sizes

** Only for scoreboard without Team Name Message Centers*

ADVERTISING/IDENTIFICATION PANELS

Non-Backlit:

1'-6" H x 18'-0" W (457 mm, 5.49 m) @2
2'-0" H x 18'-0" W (610 mm, 5.49 m) @2
2'-6" H x 18'-0" W (762 mm, 5.49 m) @2
3'-0" H x 18'-0" W (914 mm, 5.49 m) @2
4'-0" H x 18'-0" W (1.22 m, 5.49 m) @2
5'-0" H x 18'-0" W (1.52 m, 5.49 m) @2

For additional non-backlit panel sizes, see SL-03761.

Backlit:

1'-6" H x 36'-0" W (457 mm, 10.97 m)
2'-0" H x 36'-0" W (610 mm, 10.97 m)
2'-6" H x 36'-0" W (762 mm, 10.97 m)
3'-0" H x 36'-0" W (914 mm, 10.97 m)
4'-0" H x 36'-0" W (1.22 m, 10.97 m)
5'-0" H x 36'-0" W (1.52 m, 10.97 m)

FOR ADDITIONAL INFORMATION
- Installation Specifications: DWG-1189181 (attached)
- Standard I-beam Mounting: DWG-1052565 (attached)
- Optional Pole Mounting: DWG-1048184 (attached)
- Mounting Strap Installation for 3 I-beams: DWG-1115341 (attached)
- Component Locations: DWG-1049222 (attached)
- Architectural Specifications: See DD1972156
- Installation Manual: See DD1969938
- Service Manual: See DD2124597

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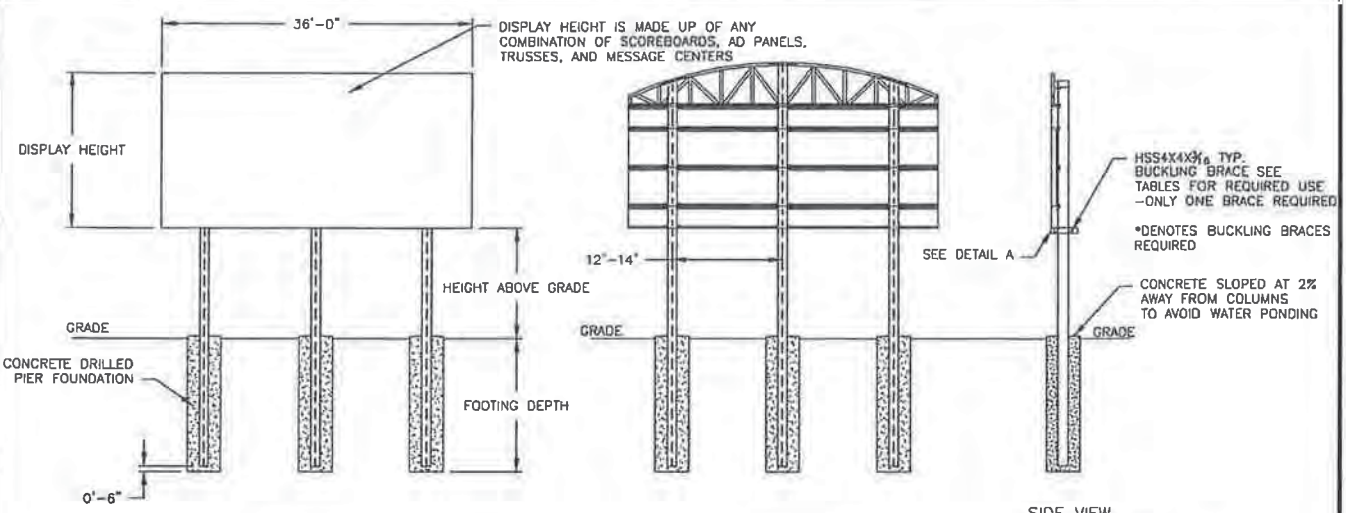
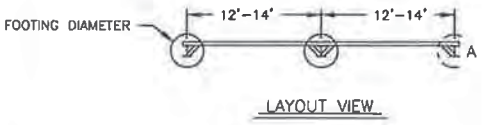
Phone: 1-800-325-8766 or 605-692-0200 Fax: 605-697-4746

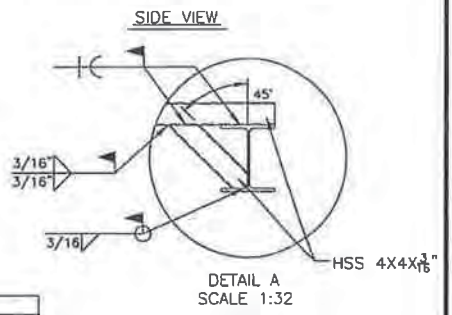
DAKTRONICS





LAYOUT VIEW

COLUMNS & FOOTING ONLY



DETAIL A
SCALE 1:32

TABLE A – MOUNTING

EXPOSURE B

HEIGHT ABOVE GRADE = 10'						HEIGHT ABOVE GRADE = 15'					
DISPLAY HEIGHT (FT)		DESIGN WIND VELOCITY				DISPLAY HEIGHT (FT)		DESIGN WIND VELOCITY			
		115 MPH	130 MPH	150 MPH	170 MPH			115 MPH	130 MPH	150 MPH	170 MPH
8	COLUMN	W10X33	W10X39	W14X43	W12X53	8	COLUMN	W14X48	W12X53	W14X61	W16X67
	FOOTING	3.0'X8.0'	3.0'X8.5'	3.0'X9.5'	3.0'X10.5'		FOOTING	3.0'X8.5'	3.0'X9.5'	3.0'X10.5'	3.0'X11.5'
10	COLUMN	W12X40	W14X48	W12X58	W12X65	10	COLUMN	W12X53	W14X61	W14X74	W18X86
	FOOTING	3.0'X8.5'	3.0'X9.5'	3.0'X10.5'	3.0'X11.5'		FOOTING	3.0'X9.5'	3.0'X10.5'	3.0'X11.5'	4.0'X11.5'
12	COLUMN	W12X50	W12X58	W16X67	W18X76	12	COLUMN	W12X65	W18X76	W18X86	W21X101
	FOOTING	3.0'X9.5'	3.0'X10.5'	3.0'X11.5'	4.0'X11.5'		FOOTING	3.0'X10.5'	4.0'X10.5'	4.0'X11.5'	4.0'X12.5'
14	COLUMN	W21X58	W12X65	W18X76	W18X86	14*	COLUMN	W21X55	W16X67	W24X76	W27X84
	FOOTING	4.0'X9.0'	3.0'X11.0'	4.0'X11.0'	4.0'X12.5'		FOOTING	4.0'X9.5'	3.0'X12.5'	4.0'X12.5'	5.0'X12.5'
16	COLUMN	W12X65	W18X76	W18X86	W21X101	16*	COLUMN	W21X62	W18X76	W27X84	W30X99
	FOOTING	3.0'X11.0'	4.0'X11.0'	4.0'X12.0'	4.0'X14.0'		FOOTING	4.0'X10.5'	4.0'X12.0'	5.0'X12.0'	5.0'X13.5'
18*	COLUMN	W21X48	W21X62	W24X68	W24X84	18*	COLUMN	W24X68	W24X84	W30X90	W30X108
	FOOTING	4.0'X10.5'	4.0'X11.5'	4.0'X13.0'	4.0'X15.0'		FOOTING	4.0'X11.5'	4.0'X12.5'	5.0'X13.0'	5.0'X15.5'
20*	COLUMN	W21X55	W21X68	W24X76	W30X90	20*	COLUMN	W18X76	W27X84	W30X99	W33X118
	FOOTING	4.0'X11.0'	4.0'X12.0'	4.0'X14.5'	5.0'X14.5'		FOOTING	4.0'X12.0'	5.0'X12.0'	5.0'X14.5'	5.0'X16.5'

FOOTING DIMENSIONS = DIAMETER X DEPTH
* DENOTES ADDITIONAL BRACES REQUIRED AT THE MID HEIGHT OF DISPLAY

EXPOSURE C

HEIGHT ABOVE GRADE = 10'				HEIGHT ABOVE GRADE = 15'			
DISPLAY HEIGHT (FT)		DESIGN WIND VELOCITY		DISPLAY HEIGHT (FT)		DESIGN WIND VELOCITY	
		115 MPH	140 MPH			115 MPH	140 MPH
8	COLUMN	W12X40	W12X53	8	COLUMN	W12X58	W16X67
	FOOTING	3.0'X9.0'	3.0'X10.5'		FOOTING	3.0'X10.0'	3.0'X11.5'
10	COLUMN	W12X53	W14X61	10	COLUMN	W12X65	W18X86
	FOOTING	3.0'X10.0'	3.0'X11.5'		FOOTING	3.0'X10.5'	4.0'X11.5'
12	COLUMN	W14X61	W18X76	12	COLUMN	W18X76	W18X97
	FOOTING	3.0'X11.0'	4.0'X11.5'		FOOTING	4.0'X10.5'	4.0'X12.5'
14	COLUMN	W16X67	W18X86	14*	COLUMN	W24X68	W27X84
	FOOTING	3.0'X11.5'	4.0'X12.0'		FOOTING	4.0'X11.5'	5.0'X12.5'
16	COLUMN	W18X76	W21X101	16*	COLUMN	W18X76	W30X90
	FOOTING	4.0'X11.0'	4.0'X13.5'		FOOTING	4.0'X12.5'	5.0'X15.5'
18*	COLUMN	W21X62	W24X84	18*	COLUMN	W24X84	W24X104
	FOOTING	4.0'X12.0'	4.0'X15.0'		FOOTING	4.0'X13.5'	4.0'X17.0'
20*	COLUMN	W24X68	W27X84	20*	COLUMN	W30X90	W30X116
	FOOTING	4.0'X13.0'	5.0'X14.0'		FOOTING	5.0'X12.5'	5.0'X16.0'

FOOTING DIMENSIONS = DIAMETER X DEPTH
* DENOTES ADDITIONAL BRACES REQUIRED AT THE MID HEIGHT OF DISPLAY

NOTES:

1. FOOTING AND COLUMN SIZES ARE SUGGESTIONS ONLY, PROVIDED TO ASSIST WITH ESTIMATING INSTALLATION COSTS AND ARE NOT INTENDED FOR CONSTRUCTION PURPOSES. THE DESIGN MUST BE CERTIFIED BY A PROFESSIONAL ENGINEER LICENSED IN THE STATE OF THE INSTALLATION BEFORE THEY CAN BE USED FOR FABRICATION Or ERECTION.

2. INTERNATIONAL BUILDING CODE 2012 USED IN DESIGN OF COLUMNS AND FOOTINGS WITH, IMPORTANCE FACTOR=1, Kzt=1.0, Kd=0.85, G=0.85. SEISMIC DESIGN WAS NOT CONSIDERED.

3. FOOTING DIMENSIONS ARE BASED ON ASSUMED SOIL CLASS 4 (ALLOWABLE LATERAL BEARING PRESSURE OF 150 psf).

4. STRUCTURAL STEEL IS GRADE A992 (50 ksi) STEEL. CONCRETE SHALL HAVE A MINNIMUM 28 DAY COMPRESSIVE STRENGTH OF 2500 psi.

5. THE AVERAGE DISPLAY WEIGHT FOR A LAYOUT CAN NOT EXCEED 8 PSF

6. DAKTRONICS INC. IS NOT RESPONSIBLE FOR STRUCTURES DESIGNED AND INSTALLED BY OTHERS.

7. LOCAL BUILDING OFFICIALS SHOULD BE CONTACTED TO DETERMINE THE WIND SPEED AND EXPOSURE CATEGORY FOR THE PROPOSED SIGN LOCATION. THE EXPOSURE CATEGORY C IS DEFINED AS:

EXPOSURE B – URBAN AND SUBURBAN AREAS, OR OTHER TERRAIN WITH NUMEROUS SPACED OBSTRUCTIONS HAVING THE SIZE OF SINGLE-FAMILY DWELLINGS OR LARGER. THESE CONDITIONS MUST PREVAIL FOR A DISTANCE FROM THE SIGN OF AT LEAST 2,600 ft OR 20 TIMES THE SIGN HEIGHT, WHICHEVER IS GREATER

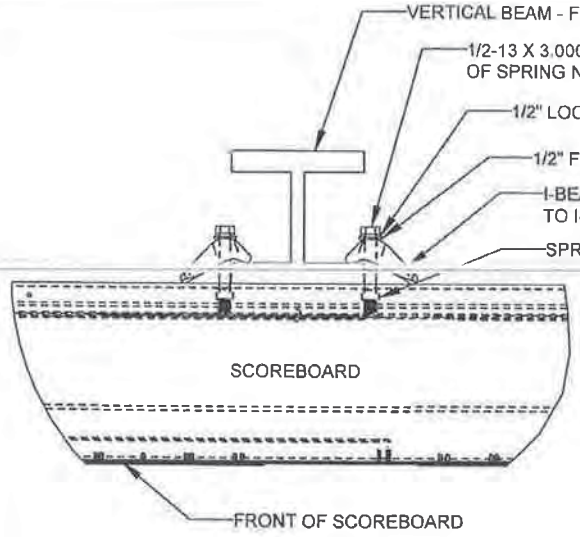
EXPOSURE C – OPEN TERRAIN WITH SCATTERED OBSTRUCTIONS HAVING HEIGHTS GENERALLY LESS THAN 30 FT. THIS CATEGORY INCLUDES FLAT OPEN COUNTRY, GRASSLANDS, AND ALL WATER SURFACES IN HURRICANE PRONE REGIONS.

8. FOR SPECIFIC PRODUCT DETAILS ON WEIGHT, MOUNTING, ETC, REFER TO THE INDIVIDUAL PRODUCT SPECIFICATION SHEETS.

DAKTRONICS, INC.
BROOKINGS, SD 57006
DO NOT SCALE DRAWING

PROJ: OUTDOOR SCOREBOARD INSTALLATION			
TITLE: 36' WIDTH SCOREBOARD INSTALLATION SPECS.			
DESIGN: TTASCHN	DRAWN: TTASCHN		DATE: 29 AUG 14
SCALE: 1/16"=1'			
SHEET	REV	JOB NO:	FUNC-TYPE-SIZE
	00	P1538	E-10-A

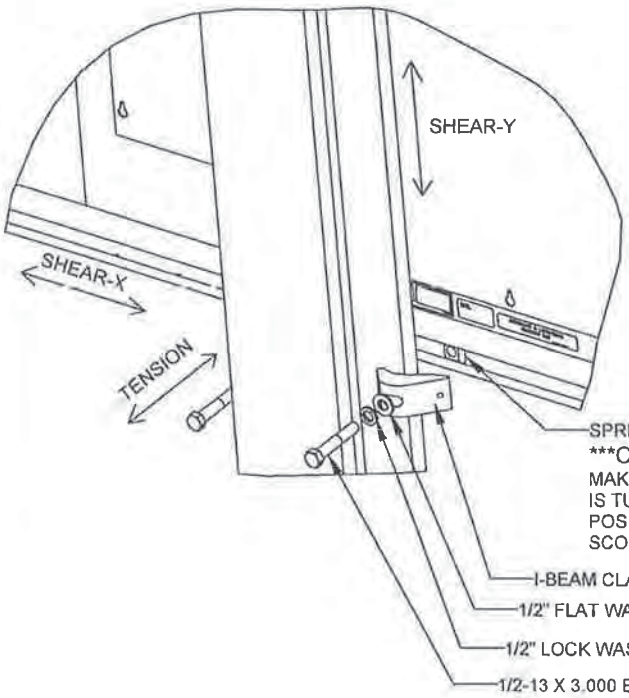
1189181



STANDARD MOUNTING METHOD

TOP VIEW

MOUNTING INSTRUCTIONS:
1. PLACE SPRING NUTS INTO SCOREBOARD CHANNEL IN APPROXIMATE LOCATION OF VERTICAL BEAMS
2. LIFT SCOREBOARD INTO POSITION
3. MAKE SURE THE 1/2-13 BOLTS ARE AS CLOSE TO THE I-BEAM FLANGES AS POSSIBLE
4. WHEN SCOREBOARD IS ADJUSTED TO FINAL DESIRED POSITION, TIGHTEN BOLTS FIRMLY
5. IF FLANGE THICKNESS IS MORE THAN 3/4" THICK LONGER BOLTS WILL BE REQUIRED AT THE CUSTOMER'S EXPENSE.



ALLOWABLE CAPACITY PER EACH CLAMP:
SHEAR = 160 LBS
TENSION = 2300 LBS

SHEAR AND TENSION LOAD DIRECTION ARE AS INDICATED ON REAR ISOMETRIC VIEW

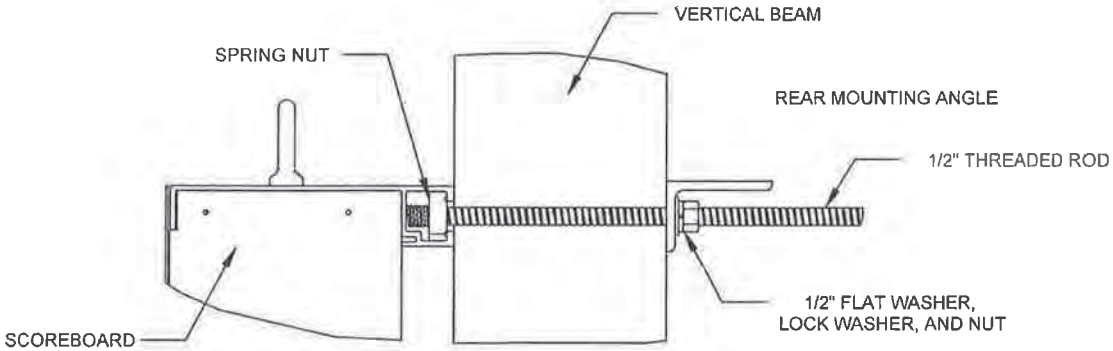
EXPLODED REAR ISOMETRIC VIEW

REV	DATE:		BY:
04	6 JAN 14	ADDED ALLOWABLE TENSION AND SHEAR CAPACITY DETAILS	JAVA
03	23 OCT 13	CHANGED BOLT TORQUE FROM 30 FT-LB TO 40 FT-LB PER EC-12382	NJM
02	07 MAR 12	ADDED STADNARD MOUNTING METHOD NOTES	KDD
01	21 FEB 12	CHANGED ROCKER TO I-BEAM	KDD

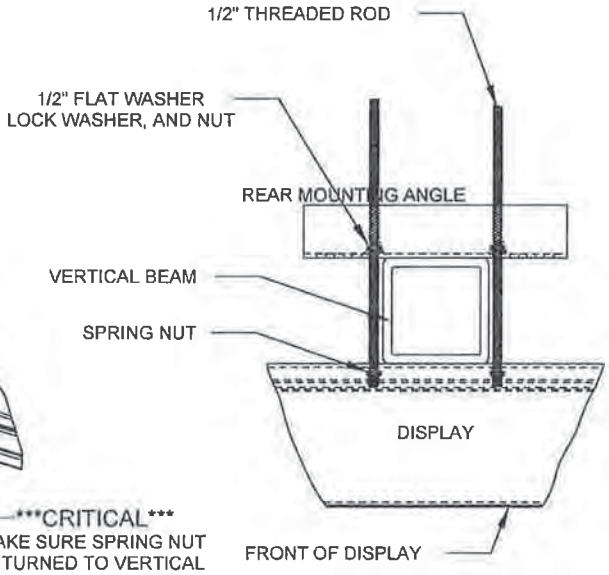
DAKTRONICS, INC.
BROOKINGS, SD 57006
DO NOT SCALE DRAWING

PROJ: OUTDOOR SCOREBOARD
TITLE: P1647; I-BEAM CLAMP MOUNTING
DESIGN: MCARSRU | DRAWN: MCARSRU | DATE: 06-JAN-14
SCALE: 1/8

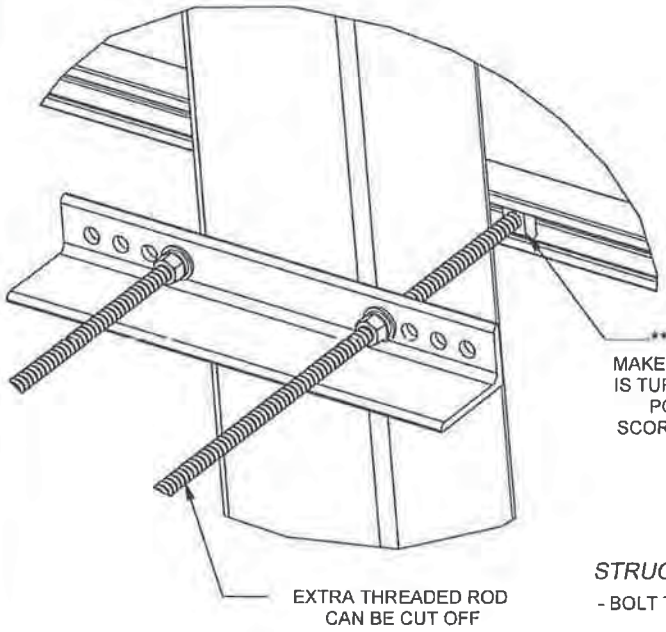
SHEET:	REV	JOB NO:	FUNC-TYPE-SIZE	
1 OF 1	04	P 1647	E – 07 – A	1052565



SIDE VIEW



TOP VIEW
SCALE 1/10



REAR ISOMETRIC VIEW

STRUCTURAL NOTES:

- BOLT TORQUE: 30 FT-LB

NOTES:

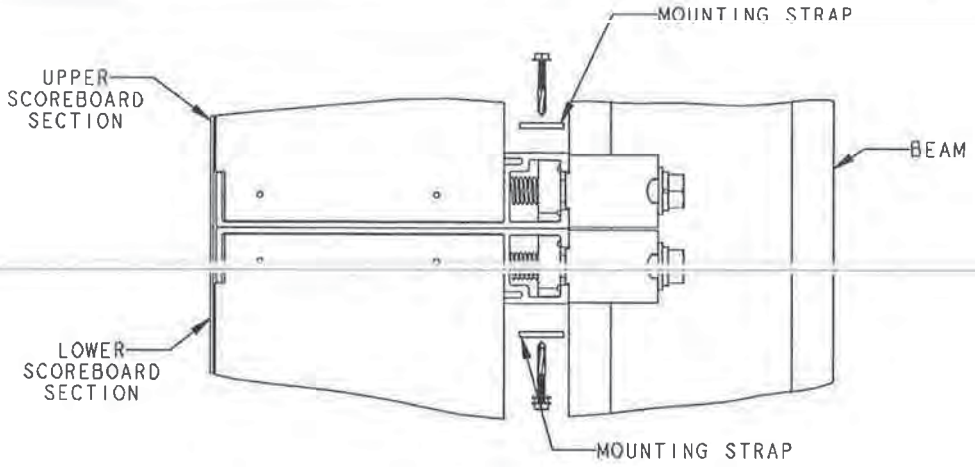
- THREADED RODS RUN ALONG BOTH SIDES OF BEAM
- RODS DO NOT PASS THROUGH THE FLANGES OF THE BEAM
- NO DRILLING NECESSARY
- MAKE SURE SPRING NUT IS PERPENDICULAR TO CHANNEL OPENING ON SCOREBOARD

REV	DATE:		BY:
03	3 JULY 13	ADDED STRUCTURAL NOTE	TTF
02	20 SEP 12	REMOVED CHAMFER FROM 0M-133259 PER EC-7114	LMG
01	08 OCT 11	REPLACED VERTICAL I-BEAM WITH 6" X 6" SQUARE TUBE	JAVA

DAKTRONICS, INC.
BROOKINGS, SD 57006
DO NOT SCALE DRAWING

PROJ:	OUTDOOR SCOREBOARDS			
TITLE:	P1647; POLE MOUNTING OPTIONS			
DESIGN:	DOPPELT	DRAWN:	DOPPELT	DATE: 22 MAR 11
SCALE:	1/5			

SHEET:	REV	JOB NO:	FUNC-TYPE-SIZE	
1 OF 1	03	P1647	E - 10 - A	1048184



SIDE VIEW
SCALE 1/4

STRAP INSTALLATION PROCEDURE FOR 3 POLE APPLICATION

AFTER CLAMPING ALL FOUR SECTIONS OF THE SCOREBOARD TO MOUNTING BEAMS, IT IS NECESSARY TO ATTACH THE TWO BOTTOM SECTIONS TO EACH OTHER AND THE TWO TOP SECTIONS TO EACH OTHER.

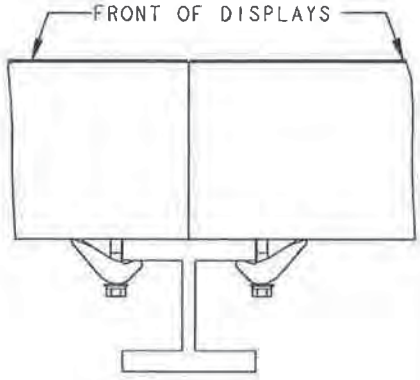
STRAPS ARE REQUIRED AT SPLICE LOCATION FOR BOTH POLE MOUNTING AND I-BEAM MOUNTING STYLES

THIS IS ACHIEVED USING FOUR MOUNTING STRAPS (1/8" X 1" X 20" LONG) AND #12 HEX HEADED SCREWS.

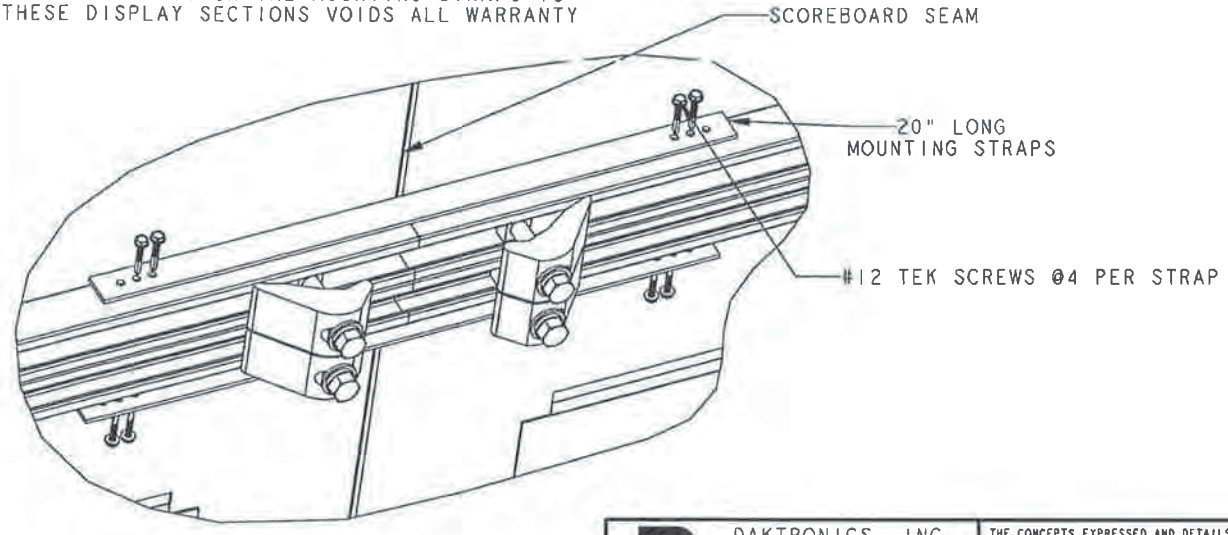
POSITION THE MOUNTING STRAPS AS SHOWN ON THIS DRAWING. ATTACH FOUR SCREWS TO ATTACH EACH STRAP. 2 SCREWS ON EACH SIDE OF THE SPLICE.

ATTACH ONE STRAP TO THE TOP & BOTTOM OF EACH LEFT & RIGHT SECTION.

FAILURE TO ATTACH THE MOUNTING STRAPS TO THESE DISPLAY SECTIONS VOIDS ALL WARRANTY



TOP VIEW
SCALE 1/8

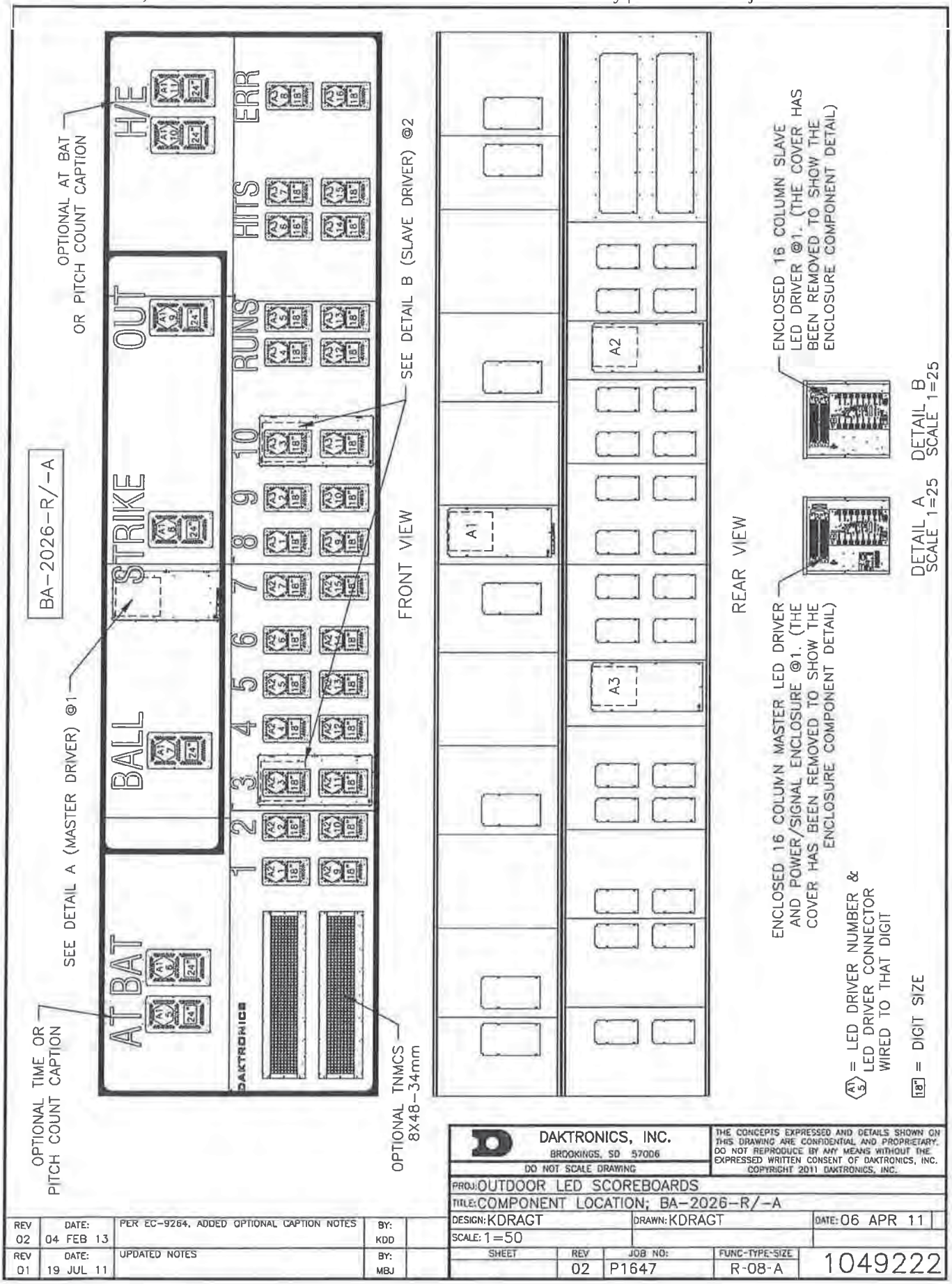


ISOMETRIC VIEW
SCALE 1/5
SHOWN WITH OUT I-BEAM

REV	DATE:		BY:

DAKTRONICS, INC.
BROOKINGS, SD 57006
DO NOT SCALE DRAWING

PROJ: OUTDOOR SCOREBOARDS				
TITLE: MTG STRAPS, 4 SEC SCBD ON 3 POLES				
DESIGN: USER NAME	DRAWN: DOPPELT			DATE: 05-OCT-12
SCALE: AS SHOWN				
SHEET: 1 OF 1	REV 00	JOB NO: P 1647	FUNC-TYPE-SIZE E-07-A	1115341



REV	DATE:		BY:
02	04 FEB 13	PER EC-9264, ADDED OPTIONAL CAPTION NOTES	KDD
01	19 JUL 11	UPDATED NOTES	MBJ

DAKTRONICS, INC.
BROOKINGS, SD 57006
DO NOT SCALE DRAWING

PROJ: OUTDOOR LED SCOREBOARDS
TITLE: COMPONENT LOCATION; BA-2026-R/-A
DESIGN: KDRAGT | DRAWN: KDRAGT | DATE: 06 APR 11
SCALE: 1=50

SHEET	REV	JOB NO:	FUNC-TYPE-SIZE	
	02	P1647	R-08-A	1049222

SECTION 133123 - TENSIONED FABRIC STRUCTURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 DEFINITIONS

A. Tensioned Fabric Structure: Cable and/or frame supported tensioned membrane-covered fabric structure; incorporating a fabric with low elongation characteristics under tension and capable of an anticlastic configuration. Fabric structures in which fabric is applied as flat or mono-axially curved configurations are not acceptable.

1.3 SUMMARY

A. Section Includes:

1. Section includes a tensioned fabric canopy system as shown on Drawings and specified in this Section.
2. Architect’s drawings indicate design intent with respect to sizes, shapes, and configurations of the tensioned fabric canopy. Provide all components and accessories required for complete tensioned fabric canopy system, whether or not specifically shown or specified.
3. The tensioned fabric structure will assume bolted/pinned connections for field assembly. No field welding will be permitted.
4. This contractor is also responsible for the design of the poles that supports the canopy and the lightning arrestor system. It is imperative that the contractor transmit to the Structural Engineer of record all loads imposed to the structure by the tensile fabric structure. Coordination with regards to life safety must be assured by the mutual cooperation of these two structural engineers.

B. The tensioned fabric structure Subcontractor shall be responsible for the structural design, detailing, fabrication, supply, and installation of the Work specified herein. The intent of this specification is to establish in the first instance an undivided, single-source responsibility of the Subcontractor for all of the foregoing functions.

C. Subcontractor’s Work shall include the structural design, supply, fabrication, shipment, and erection of the following items:

1. The architectural membrane as indicated on the drawings and in these specifications.
2. Cables and fittings.
3. Perimeter, catenary, and sectionalized clamping system.
4. Structural steel, including masts, trusses, struts, and beams as indicated on the drawings.
5. Fasteners and gaskets.

D. Related Requirements:

1. Division 05 Sections "Structural Steel Framing" and “Architecturally Exposed Structural Steel" for steel structure supporting tensioned fabric structure.

1.4 REFERENCES

A. General: Except as otherwise shown or noted, all work shall comply with the requirements of the following codes and standards:

1. American Institute of Steel Construction (AISC).

a. Specifications for the Design, Fabrication, and Erection of Structural Steel for Buildings.
b. Code of Standard Practice for Steel Buildings and Bridges.
c. Specification for Structural Steel Buildings – Allowable Stress Design and Plastic Design.
d. Specification for Allowable Stress Design of Single-angle Members.

2. American Society of Civil Engineers.

a. ASCE 19: Structural Applications of Steel Cables for Buildings.

3. American Society of Testing and Materials (ASTM).

a. ASTM A586: Standard Specifications for Zinc-Coated Steel Structural Strand.
b. ASTM A603: Standard Specifications for Zinc-Coated Steel Structural Wire Rope.
c. ASTM D4851-88: Standard Test Methods for Coated and Laminated Fabrics for Architectural Use.
d. ASTM E84: Standard Test Method for Surface Burning Characteristics of Building Materials.
e. ASTM E108: Standard Test Methods for Fire Test and Roof Coverings.
f. ASTM E136: Standard Test Method for Behavior of Materials in a Vertical Tube Furnace at 750 degrees C.
g. ASTM C423: Standard Test Method for Sound Absorption and Sound Absorption Coefficients by the Reverberation Room Method.
h. ASTM E424: Standard Test Method for Solar Energy Transmittance and Reflectance of Sheet Materials.

4. American Welding Society (AWS).

a. AWS D1.1: Structural Welding Code.
b. AWS 2.4: Symbols for Welding and Nondestructive Testing.

5. Aluminum Association

a. Specifications for Aluminum Structures.

6. National Fire Protection Association (NFPA).

a. NFPA 701: Standard Methods of Fire Tests for Flame Propagation of Textiles and Films.

7. Steel Structures Painting Council (SSPC).

a. Steel Structures Painting Manual, Volumes 1 and 2.

1.5 SYSTEM REQUIREMENTS

A. General: Provide a tensioned fabric structure system that complies with requirements specified herein by testing the Subcontractor's corresponding membrane system in accordance with the indicated test methods.
B. Building Code Criteria: The tensioned fabric structure shall comply with the Florida Building Code, 2014 edition, with supplements.
C. Comply with local building codes and respective loading criteria for Live Loads, Dead Loads, and Wind Speed.
D. Life Safety: Tensioned fabric structure shall be detailed so that no life safety issue is created in the event of a loss of a part of the membrane. The tensioned fabric structure shall not rely on the membrane for structural stability.

1.6 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. Include styles, material descriptions, construction details, fabrication details, dimensions of individual components and profiles, hardware, fittings, mounting accessories, features, and finishes for tensioned fabric structures.
2. Include rated capacities, light transmissions, and operating characteristics of furnished specialties and accessories.

B. LEED Submittals:

1. Product Data for Credit MR 4: For products having recycled content, documentation indicating percentages by weight of postconsumer and pre-consumer recycled content. Include statement indicating cost for each product having recycled content.
2. Product Certificates for Credit MR 5.1 [and Credit MR 5.2]: For products and materials required to comply with requirements for regionally manufactured materials. Include statement indicating cost for each regionally manufactured material.

    a. Include statement indicating location of manufacturer and distance to Project for each regionally manufactured material.

C. Design Drawings:

1. Include plans, elevations, sections, mounting heights, and frame assembly details.
2. Preliminary member sizes with wall thickness TBD.
3. Preliminary footing layout and foundation design with final depth TBD.
4. Show intended fabric attachment hardware and details.
5. Identify direction, details and locations of fabric seams.
6. Show details of fabric membrane dimensions including length of spans, sag in curvature and actual shaded area.

D. Engineered Drawings (submit after Design Drawings have been approved):

1. Calculations with Wet Stamp seal of a Professional Engineer with a license in the same state as the project location.
2. Engineering Drawings with Wet Stamp seal of a Professional Engineer with a license in the same state as the project location.
3. Include plans, elevations, sections, mounting heights, and frame assembly details.
4. Provide frame member sizes and required wall thicknesses.
5. Identify all welding requirements.
6. Detail all bolted and/or pin connections for frame assembly.
7. Identify required sizes of bolts, pins, plates and tubing.
8. Verify the fabric meets minimum engineering requirements.
9. Detail fabric attachment methods and identify thickness of all membrane plates, clamps and other attachment components.

10. Call out all cable sizes and pretension requirements.
11. Submit anchor-bolt plans before foundation work begins. Include location, diameter, and projection of anchor bolts required to attach the tensioned fabric structures to foundation. Indicate column reactions at each location.

E. Samples for Initial Selection: Electronic file of available frame finish colors.
F. Samples for Verification: For the following:

1. Fabric: Qty. (4) 8 ½" x 11" samples of fabric as selected by the architect.
2. Frame Finish: Qty. (4) Sample chips, not less than 2" x 3" in size.

1.7 INFORMATIONAL SUBMITTALS

A. Qualification Data: For Installer, fabricator and professional engineer.
B. Welding certificates.
C. Sample Warranty: For fabric warranty.

1.8 CLOSEOUT SUBMITTALS

A. Maintenance Data: For tensioned fabric structures to include in operation and maintenance manuals.

1. Include the following:

a. Methods for maintaining tensioned fabric structure fabrics and finishes.
b. Precautions about cleaning materials and methods that could be detrimental to fabrics, finishes, and performance.

1.9 QUALITY ASSURANCE

A. Fabricator Qualifications: Shop that employs skilled workers who custom-fabricate tensioned fabric structures similar to those required for this Project and whose products have a record of successful in-service performance.

1. Fabricator is a Master Fabric Craftsman certified by the Industrial Fabrics Association International.
2. Fabricator's responsibilities include fabricating and installing tensioned fabric structures and providing professional engineering services needed to assume engineering responsibility.
3. Fabricator's engineering services must utilize Finite Element Analysis software that performs fabric form finding and takes into account fabric material properties and pre-stress characteristics.
4. Fabricator must have proven record of at least (5) successful projects of similar size and similar specified fabric material.
5. Fabricator must have been in continuous operation as a professional tensioned fabric structure manufacturer for minimum of (10) years prior to contract.
6. Fabricator must have an in-house Made-in-America manufacturing facility for both frame and fabric membrane components.

B. Installer Qualifications: Fabricator of products.
C. Welding Qualifications: Qualify procedures and personnel according to the following:

1. AWS D1.1/D1.1M, "Structural Welding Code -Steel."

1.10 FIELD CONDITIONS

A. Weather Limitations: Proceed with installation only when existing and forecasted weather conditions permit installation of tensioned fabric structure in exterior locations to be performed according to manufacturers' written instructions and warranty requirements.
B. Field Measurements: Where tensioned fabric structure installation is indicated to fit to other work, verify dimensions of other work by field measurements before fabrication and indicate measurements on Shop Drawings. Allow clearances for fenestration operation throughout the entire operating range. Notify Architect of discrepancies. Coordinate fabrication schedule with construction progress to avoid delaying the Work.

1.11 WARRANTY

A. Special Warranty: Manufacturer and fabricator agree to repair or replace components of tensioned fabric structures that fail in materials or workmanship within specified warranty period of one year from the date of Substantial Completion.

1. Failures include, but are not limited to, the following:

a. Structural failures including framework.
b. Deterioration of fabric including seam failure.
c. Deterioration of metals, metal finishes, and other materials beyond normal weathering.

2. Warranty Period, Fabric: Reference the manufacturer’s limited warranty for the specified fabric manufacturer and product.
3. Warranty Period, Cables, Securement Devices and Accessories: One year from date of Substantial Completion

PART 2 - PRODUCTS

2.1 MANUFACTURERS

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

1. Eide Industries, Inc. (Basis of Design)
2. Creative Shade Solutions, Inc.
3. Big Span Structures, LLC
4. Legacy Building Solutions

B. Approved equal. Manufacturer must meet all minimum requirements as outlined in item 1.7 QUALITY ASSURANCE of this section and show written proof for each item listed to become an approved equal.

1. Substitutions in accordance with Section 012500
2. Substitution requests must be submitted and approved prior to bid date. Any approved equals shall be issued by addendum.

C. Source Limitations: Obtain tensioned fabric structures from single source from single manufacturer.

2.2 PERFORMANCE REQUIREMENTS

A. Regulatory Requirements: Provide tensioned fabric canopy system complying with requirements and limitations of authorities having jurisdiction that are within Contractor's control.
B. Delegated Design: Engage a qualified professional engineer to design tensioned fabric canopy system. Delegated design engineering requirements include, but are not limited to, the following:

    1. Prepare structural design drawings defining the precise interface geometry determination, reaction loads imposed on structural steel framing, anchoring loads, connection details, interfaces and seam layouts.
    2. Structural calculations for the tensioned fabric canopy system shall include:

        a. Large deflection numerical shape generation that will insure a stable, uniformly stressed, three dimensionally curved shape that is in static equilibrium with the internal pre-stress forces and is suitable to resist all applied loads.
        b. Large deflection finite element method structural analysis of the membrane system under all applicable wind and seismic loads.
        c. Connection design including bolt, weld and ancillary member sizing.
        d. Biaxial fabric test specification, interpretation and fabric compensation determination.
        e. Accurate generation of the two dimensional compensated fabric templates required to generate the three dimensional equilibrium shape.

C. In engineering tensioned fabric canopy system fittings and accessories to withstand structural loads indicated, determine allowable design working stresses of railing materials based on the following:

    1. Steel: 72 percent of minimum yield strength.
    2. Stainless Steel: 60 percent of minimum yield strength.
    3. Aluminum: The lesser of minimum yield strength divided by 1.65 or minimum ultimate tensile strength divided by 1.95.

D. Structural Performance: Tensioned fabric canopy system shall withstand the effects of gravity loads and the following loads and stresses within limits and under conditions indicated according to ASCE/SEI 7:

    1. Wind Loads: To be as determined by Engineer of Record.
    2. Live Loads: To be as determined by Engineer of Record.

E. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes.

    1. Temperature Change: 120 deg F, ambient; 180 deg F, material surfaces.

F. Control of Corrosion: Prevent galvanic action and other forms of corrosion by insulating metals and other materials from direct contact with incompatible materials.

2.3 CANOPY FABRIC

A. Product: Subject to compliance with requirements, provide fabric as called out and specified by the Architect in the bid drawings.
B. Fire-Test-Response Characteristics: Provide canopy fabric with the fire-test-response characteristics indicated, as determined by testing identical products according to test method indicated below by UL or another testing and inspecting agency acceptable to authorities having jurisdiction:

    1. Flame-Resistance Ratings: Passes NFPA 701.

C. Fabric manufacturer: The following is a list of approved fabric manufacturers for tensioned fabric structures.

1. Saint Gobain (Sheerfill product line)
2. Ferrari Textiles (Precontraint product line)
3. SEFAR (Tenara product line)
4. Interglass (Atex product line)
5. Seaman Corporation (Shelter-Rite product line)
6. Verseidag (Duraskin product line)
7. Naizil
8. Hiraoka
9. Mehler (Polymar product line)

D. Fabric properties:

1. Fabric thickness and tensile strength: Must meet engineering requirements with a safety factor of five.
2. Color: Dark Blue and Gold as selected by the Architect.

E. Fabric Substitutions

1. High Density Polyethylene (HDPE) woven mesh fabric may be substituted for non-waterproof applications only. HDPE fabric substitutions are only allowed when the architectural drawings specifically call out fabric as “Shade Fabric” or “HDPE Fabric” or “Non-waterproof Fabric” or “Fabric Mesh”.
2. Acceptable manufacturers of HDPE fabrics are Polyfab and Coolaroo.
3. Color: To be selected from the manufacturer’s range of available colors.
4. HDPE fabric membranes shall be designed to avoid contact with any PVC material.

2.4 CANOPY FRAME, CABLES, FITTINGS AND ACCESSORIES

A. General: Provide accessories as standard with tensioned fabric canopy system fabricator and as specified. Fabricate and finish accessories at the factory to greatest extent possible, by manufacturer's standard procedures and processes. Comply with indicated profiles and with dimensional and structural requirements.
B. Metal Surfaces, General: Provide materials with smooth surfaces, without seam marks, roller marks, rolled trade names, stains, discolorations, or blemishes.
C. Frame material shall be shall be constructed of cold rolled carbon steel unless otherwise specified by the architect in the bid drawings.
D. Stainless Steel;

1. Tubing: ASTM A 554, Grade MT 316L.
2. Pipe: ASTM A 312/A 312M, Grade TP 316L.
3. Castings: ASTM A 743/A 743M, Grade CF 8M or CF 3M.
4. Sheet, Strip, Plate, and Flat Bar: ASTM A 666, Type 316L.
5. Bars and Shapes: ASTM A 276, Type 316L.

E. Aluminum (when applicable):

1. Provide alloy and temper recommended by aluminum producer and finisher for type of use and finish indicated, and with strength and durability properties for each aluminum form required not less than that of alloy and temper designated below.
2. Extruded Bars and Shapes: ASTM B 221, Alloy 6063-T5/T52.

F. Cables and Fittings shall be constructed of stainless steel:

1. All cables in contact with PTFE fabric shall be PVC coated.

2. Any cable in contact with HDPE fabric shall never have PVC coating.
3. Manufacturers: Subject to compliance with requirements, provide products by one of the following manufacturers:

    a. John A. Batchelor Co Inc.
    b. Jack Rueben and Sons.
    c. McMaster Carr
    d. Frontier Technologies.
    e. The Crosby Group.
    f. Ronstan International Inc.

4. Stainless Steel Cables:

    a. Cable: 7-by-19 wire rope made from wire complying with ASTM A 492, Type 316.
    b. Cable Fittings: Connectors of types indicated or required, fabricated from stainless steel, and with capability to sustain, without failure, a load equal to minimum breaking strength of cable with which they are used.

G. Metal Battens for Securing Canopy Fabric to Stainless Steel Frame: Extruded aluminum.
H. Frame Finish shall be polyester powder painted unless otherwise specified by the architect in the bid drawings.

1. Powder Coat Finish:

    a. Commercial blast clean surface in accordance to SSPC-SP 10.
    b. Apply polyester powder coat paint to a minimum of 3 mils thick.
    c. Color: As selected from manufacturer’s available stock colors.

2. Paint Finish for marine or other corrosive environments:

    a. See specification Section 051213 “Architecturally Exposed Structural Steel”.
    b. Color: As selected by the Architect from manufacturer’s available stock colors.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine structural steel framing and other substrates, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
B. Prepare written report, endorsed by Installer, listing conditions detrimental to performance.
C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 FIELD QUALITY CONTROL

A. Manufacturer's Field Service: Engage a factory-authorized service representative to test and inspect components, assemblies, and equipment installations, including connections.
B. Prepare test and inspection reports.

3.3 ERECTION

A. Proceed with installation of tensioned fabric structure only when existing and forecasted weather conditions will permit work to be performed in accordance with manufacturer’s recommendations.
B. Erect frame and fabric in accordance with the procedures of the approved manufacturer.

C. Adequate prestress shall be applied to eliminate fabric wrinkles and excess cable sag.

3.4 ADJUSTING

A. Occupancy Adjustments: When requested within 12 months from date of Substantial Completion, provide on-site assistance in adjusting system to suit actual occupied conditions. Provide up to one visit to Project during other-than-normal occupancy hours for this purpose.

3.5 DEMONSTRATION

A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust cable and fabric tension and to clean and maintain canopy fabric.

END OF SECTION 133123

SECTION 133416 - GRANDSTANDS

PART 1 - GENERAL

1.01 APPLICABLE CODES AND STANDARDS

A. Florida Building Code - latest edition adopted in building area.
Building Code Requirements for Grandstand Structures.

1.02 RELATED DOCUMENTS

A. Drawings and general provisions of Contract, including General and Supplementary Conditions and technical specification sections, apply to work of this section.

B. Refer to Section 051200, Structural Steel Framing for steel framing members.

1.03 PERFORMANCE CRITERIA & SCOPE OF WORK

A. Provide an outdoor permanent Grandstand and pre-engineered Press Box for the complex as shown on drawings and detailed in these performance specifications. Drawing intent is for a Clear Span I-Beam Grandstands with a Fully Closed Moisture Control Interlock Decking System with double stringer gutters. ADA Seating shall be as located on the plans. The scope of work includes providing and installing the pre-fabricated Press Box and related railings, trim and flashings attached to the grandstand structure as indicated on the drawings.

B. The minimum acceptable standards of design are:

1. Grandstands are elevated per plans. Overall length and width per plans. Total net seating capacity with Handicap seating per plans.
2. Rise/run per plans with Tongue and Groove surface mount decking.
3. Aisle layout is per plans. There shall be center aisle rails or end aisle rails per code.
4. Handicap seating areas per plans with side and back closure panels and rails as needed.
5. Finishes to be “hot dipped” galvanized on the steel understructure, clear anodized on the seat boards, High Performance Dur-Kyn paint on the aluminum aisle nosing strips at aisles and stairs color black, Dur-Kyn High Performance painted finish on aluminum stair risers and main grandstand risers color Charcoal Gray. Perimeter Rail risers to be hot dipped galvanized, rails to be clear anodized. Along the back and sides of the stand the railing system will be Aluminum vertical picket rails – color black.
6. The front closure to provide closure from the walkway elevation to approx. 3” above grade will be concealed galvanized steel supports with reverse clip concealed fastening of the flat aluminum riser panels. This closure is along the front of the bleachers as shown on plans. Finish on the aluminum risers to be Dur-Kyn High Performance paint system.
7. Signage.
8. Properly label all handicap seating areas.

1.04 RELATED WORK/ RELATED SECTIONS

A. In accordance with plans and specifications:

1. Demolition (By G.C.)
2. Concrete Foundations designed by grandstand manufacturer and install by G.C.
3. Press Box (By Grandstand Manufacturer)
4. Site restoration including grading, additional soils and re-seeding (By G.C.)

1.05 QUALITY ASSURANCE

A. Manufacturers Qualifications:

1. Manufacturers must have a minimum of (10) ten years of experience in the manufacturing of grandstands and press boxes under current company name.
2. Manufacturer must provide five references (upon request) of similar projects within the State of Florida. References shall include scope of work, contract amount, owner's name and phone numbers, contract completion date and actual completion date.
3. Manufacturer shall have local representation or project superintendent within a one-hundred-fifty mile radius of the project. Representative is responsible to attend job site meetings, provide sequencing and scheduling information and make decisions on behalf of the manufacturer. Due to the coordination and timeframe of each project, it is imperative that this representative can immediately respond, in person, to evaluate questions, concerns and actions, resolve issues that immediately impact the fabrication and installation of the product or other contractors' abilities to proceed with their work. Resume of representatives needs to be submitted for review and approval.
4. List with submission the date that you visited the site and reviewed the existing conditions.
5. If approved bidder is a dealer or representative of the manufacturer in addition to the manufacturer the dealer must provide the same information required in this section.
6. Welders must be AWS certified; manufacturing capabilities in accordance with the governmental agencies having jurisdiction.
7. Manufacturers must be a participant in the AISC Certification program and have proof of certification at time of bid.

B. Installers Qualifications:

1. Factory-trained and experienced in the installation of grandstands and press boxes.

C. Source Quality Control: Mill Test Certification.

D. Single Source Responsibility: Obtain all of each distinct material required from a single manufacturer.

E. Code Compliance: Provide aluminum bleachers to meet or exceed all State and Local applicable codes and in compliance with the FBC, IBC/ICC National Code and along with other relevant State and Local Codes and Regulations

1.06 SUBMITTALS

A. Product Data: Submit technical data for each distinct type of material, component and accessory indicated.

1. Include information which specifically details physical properties and performance characteristics.

B. Shop Drawings: Manufacturer to submit shop drawings and structural design calculations signed and sealed by a Florida licensed professional engineer, and schedules for type, location, quantity and details of all aluminum components required for this project. Indicate on shop drawings that products are in compliance with the FBC, IBC/ICC National Building Code and all other State and Local Codes and Regulations.

C. Concrete designed per American Concrete Institute Guidelines.

D. Samples: Submit manufacturer's samples for the following components as requested with the submission –

1) Seat board
2) Interlock Decking Sample
3) Flat Riser board sample verifying thickness and quality with 2 internal leg supports.
4) Nose Channel extrusion reflecting mounting methods in compliance with specifications.
5) 6 ga. black perimeter fencing material and Aluminum Vertical Picket Railing section.
6) Design Calculations reflecting L/200 deflection criteria.

E. Certificate: Submit manufacturer's certification that materials furnished comply with requirements indicated and also in compliance with the FBC, IBC/ICC code and all other applicable Federal, State and local codes, and that materials meet or exceed test requirements indicated.

1.07 WARRANTY

A. Submit a written warranty signed by the manufacturer, installer, and the contractor, guaranteeing to correct failures for a period of Two (2) years after substantial completion, without reducing or otherwise limiting any other rights to correction which owner may have under the contract documents. Failures are defined to include faulty workmanship or faulty materials. Correction may include repair or replacement.

1.6 BUILDING CODES

A. Comply with all applicable which includes but not limited to the following:

1. FBC, IBC/ICC Building Code- Current Edition
2. AISC Manual of Steel Construction, 9th Edition
3. Aluminum Association of America Guidelines
4. IBC barrier free sub-code and Guidelines
5. U.S. Department of Justice ADA Standards
6. American Concrete Institute

B. The bleacher shall be designed to support, in addition to its own weight, a uniformly distributed live load of not less than 100 pounds per square foot of gross horizontal projection of the bleacher. And 6 pounds per square foot of dead load on seats, footboards, risers and steel framing. The wind load will need to account for the enclosed structure created by the insulated metal panels.

C. All seat and footboard members shall be designed to support not less than 120 pounds per linear foot. The bleacher shall be designed to resist, with or without live load, horizontal wind load appropriate for local conditions. It shall also be designed to resist, in addition to the live load, sway forces applied to the seats in a direction parallel to the length of the seat planks 24 pounds per liner foot; and, in a direction perpendicular, stresses in aluminum members and connections shall not exceed those specified for Building Type Structures by the Aluminum Association.

D. General: The structure shall be properly braced for wind and construction loads until all structural elements are secured. Lateral and longitudinal bays shall be cross-braced as required. Guardrails shall be of adequate size, location, and height to meet specified codes and designed to carry required loads. Exit stairs and intermediate aisle stairs shall be completely closed, in the direction of travel and shall have a maximum rise of 7” and a minimum tread of 11”.

E. Code Compliance: Submittals shall be based upon specifications and drawings contained in the bid documents. Architect will not review any design or product changes prior to the bid date. Design changes to reduce overall aisle egress calculations or number of stair and ramp exits will not be allowed. Design changes to seatboard bracket support and location is not allowed. All bidders must bid in accordance with these specifications.
1. The Bleacher Contractor shall be responsible to meet the code interpretation provided in the bid documents and modify as required by state or local governmental review boards.
2. Calculations that demonstrate code compliance with egress and exit of aisles, stairs, and ramps are a required submission with approved drawings.

1.7 MAINTENANCE

A. Manufacturer's Recommendations:
Owner conduct annual visual inspection and required maintenance of grandstand and press boxes assure safe conditions. It is also recommended that a professional engineer, registered architect or certified grandstand representative performs inspections biennially.

PART - 2

2.01 PRODUCT MANUFACTURERS

A. The Design intent is based on product provided by Southern Bleacher Company (800) 433-0912; Graham TX. Or approved equal.

B. Products specified herein have been selected because of their quality of construction, configuration, design, function, available finishes, components, accessories, dimensions, shape and style.

C. Manufacturers consideration will be given only as listed. Proof of specification compliance must be submitted. Any Deviations shall be clearly listed and submitted with the bid for review prior to award.
1) Specified Manufacturer – Southern Bleacher Company
2) Other manufacturers seeking approval must submit all requirements to the Architect for product submittal and the list below. Information must be submitted a min of 10 days prior to the bid. Only manufacturers listed within these specification or prior approval through addendum will be considered.

D. Manufacturers submittal requirements in addition to product samples. No substitutions for product will be permitted.
1. Provide a side by side comparison of all products specified.
2. Provide documentation certifying participation in the AISC program.
3. Provide proof of a minimum of 10 years manufacturing experience.
4. Provide a reference list with contacts for a minimum of 5 projects in the State of Florida in recent years. This list should be of similar projects or greater complexity and size.
5. Provide design calculations reflecting min. L/200 deflection criteria.
6. Provide specifications in compliance with the High Performance paint system specified.

E. **Bidder and/or Contractor will be held financially responsible for adhering to the products specified herein and as detailed on the drawings.**

F. Only the Architect reserves the right to accept or approve Grandstand manufacturers. Refer also to Section 008200, Special Conditions, Article 15, Substitution of Materials and Equipment for additional information and requirements.

2.02 PERMANENT STEEL GRANDSTAND

A. Product Description – Interlock Decking System:

1. The intent of the product design is to reduce deflection of aluminum deck and to eliminate fluid drainage below spectator seating.
2. All individual deck members shall be locked together longitudinally at all treads, front walk and cross walk locations.
3. This design, in ambient conditions, allows for expansion and contraction without damage or deformation of the aluminum deck.
4. The locking design restricts fluids to pass to the ground under the spectator seating up to 95%.
5. Extrusion gutters are part of each decking member that will allow for the collection and control

of fluids that occur on the deck surface.

6. At all butt joint locations, internal gutters shall be mounted onto the structural members to direct fluids to determined locations.
7. Vertical columns are to be placed with spacing as listed per plans.
8. Traverse bays are free of cross bracing the total length of the grandstand.
9. Stringers are wide flange with steel angle rise and depth fabrication and are placed 6 feet on center.
10. Front Walkway: per plans
11. Entry stairs to be firmly anchored to uniformly poured concrete bases.

    a. Stair rise: max. (7) inches per South Florida Building Code with aluminum closure.
    b. Stair tread depth: min. (11) inches per South Florida Building Code.
    c. Guardrails on Stair to be (42) inches above leading edge of step with intermediate rails.
    d. Stairs to have handrail extension. The handgrip portion of handrails shall not be less than 1 1/2 inches or more than 2 inches in cross-sectional dimension or the shape shall provide an equivalent gripping surface. The handgrip portion of handrails shall have a smooth surface with no sharp corner. The top of handrails and handrail extensions shall be placed not less than 34 inches or more than 38 inches above the nosing of treads and landings. Handrails shall be continuous the full length of the stairs and shall extend in the direction of the stair run not less than 12 inches beyond the bottom riser. Ends shall be returned or shall terminate in newel posts or safety terminals.

12. Aisles:

    a. Aisles with seating on both sides to have 34-inch high handrail with intermediate rail at approximately 22 inches above tread.
    b. Anodized aluminum handrails with rounded ends (no fittings) are discontinuous to allow access to seating through a space 22 inches (min.) to 36 inches (max.).
    c. Intermediate steps shall provide equal rise and run throughout aisle. Each shall have aisle nosing with Dur-Kyn finish and riser closure with Dur-Kyn finish.

13. Interlock Deck System-

    a. Rise and depth at each row is per plans
    b. Each seat 17 inches above its respective tread.
    c. Decking Arrangement:

        1. The seats shall be 2”x10” seat plank with two internal legs and extruded aluminum alloy, 6063-T6 with clear anodized 204R1, AA-M10C22A31, Class II finish. Mounting brackets to be “L” type riser mounted (home stand).
        2. The tread system shall be comprised of uniform serrated, slip resistant aluminum interlock together lengthwise and form a .922” x .60” V-shaped gutter running the length of the planks. The interlocking mechanism will minimize deflection and not separate due to loads being applied to individual planks. The locking mechanism by design shall allow for expansion and contraction of individual planks without effecting performance of the system.
        3. The system shall cause the deck planks to react together at all treads and cross walks to live load and form the appearance of a single tread system. By design, this system forms a solid, overlapping tread and riser installation.
        4. The nose extrusion shall allow for a 1” extruded aluminum contrasting nose piece to be flush mounted on the leading edge and shall capture the vertical riser plank in an extruded pocket. The heel extrusion shall have a .70” vertical lip at the rear of the plank to allow for placement of vertical riser plank and inhibit fluids from escaping at the rear of the tread.
        5. These extrusions shall be such that the attachment of the seat brackets, step brackets, mid-aisle rails and all other components is accomplished without deck penetrations. No through bolting or drilling of the aluminum tread / riser system shall be permitted.

6. The system shall allow for seat and aisle reconfiguration at any time without evidence of its previous configuration.
7. At all butt joint locations of the interlocking deck system, a secondary gutter shall be installed below the aluminum tread / riser system that allows fluids to be contained and gravity flow toward the first tread. This gutter will collect fluids and control them to specific areas.
8. The secondary gutter system shall be placed on to the structural steel support system of the grandstand such that the gutter is supported by stringers (raker beams) at each side. These stringers (raker beams) shall be a minimum 12" apart to allow for adequate gutter widths to properly collect fluids drainage.
9. These secondary gutters shall terminate at strategic locations dependent on the grandstand layout. At the termination points, a collection box will be provided such that the owner can make a connection to allow for desired fluid routing. The intention is to control a majority of the water from collection at the front or under the stand.
10. Entry stairs and ramps to be 2 x 12 mill finish aluminum.
11. Open ends of planks to be covered with aluminum end caps, securely fastened to the plank.
12. Joint sleeves: Dual joint sleeves to be inserted at each butt joint of each load bearing aluminum plank, and to penetrate 6 inches into each plank at the joint. Joint sleeves are not required at secondary gutter locations.

14. Guardrailing: To be at all sides of bleacher, entry stairs, ramps portals and landings.

    a. Vertical rail risers to be galvanized steel angle 3" x 3" x ¼ (50 ksi) for steel to steel connection and fastened with 3/8" galvanized hardware
    b. Horizontal railing to be anodized aluminum with aluminum cast end plugs at ends of straight runs and/or elbows at corners.
    c. All guards shall be secured to vertical rail members with hot dipped galvanized fasteners and clamps
    d. Railings shall be placed at a minimum of 42" above walkways, entrances and adjacent seat boards.
    e. The barrier material shall include 6 gauge black vinyl coated chain link fencing, fastened in place with hot dipped galvanized tension bars and aluminum ties. Rear of stand to have black anodized aluminum vertical picket style design rails.

15. Ramps:

    a. Slope: 1 in 12 maximum.
    b. Guardrails to be 42 inches above ramp with two-line anodized aluminum rail and in filled with 6 gauge black vinyl coated chain link fence (2" mesh) and 2 x 6 extruded aluminum toe board.
    c. Handrail: Ramps to have handrail extensions. The handgrip portion of handrails shall not be less than 1 1/2 inches or more than 2 inches in cross-sectional dimension or the shape shall provide an equivalent gripping surface. The handgrip portion of handrails shall have a smooth surface with no sharp corners. The top of handrails and handrail extensions shall be placed not less than 34 inches or more than 38 inches above the ramp surface. Handrails shall be continuous the full length of the ramp and shall extend in the direction of the ramp not less than 12 inches beyond the end of the ramp. Ends shall be returned or shall terminate in newel posts or safety terminals. If returned, rail must be smooth with no external fittings.
    d. Termination: Ramps shall end with smooth transition onto level concrete pad at benchmark elevation. Aluminum plate with end closures required.

16. Handicap provision:

    a. Quantity of wheelchair spaces: as shown on drawings and in full compliance with FL Barrier Free Standards set forth in the International Building Code

b. Riser area adjacent to wheelchair spaces to have intermediate construction so 4-inch sphere cannot pass through opening.
c. Guardrail: Area directly behind handicap areas shall have two-line anodized aluminum rail attached to the surface of the decking / riser members. These rails shall be pre-fabricated to match the appearance of the mid-aisle handrails. A toe rail shall be attached to the base of the rail.

B. Materials/Finishes

1. Substructures:

a. Structural shapes meet one of the following ASTM specifications: A36, A36/A572 grade 50, A572 grade 50, A529-50, or A500 grade B.
b. Shop connections are seal welds.
c. After fabrication, all steel is hot-dipped galvanized to ASTM-A-123 specifications. Painted and/or powder coated steel does not offer proper protection and is not an acceptable protective finish for this project.
d. All hardware shall be hot-dipped galvanized to ASTM A-123, mechanically galvanized or aluminum (aluminum applies to pop rivets, drive rivets, wire ties).
e. A minimum of 3/8” galvanized connection hardware to be used on the substructure.

2. Extruded Aluminum:
Seat Planks and Railing are extruded aluminum alloy, 6063-T6 with clear anodized 204R1, AA-M10C22A31, Class II finish. Riser planks are extruded aluminum alloy, 6063-T6 with Dur-Kyn painted finish.

a. Tread, stair and ramp planks are extruded aluminum alloy 6063-T6 mill finish with traffic coating.
b. Joint Sleeve Assembly to be inserted in flat plank to maintain true alignment in joining together two plank pieces. Extruded aluminum alloy, 6063-T, mill finish. Splice cover is unacceptable between two flat plank pieces joined in a straight line.

3. Accessories:
Channel End Caps: Aluminum alloy 6063-T6, clear anodized 204R1, AA-M10C22A31, Class II. Mechanically fastened.
Cast End Plugs: Aluminum 319 alloy, cast finish. (Required at termination ends of railing).

a. Hardware:
(1) Bolts, Nuts: Hot-dipped galvanized or mechanically galvanized.
(2) Hold-down Clip Assembly: Aluminum alloy 6005A-T6, mill finish.
(3) Structural Hardware: Equal to or greater than hot dipped galvanized ASTM-A307. No connections utilizing high strength bolts are classed as slip critical.
b. Aisle Nose and Stair Nose: Aluminum alloy, 6063-T6, slip-resistant black painted finish. Mechanically fastened.

C. Fabrication:

1. Design Load:

a. Live Load: 100 psf gross horizontal projection.
b. Lateral Sway Load: 24 plf seat plank.
c. Perpendicular Sway Load: 10 plf seat plank.
d. Live Load of Seat and Tread Planks: 120 plf.
e. Handrails and Guardrail: Designed to resist a single concentrated load of 200# applied in any direction at any point along the top. Per IBC Building Code.
f. Wind load: Per IBC Building Code.
g. Liveload deflection of structural members shall be limited to L/200 of the span.

2. All manufactured connections to be shop welded.

    a. Manufactured by certified welders conforming to AWS Standards.

PART 3 – EXECUTION

3.01 INSTALLATION

A. All work performed by technicians experienced in bleacher seating. Project references may be required to verify the quality of finished projects.
Installation with proven experience in the Mid-Atlantic region. Requirement for a minimum of (3) installer references in FL for this project of similar size and scope.

B. Project is only to be installed as per approved shop drawings.

C. General Contractor is responsible to furnish and complete all foundations (spread footings and grade beams) as well as exit pads per plans. All site restoration, including rough and final grade, topsoil and lawn re-establishment shall be provided.

D. Provide all necessary pads, anchors, flashings, etc. to connect grandstand structure to the concrete foundations and concrete roofs of buildings as indicated on the drawings.

E. Install the insulated metal panels on the grandstand structure as indicated on the drawings.

3.02 CLEAN-UP

A. Clean up all debris caused by work of this section removed from site.

B. Upon completion of the work and final inspections, bleacher manufacturer shall broom clean the stand removing all loose debris.

C. If broom cleaning does not properly remove dirt and debris from the surface, pressure washing will be required.

D. Clean up of loose debris through-out the project shall occur daily. The materials shall be placed in a GC provided dumpster.

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END OF SECTION 133416

SECTION 133419 – METAL BUILDING SYSTEMS

PART 1 - GENERAL

1.8

1.9 RELATED DOCUMENTS

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

1.2 RELATED SECTIONS

A. Section 031500- Placement of anchor bolt, leveling plates and grout.

B. Section 033000- Cast-in-place concrete.

C. Section 074213 – Insulated Core Metal Panels

D. Section 099600 – High Performance Coatings: Finish painting of primed steel surfaces exposed to exterior.

1.3 REFERENCES STANDARD

A. American Institute of Steel Construction (AISC):
   1. AISC Specification for Structural Steel Buildings.
   2. AISC Serviceability Design Considerations for Low-Rise Buildings

B. American Iron and Steel Institute (AISI):
   1. AISI North American Specification for the Design of Cold-Formed Steel Structural Members

C. American Welding Society (AWS):
   1. AWS D1.1 / D1.1M – Structural Welding Code – Steel.
   2. AWS D1.3 / D1.3M – Structural Welding Code – Sheet Steel

D. Association for Iron & Steel Technology (AISE):
   1. AISE 13 – Specifications for Design and Construction of Mill Buildings.

E. ASTM International (ASTM):
   1. ASTM A 36 – Standard Specification for Carbon Structural Steel
   2. ASTM A 48 – Specification for Gray Iron Castings
   3. ASTM A 123 – Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products
   4. ASTM A 307 – Specification for Carbon Steel Bolts and Studs, 60 000 psi Tensile Strength
   5. ASTM A 325 – Standard Specification for Structural Bolts, Steel, Heat Treated, 120/105 ksi Minimum Tensile Strength.

6. ASTM A 354 – Standard Specification for Quenched and Tempered Alloy Steel Bolts, Studs, and Other Externally Threaded Fasteners
7. ASTM A 475 – Specification for Zinc-Coated Steel Wire Strand
8. ASTM A 490 – Specification for Structural Bolts, Alloy Steel, Heat Treated, 150 ksi Minimum Tensile Strength
9. ASTM A 500 – Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes
10. ASTM A 529 – Standard Specification for High-Strength Carbon-Manganese Steel of Structural Quality.
11. ASTM A 563 – Specification for Carbon and Alloy Steel Nuts
12. ASTM A 572 – Standard Specification for High-Strength Low-Alloy Columbium-Vanadium Structural Steel.
13. ASTM A 653 / A 653M – Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process
14. ASTM A 792 / A 792M – Standard Specification for Steel Sheet, 55 % Aluminum-Zinc Alloy-Coated by the Hot-Dip Process
15. ASTM A 992 – Standard Specification for Structural Steel Shapes.
16. ASTM A 1011 – Standard Specification for Steel, Sheet and Strip, Hot-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, and Ultra-High Strength.
17. ASTM A 1039 – Specification for Steel, Sheet, Hot Rolled, Carbon, Commercial, Structural, and High-Strength Low-Alloy, Produced by Twin-Roll Casting Process
18. ASTM E 96 / E 96M – Standard Test Methods for Water Vapor Transmission of Materials.
19. ASTM E 108—Spread-of Flame Testing: Class 1A Rating.
20. ASTM E 283 – Standard Test Method for Determining the Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen.
21. ASTM E 331 – Standard Test Method for Water Penetration of Exterior Windows, Skylights, Doors, and Curtain Walls by Uniform Static Air Pressure Difference.
22. ASTM E 1592 – Test Method for Structural Performance of Sheet Metal Roof and Siding Systems by Uniform Static Air Pressure Difference
23. ASTM E 1646 – Test Method for Water Penetration of Exterior Metal Roof Panel Systems by Uniform Static Air Pressure Difference
24. ASTM E 1680 – Test Method for Rate of Air Leakage Through Exterior Metal Roof Panel Systems
25. ASTM E 2140 – Test Method for Water Penetration of Metal Roof Panel Systems by Static Water Pressure Head
26. ASTM F 436 – Specification for Hardened Steel Washers
27. ASTM F 1145 – Specification for Turnbuckles, Swaged, Welded, Forged
28. ASTM F 1554 – Specification for Anchor Bolts, Steel, 36, 55, and 105-ksi Yield Strength

F. LGSI – Light Gauge Steel Institute

G. SJI – Steel Joist Institute

H. Florida Product Approval:

1. American Buildings Company Roof Deck approved under file number FL704 & FL6961
2. American Buildings Company Metal Roofing approved under file number FL 4813

I. FM Global:
1. FMRC Standard 4471 – Approval Standard for Class 1 Roofs for Hail Damage Resistance, Combustibility, and Wind Uplift Resistance.

J. Metal Building Manufacturers Association (MBMA):
1. MBMA Metal Building Systems Manual

K. Underwriters Laboratories (UL):
1. UL 580 – Standard for Tests for Uplift Resistance of Roof Assemblies

1.4 DEFINITIONS

A. Metal Building System: A building system that will employ:
- Either continuous or simple-span ‘Z’ or ‘C’-shaped cold-formed purlins or open-web steel joists for support of the roof cladding.
- Simple-span ‘Z’ or ‘C’-shaped cold-formed purlins or open-web steel joists for support of the steel wall cladding.1
- Three-plate, built-up rigid space frames and/or cold-formed ‘C’ or hot-rolled I-shaped post-and-beam framing to support the roof and wall secondary members.
- All systems (cladding, roof and wall secondary, lateral primary framing, and longitudinal bracing) work together to provide resistance to vertical and lateral loading demands.

B. Gable Symmetrical: A continuous frame building with the ridge in the center of the building, consisting of tapered or straight columns and tapered or straight rafters. The sidewall girts may be continuous (by-passing the columns) or simple span (inset in the column line). The rafters may or may not have interior columns.

C. Gable Asymmetrical: A continuous frame building with an off-center ridge, consisting of tapered or straight columns and tapered or straight rafters. The eave height and roof slope may differ on each side of the ridge. The sidewall girts may be continuous (by-passing the columns) or simple span (flush in the column line). The rafters may or may not have interior columns.

D. Single-Slope: A continuous frame building which does not contain a ridge, but consists of one continuous slope from side to side. The building consists of straight or tapered columns and tapered or straight rafters. The sidewall girts may be continuous (by-passing the columns) or simple span (flush in the column line). The rafters may or may not have interior columns.

E. Lean-To: A building extension, which does not contain a ridge, but consists of one continuous slope from side to side. These units usually have the same roof slope and girt design as the building to which they are attached and supported by.

F. Roof Slope: Pitch expressed as inches of rise for each 12" of horizontal run.

G. Building Width: Measured from outside to outside of sidewall secondary structural member (girt) except Shadow Panel which is outside to outside of panel.

H. Building Eave Height: A nominal dimension measured from the finished floor to top flange of eave strut.

I. Building Length: Measured from outside to outside of endwall secondary structural member except Shadow Panel which is outside to outside of panels.

J. Auxiliary Loads: Dynamic loads induced by cranes, conveyors, or other material handling systems.

K. Collateral Loads: The weight of any non-moving equipment or material, such as ceilings, electrical or mechanical equipment, sprinkler systems, plumbing, or ceilings.

L. Dead Load: The actual weight of the building system (as provided by the metal building supplier) supported by a given member.

M. Floor Live Loads: Loads induced on a floor system by occupants of a building and their furniture, equipment, etc.

N. Roof Live Loads: Loads produced by maintenance activities, rain, erection activities, and other movable or moving loads but not including wind, snow, seismic, crane, or dead loads.

O. Roof Snow Loads: Gravity load induced by the weight of snow or ice on the roof, assumed to act on the horizontal projection of the roof.

P. Seismic Loads: Loads acting in any direction on a structural system due to the action of an earthquake.

Q. Wind Loads: The loads on a structure induced by the forces of wind blowing from any horizontal direction.

1.5 DESIGN REQUIREMENTS

A. GENERAL:

1. The building manufacturer will use standards, specifications, recommendations, findings and/or interpretations of professionally-recognized groups such as AISC, AISI, AWS, ASTM, CSA, CWB, MBMA, Federal Specifications, and unpublished research by MBMA as the basis for establishing design, drafting, fabrication, and quality criteria, practices, and tolerances. The Manufacturer's design, drafting,

fabrication and quality criteria, practices, and tolerances shall govern, unless specifically countermanded by the contract documents.

2. Design structural mill sections and built-up plate sections in accordance with:
   a. (US) code-appropriate edition of AISC's "Specification for the Design, Fabrication and Erection of Structural Steel for Buildings", ANSI/AISC 360 ASD method.
3. Cold-Formed steel structural members and panels will generally be designed in accordance with applicable version of "Specifications for the Design of Cold-Formed Steel Structural Members", ANSI/AISI S-100
4. Design weldments per the following:
   a. Structural Welding
      1) (US) Design per AWS D1.1, “Structural Welding Code – Steel”, Latest Edition.
      1)
   b. Cold-Formed Welding
      1) (US) Design per AWS D1.3, “Structural Welding Code – Sheet Steel”, Latest Edition.

B. DESIGN CODE:

1. Structural design for the building structural system shall be provided by the metal building system manufacturer for the following design criteria:

   a. Governing Building Code: _FLORIDA BUILDING CODE.
   b. Year/Version: ____2014.
   c. Occupancy Category: __B.

C. Design Loads:

1. Dead Load – Weight of the building system as determined by manufacturer.
2. Roof Live Load – _20 PSF.
3. Collateral Load – _____.
4. Wind Load:

   a. Wind Speed – ___134 MPH.
   b. Wind Exposure – _C.

5. Floor Load.

   a. Live Load – __100 PSF.
   b. Dead Load (Weight of Material by others) – ____.
   c. Collateral Load – _____.

B. D. GENERAL SERVICEABILITY LIMITS:

1. Deflection Limits shall be in accordance with the applicable provisions of the Metal Building Systems Manual (MBMA), latest edition.
2. Vertical deflection Limits

a. Roof Secondary (Purlins) - L/150
b. Main Frame roof beams - L/180
c. Horizontal Deflection Limits:
d. Wall Secondary (Girts) - L/90
e. Main Frame - H/60 @ eave height

3. Vertical deflection limits apply for the loads induced by a factored snow load (50-year mean recurrence interval), or the code required live load. The horizontal drift and deflection limits apply for the loads induced by a basic wind speed corresponding to a 10-year mean recurrence interval.

1.6 SUBMITTALS

A. Submit under provisions of Section 013300.

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. Installation methods.

C. Drawings: American Buildings Company shall furnish complete erection drawings for the proper identification and assembly of all building components. These drawings will show anchor bolt settings, transverse cross sections, sidewall, endwall and roof framing, flashing, and sheeting and accessory installation details.

D. Certifications: Standard drawings and design analysis shall bear the seal of a registered professional engineer upon request.

E. Bill of Materials: Bills of material shall be furnished and shall include item weights.

F. Preventive Maintenance Manual.

G. Welder's Certifications: Certification of welder qualifications shall be furnished as specified by the Project Engineer.

H. Submit certification verifying that the metal roof system has been tested and approved by Underwriter’s Laboratory as Class 90.

I. Submit certification verifying that the metal roof system has been tested and approved by Factory Mutual.

B. J. Submit certification verifying that the metal standing seam roof system has been tested in accordance with ASTM E 1592 test protocols.

1.7 QUALITY ASSURANCE

A. Manufacturer / Fabricator Qualifications:

1. (US) All primary products specified in this section will be supplied by a single IAS AC 472 Accredited Manufacturer /Fabricator with a minimum of five (5) years' experience.

C. Weldments /Welder/Weld Inspection Qualifications:

1. (US) Welding inspection and welding inspector qualification for structural steel shall be in accordance with AWS D1.1, "Structural Welding Code – Steel", latest edition. Welding inspection and welding inspector qualification for cold-formed steel shall be in accordance with AWS D1.3, "Structural Welding Code – Sheet Steel", latest edition.

C. Erector Qualifications: All products listed in this section are to be installed by a single installer with a minimum of five (5) years demonstrated experience in installing products of the same type and scope as specified.

1. Design: Standard drawings and design analysis must bear the seal of a registered professional engineer. Design analysis must be on file and furnished by manufacturer upon request.
2.

DELIVERY, STORAGE, AND HANDLING

1.8 Delivery and Acceptance Requirements: Deliver materials to site in manufacturer's original, unopened containers and packaging, with labels clearly identifying product name and manufacturer.

B. Storage and Handling Requirements:
1. Store and handle materials in accordance with manufacturer's instructions.
2. Keep materials in manufacturer's original, unopened containers and packaging until installation.
3. Do not store materials directly on ground.
4. Store materials on flat, level surface, raised above ground, with adequate support to prevent sagging.
5. Protect materials and finish during storage, handling, and installation to prevent damage.
C. 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.
D. Store and dispose of hazardous materials, and materials contaminated by hazardous materials, in accordance with requirements of local authorities having jurisdiction.

1.9 WARRANTY

Type	Requirements	Liability / Sq Ft	Eligible Product Lines
Manufacturer's Workmanship	- One year workmanship - Certificates issued upon	FOB Materials Only	All products provided by the Manufacturer

	request		
Exterior Material and Finish	- 25-year roof and wall materials - AZ50/AZ55 and SP COOL™ (Silicone Modified Polyester SMP) -35-year roof and wall materials - Smartkote® (PVDF) - Valid in the contiguous United States and Canada	AZ50/AZ55 Substrate – FOB Materials only. Silicone Modified Polyester (SMP) Finish – Full repair, repaint or replacement cost. SmartKote Finish – Full repair, repaint or replacement cost.	L3P, A3P, LocSeam, LocSeam 360, HFP, SSII, SS360, and MRP Parts made from embossed substrate are excluded from the material portion of the warranty, the finish portion of the warranty still applies Specifically excluded products are: - Products not manufactured but sold by the Manufacturer - Projects within 1000 ft. of seashore or any other body of salt water
Insulated Panel Exterior Finish	- 25 year roof and wall finish - Valid in the contiguous United States and -	SmartKote Finish- Full repair, repaint, or replacement cost	AWIP roof and wall panels with SmartKote Exterior Specifically excluded products are: Products not manufactured by AWIP or ABC/AMS but Sold by the Manufacturer Projects within 1000 ft. of seashore or any other body of saltwater

PART 2 PRODUCTS

2.1 MANUFACTURERS

1.10 Acceptable Manufacturer: American Buildings Company www.americanbuildings.com
1.11 Substitutions: Not permitted unless approved by Section 008200 Article 15.

2.2 MATERIALS

A. Primary Framing Steel:
   1. Steel for mill-rolled structural sections shall conform to the requirements of ASTM specification A 36 or ASTM A 572 Grade 50 or 55 as applicable.
   2. Steel for all built-up sections shall meet as applicable the physical and chemical properties of:
      a. ASTM A 1011, Grade 55.
      b. ASTM A 572, Grade 55.
      c. ASTM A 529, Grade 55.
   3. Steel used for endwall “C” sections shall meet the physical and chemical properties of ASTM A 1011, Grade 55.Steel for Cold-Formed Endwall "C" sections must conform to the requirements of ASTM A-1011 or A-1039 Grade 55, or ASTM A-653 Grade 55 with minimum yield strength of 55 ksi.

B. Secondary Framing Steel:
   1 Steel used to form purlins, girts, eave struts and “C” sections shall meet the physical and chemical properties of ASTM A 1011, Grade 55.
   2 Steel used to form zinc-coated (galvanized) purlins and girts shall meet the physical and chemical properties of ASTM A 653, Grade 50, 55 ksi minimum yield and G90 Coating designation as described in ASTM A 924.

C. Panels: Exterior panels shall conform to one of the following:
   1. Panel material as specified shall be 26 gage AZ50 or AZ55 aluminum-zinc alloy-coated steel, conforming to the requirements of ASTM A 792, Grade 80. Minimum yield strength shall be 80,000 psi.
   2. Panel material as specified shall be 24 gage AZ50 or AZ55 aluminum-zinc alloy-coated steel, conforming to the requirements of ASTM A 792, Grade 80. Minimum yield strength shall be 80,000 psi.
   3. Panel material as specified shall be 24 gage AZ50 or AZ55 aluminum-zinc alloy-coated steel, conforming to the requirements of ASTM A 792, Grade 50, Class 2. Minimum yield strength shall be 50,000 psi.
   4. Panel material as specified shall be 22 gage AZ50 or AZ55 aluminum-zinc alloy-coated steel, conforming to the requirements of ASTM A 792, Grade 50, Class 2. Minimum yield strength shall be 50,000 psi.
   5. Panel material as specified shall be 26 gage zinc-coated (galvanized) steel, coating designation G90, conforming to the requirements of ASTM A 653, Grade 80. Minimum yield strength shall be 80,000 psi.

6. Panel material as specified shall be 24 gage zinc-coated (galvanized) steel, coating designation G90, conforming to the requirements of ASTM A 653, Grade 80. Minimum yield strength shall be 80,000 psi.
7. Panel material as specified shall be 22 gage zinc-coated (galvanized) steel, coating designation G90, conforming to the requirements of ASTM A 653, Grade 50, Class 3. Minimum yield strength shall be 50,000 psi.
8. Panel material as specified shall be 0.032", 3105-H14 or equivalent aluminum alloy conforming to ASTM B 209. Minimum yield strength shall be 20,000 psi.

D. Panel Fasteners:
1. For Galvalume® and Painted finished roof panels: Premium Cast Zinc head.
2. For wall panels: Coated carbon steel.
3. Color of exposed fastener heads to match the wall and roof panel finish.
4. Concealed Fasteners: Self-drilling type, of size required.

E. Gutter, Flashing and Downspout:
1. Gutters and Flashings: All standard exterior gutters are 26 gage G90 zinc-coated (Galvanized) or AZ50 aluminum-zinc alloy-coated steel with a pre-painted finish. Standard rake flashing is 26 gage G90 zinc-coated (galvanized) or AZ50 aluminum-zinc alloy-coated steel with a pre-painted finish. All other gutter and flashings shall be a minimum 26 gage steel.
2. Downspouts: All downspouts shall be 29 gage zinc-coated (galvanized) or aluminum-zinc alloy-coated steel with color coordinated, pre-painted finish, rectangular in shape.

F. Panel Clips:
1. All clips must have factory-applied mastic and designed so that movement between the panel and the clip does not occur.
2. Short or Tall Sliding clips: shall be either 3 ¼" or 4 ½" inches in height and provide 1 ¼" or 2 ½" inches of travel for panel thermal expansion and contraction, depending on clip choice.

G. Sealant And Closures:
1. Sidelaps: Factory applied non-skinning Butyl mastic.
2. Endlaps, Eave, Ridge Assembly, and Gable Flashings: Field applied 100% solids butyl-based elastomeric tape sealant, furnished in pre-cut lengths.
3. Outside Closures: Closed-cell, plastic or metal
4. Inside Closures: Closed-cell, plastic or metal

2.3 PRIMARY FRAMING

A. Rigid Frame: All rigid frames shall be welded, built-up "I" sections or mill-rolled structural sections. The columns and the rafters may be either uniform depth or tapered.

B. Endwall Frames: All endwall roof beams and endwall columns shall be cold-formed “C” sections, mill-rolled structural sections, or built-up “I” sections as required by design.

C. Plates, Stiffeners, etc.: All base plates, splice plates, cap plates, and stiffeners shall be factory welded into place on the structural members.

D. Bolt Holes, etc.: All base plates and flanges shall be shop fabricated to include bolt connections holes. Webs shall be shop fabricated to include cable brace or rod brace holes and flange brace holes.

E. Shop Applied Primers – All uncoated structural steel members shall be cleaned of all foreign matter and loose mill scale as per requirements of the Structural Steel Painting Council cleaning specification SSPC-SP2 and SSPC-SP1 as required. Structural steel members will then receive a one mil coat of red oxide primer. Primer meets or exceeds the performance requirements of the specification SSPC-15, for Type 1 Red Oxide Paint. Primer is not intended as a finish coat and is compatible only for top coating with aliphatic solvent based alkyd enamels.

2.4 SECONDARY FRAMING

A. Purlins and Girts: Purlins and girts shall be cold-formed “Z” or “C” sections with stiffened flanges. They shall be pre-punched at the factory to provide for field bolting to the primary framing. They shall be simple or continuous span as required by design.

B. Purlins (Excluding Open Web Joists): Horizontal structural members which support roof coverings.
1. Depth: To be determined by design (8”, 9.5” or 12”)
2. Maximum Length: To be determined by design.
3. Finish: Red Oxide Primer.
4. Finish: Gray Primer.
5. Finish: Pre-Coated Galvanized.

C. Girts: Horizontal structural members that support vertical panels.
1. Depth: To be determined by design (8”, 9.5”, or 12”)
2. Maximum Length: To be determined by design.
3. Finish: Red Oxide Primer.
4. Finish: Gray Primer.
5. Finish: Pre-Coated Galvanized.

D. Eave Struts: Eave Struts: Eave Struts shall be unequal flange, cold-formed “C” sections.
1. Depth: To be determined by design (8”, 9.5” or 12”)
2. Maximum Length: To be determined by design.
3. Finish: Red Oxide Primer.

4. Finish: Gray Primer.
5. Finish: Pre-Coated Galvanized.

E. Base Framing: Base members to which the base of the wall covering may be attached to the perimeter of the slab. Secured to the concrete slab with mechanical anchors.
1. Formed base sill.
2. Base channel.
   a. With flashing.
   b. Without flashing.
3. Base angle.
   a. With flashing.
   b. Without flashing.
4. Base girt.
   a. With flashing.
   b. Without flashing.
5. Finish: Red Oxide Primer.
6. Finish: Gray Primer.
7. Finish: Pre Coated Galvanized.

F. American Buildings Company roof joist system.
1. Open web, parallel chord, simple span load carrying members suitable for the direct support of roof systems utilizing material sizes and yield strengths as required.
2. Bridging
   a. All Bolted
   b. Welded
3. Joist attachment
   a. Welded
   b. All Bolted (No welding required)
   c. Alt. Bolted (Some welding required)
4. Open web members shall be fabricated of material that conforms to the material specifications designated by the Steel Joist Institute as acceptable for this product.

G. Pre-painted Cold Formed Materials – At option, cold formed secondary structural framing may use pre-painted coil stock which eliminates the need for shop applied primer. Primer will be applied in a thickness of 0.45 – 0.55 mils. Primer is not intended as a finish coat. Due to lubricants used to aid the roll forming process, the application of a tie coat must be used prior to application of a topcoat.

2.3 2.5 ROOF PANELS

A. Roof panels shall be American Buildings Company's Standing Seam II Panel (S2P), Standing Seam 360 Panel (S3P) or Loc Seam Panel (LOC).

PART 3 B. American Buildings Company's Long Span III Panel (L3P) shall have major ribs 1 1/4" high, spaced 12" on center for an even shadowed appearance. The panels are reinforced between the ribs for added strength. Each panel shall provide 36" net coverage in width. A minimum 1/2:12 roof slope is required. All roof panel side laps shall be at least one major rib and shall have a purlin bearing leg on the bottom section of the lap.

2.5 ACCESSORIES

PART 4 A Canopies: Overhanging or projecting roof structures off the sidewall or end wall. For aesthetic application or to cover entrance or walkway.

PART 5 B Roof Line Trim:
1 Trim Type: Simple Eave/Rake Trim.
2 Trim Type: Sculptured Eave/Rake Trim.
3 Trim Type: Low-Eave Gutter / Sculptured Rake Trim.

PART 6 C Purlin Extensions: Overhanging or projecting roof structure at the end of a building.

PART 7 D Framed Openings: Used to frame out doors, windows, louvers, and any other openings. Refers to the framing members and flashing which surround an opening and includes jambs, header and or sill, trim, and fasteners.

E Overhead door support framing shall be designed to resist applicable horizontal wind loads and shall consist of channel jambs with a channel header at the top of the opening. 26 gage steel, color coordinated flashing shall be provided to conceal panel edges at the opening unless otherwise specified.

PART 8 F Soffit and Liner Panels:
Soffit and Liner panels shall be either American Buildings Company's Multi-Rib Panel (MRP), Long Span III Panel (L3P), Architectural III Panel (A3P) or Soffit-Liner Panel (SLP).

1. American Buildings Company's Multi-Rib Panel (MRP) shall have a configuration consisting of ribs 3/4" deep spaced 6" on center. Each panel shall provide 36" net coverage in width.

2.1.1.A.1.1 a Gauge: 29.
2.1.1.A.1.2 b Gauge: 26 (std).
2.1.1.A.1.3 c Gauge: 24.
2.1.1.A.1.4 d Gauge: 22.
2.1.1.A.1.5 e Dimensions: 36 inches wide by 15/16 inch high.
2.1.1.A.1.6 f Finish: As specified in Article 2.8 PANEL FINISHES.

2. American Buildings Company's Soffit Liner (SLP) shall have a configuration consisting of 1" interlocking ribs. The interlocking ribs are designed to conceal the panel fasteners. The Soffit Liner Panel shall provide a net coverage of 12" in width.

2.1.1.A.1.7 a Gauge: 24 (std).
2.1.1.A.1.8 b Gauge: 0.032" aluminum.
2.1.1.A.1.9 c Dimensions: 12 inches wide by 1 inch high.
2.1.1.A.1.10 d Finish: As specified in Article 2.8 PANEL FINISHES.

L. Roof Vents: Accessories used on the roof to allow air to pass through.
1. Gravity ridge ventilators shall be manufactured from galvanized steel and painted white. The ventilator body shall be 24 gage and the skirt shall be adjustable to match the roof slope. Chain operated damper will be furnished. Ventilators shall be equipped with standard bird screens and riveted end caps. Ventilators shall be 10' long and have a 9" or 12" throat.
2. 20" round ventilators shall be 24 gage and shall have an adjustable base for ridge mounting or a pitched base for on-slope mounting.

M. Pipe Flashings: Pipe flashing shall be of a one piece construction and fabricated from an EPDM membrane and shall have an aluminum base that can be field conformed to any panel configuration. Pipe flashings shall be flexible for mounting on any roof slope. Service temperature ranges shall be from -30°F to +250°F. Three standard flashing sizes shall accommodate pipe sizes from 1/4" diameter up to 13" diameter.
1. Size: ¼" to 4" Pipe
2. Size: 4" to 7" Pipe
3. Size: 7" to 13" Pipe

2.1.2 PANEL FINISHES

A. Roof Panel:
1. Aluminum Coated (ALCT)

2. American Cool Roof: SP-COOL™ Panel Paint System (Siliconized Polyester Resin, 25-year Finish Warranty):
a. Color: Burnished Slate (BRSL)
b. Color: Hunter Green (HNGR)
c. Color: Aztec Blue (AZBL)
d. Color: Brick Red (BKRD)
e. Color: Sagebrush Tan (SBTN)
f. Color: Fox Gray (FXGY)
g. Color: Sandstone (SDST)
h. Color: Polar White (POWH)

3. American Cool Roof: SmartKote® PVDF Panel Paint System (PVDF Resin, 30-year Finish Warranty):
   a. Color: Dark Bronze (DKBZ)
   b. Color: Evergreen (EVGR)
   c. Color: Royal Blue (ROBU)
   d. Color: Terra Cotta (TCOT)
   e. Color: Surrey Beige (SUBG)
   f. Color: Slate Gray (SLGY)
   g. Color: Warm White (WMWH)
   h. Color: Regal White (REGW)

B. Liner Panel:
   1. American Cool Roof: SP-COOL™ Panel Paint System (Siliconized Polyester Resin, 25-year Finish Warranty):
      a. 29 gauge:
         1) Color: Polar White (POWH)
      b. 26 & 24 gauge:
         1) Color: Burnished Slate (BRSL)
         2) Color: Evergreen (EVGR)
         3) Color: Aztec Blue (AZBL)
         4) Color: Brick Red (BKRD)
         5) Color: Sagebrush Tan (SBTN)
         6) Color: Fox Gray (FXGY)
         7) Color: Sandstone (SDST)
         8) Color: Polar White (POWH)

C. Soffit-Liner Panel:
   1. American Cool Roof: SmartKote® PVDF Panel Paint System (PVDF Resin, 30-year Finish Warranty):
      a. .032 Aluminum
         1) Color: Regal W
      b. 24 gauge:
         1) Color: Dark Bronze (DKBZ)
         2) Color: Evergreen (EVGR)
         3) Color: Royal Blue (ROBU)
         4) Color: Terra Cotta (TCOT)
         5) Color: Surrey Beige (SUBG)
         6) Color: Slate Gray (SLGY)
         7) Color: Warm White (WMWH)
         8) Color: Regal White (REGW)

FABRICATION

A. General:
   1. Framing members shall be shop fabricated for field bolted assembly. The surfaces of the bolted connections shall be smooth and free from burrs or distortions.
   2. All shop connections shall be in accordance with the American Welding Society (AWS) Code for Building

Construction or the Canadian Welding Bureau (CWB), as applicable. Certification of welder qualification will be furnished when required and specified at order entry.
   3. Visual inspection methods will be used for verification of weld quality as outlined by the AWS Structural Steel Welding Code, Visual Inspection Acceptance Criteria, Table 6.1.
   4. All framing members where necessary shall carry an easily visible identifying mark.

B. Primary Framing:
   1. Plates, Stiffeners and Related Members.: Factory weld base plates splice plates, cap plates, and stiffeners into place on the structural members.
   2. Bolt Holes and Related Machining: Shop fabricate base plates, splices and flanges to include bolt connection holes. Shop fabricated webs to include bracing holes.
   3. Secondary structural connections (purlins and girts) to be ordinary bolted connections, which may include welded clips.
   4. Manufacturer is responsible for all welding inspection in accordance with the manufacturer's IAS Accreditation or CAN/CSA A660 Certification. Special inspection by the buyer or owner may be done in the manufacturer's facility and must be noted on the Contract Documents.
   5. Non-Destructive Testing (NDT) - NDT shall be performed and documented as required by the governing building code for this project.

C. Open-Web Roof Joists:
   1. Purlins for ‘long-bay’ building layouts shall consist of open-web bar joists designed under Steel Joist Institute (SJI) specifications by an SJI-Certified Joist Manufacturer for the prescribed loads.
   2. Field welding of joist bridging and seats is an alternative method for connection of joists to supporting primary structural members.

D. Zee Purlins:
   1. Fabricate purlins from cold-formed "Z" sections with stiffened flanges. Size flange stiffeners to comply with the requirements of the latest edition of AISI. Connection bolts will install through the webs, not the flanges.

E. Girts
   1. Girts must be simple or continuous span as required by design. Connection bolts will install through the webs, not the flanges.

F. Bracing:
   1. Diagonal Bracing: Diagonal bracing in the roof and sidewall shall be used to remove longitudinal loads (wind, crane, etc.) from the structure. This bracing will be furnished to length and equipped with hillside washers, cut washers and nuts at each end. It may

consist of rods threaded at each end or galvanized cable with suitable threaded end anchors.

2. Special Bracing: When diagonal bracing is not permitted in the sidewall, a rigid frame type portal, fixed base columns, or wall diaphragm must be used. Wind bracing in the roof and/or walls need not be furnished where it can be shown that the diaphragm strength of the roof and/or wall covering is adequate to resist the applied wind forces.

3. Flange Braces: The compression flange of all primary framing shall be braced laterally with angles connecting to the webs of purlins or girts so that the flange compressive stress is within allowable limits for any combination of loadings.
4. Bridging: Laterally bridge the top and bottom chords of the open-web bar joists as required by design thereof and specified on the building erection drawings.

G. Standing Seam Panels - General:
1. One side of the panel is configured as female, having factory applied butyl mastic inside the female seam. The female side will hook over the male side and when seamed creates a continuous lock, forming a weathertight seam.
2. Panels are factory notched at both ends so that field installation can commence or terminate from either end of the building. Panels cannot start at both ends of the building and work towards each other.
3. Maximum panel length is 50 feet unless otherwise noted in the Contract Documents.
4. Endlaps:
   a. Endlaps must have a 16 gauge backup plate and have the endlap joint fasteners installed in four factory applied dimples.
   b. Apply mastic between the panels and secure with #14-14x1 inch self-drilling fasteners through the panels, and backup plate to form a compression joint.
   c. "Through-the-Roof" fasteners may only be used at endlaps and eaves.

Part 3 EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with erector present, for compliance with requirements for installation tolerances and other conditions affecting performance of work.

B. Before erection proceeds, survey elevations and locations of concrete and masonry bearing surfaces and locations of anchor rods, bearing plates and other embedment’s to receive structural framing, with Erector present, for compliance with requirements and metal building system manufacturer’s tolerances.

C. Proceed with erection only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Clean surfaces thoroughly prior to installation.

B. Provide temporary shores, guys, braces, and other supports during erection to keep structural framing secure, plumb, and in alignment against temporary construction loads equal in intensity to design loads. Remove temporary supports when permanent structural framing connections and bracing are in place, unless otherwise indicated.

3.3 INSTALLATION

A. The erection of the metal building and the installation of accessories shall be performed in accordance with the American Buildings Company's erection manuals and the building erection drawings. The erection shall be performed by a qualified erector using proper tools and equipment. In addition, erection practices shall conform to Section 4, Common Industry Practices found in the most current version of the Metal Building Systems Manual. There shall be no field modifications to primary structural members except as authorized and specified by American Buildings

3.4 PROTECTION

A. Protect installed products until completion of project.

B. Touch-up, repair or replace damaged products before Substantial Completion.

END OF SECTION

SECTION 22 00 50 - PLUMBING

PART 1 – GENERAL

1.1 RELATED REQUIREMENTS

Section 23 00 50, "Mechanical General Requirements," applies to this section, with the additions and modifications specified herein. Any requirements shown or specified on the project drawings related to the equipment of this section also applies to this section.

1.2 SUBMITTALS

Submit the following:

1.2.1 Manufacturer's Catalog Data

a. Pipe and fittings

b. Valves

c. Plumbing fixtures

d. Pipe supports (hangers)

e. Drains

f. Water hammer arresters

1.2.3 Certificates of Compliance

a. Pipe and fittings

b. Valves

1.3 QUALITY ASSURANCE

Plumbing systems including fixtures, equipment, materials, installation, and workmanship shall be in accordance with the Florida Plumbing Code except as modified herein. In the Plumbing Code referred to herein, the advisory provisions shall be considered to be mandatory, as though the word "shall" had been substituted for the word "should" wherever it appears. Capacity of equipment shall be not less than that indicated.

PART 2 PRODUCTS

2.1 DRAIN, WASTE, AND VENT (DWV) PIPING

Fittings shall be long radius fittings, except fittings in vent piping may be short radius fittings. Minimum size piping shall be 2 inches for buried piping and 1.5 inches for aboveground piping.

2.1.1 Buried Piping

Provide piping up to but not more than 6 inches above ground or floor slab on grade.

2.1.1.1 Plastic Pipe, Fittings, and Solvent Cement

A. Polyvinyl Chloride (PVC) System: ASTM D 2665. Underground installation shall be in accordance with ASTM D 2321.

2.1.1.2 Cast-iron Pipe and Fittings

A. Cast-Iron Hub and Spigot Pipe and Fittings, ASTM A74 with ASTM C564 or CISPI HSN rubber compression gasket joints or caulked and leaded joints. Cast Iron pipe and fittings shall be marked with the collective trademark of the Cast Iron Soil Pipe Institute.

2.1.2 Aboveground Piping

2.1.2.1 Cast-Iron Hubless Pipe and Fittings

CISPI 301 or ASTM A 888 with CISPI 310, ASTM C 1277, and ASTM C 564 coupling joints. Cast Iron pipe and fittings shall be marked with the collective trademark of the Cast Iron Soil Pipe Institute.

2.1.2.2 Cast-Iron Hub and Spigot Pipe and Fittings

ASTM A 74 with ASTM C 564 rubber compression gasket joints, conforming to ASTM C 1563; or caulked and leaded joints. Cast Iron pipe and fittings shall be marked with the collective trademark of the Cast Iron Soil Pipe Institute.

2.1.2.3 Plastic Pipe, Fittings, and Solvent Cement Polyvinyl Chloride (PVC) System

ASTM D 2665 (no plastic pipe in return air plenums).

2.1.3 Drains

ANSI A112.21.1M; provide cast-iron drains and clamping rings for use with membrane waterproofing. Provide P-traps for each floor drain.

2.1.3.1 Flush Strainer Floor Drains or Hub Drains

Provide with double drainage flange, perforated or slotted cast bronze or nickel bronze strainer, and adjustable collar. Drains of sizes 2, 3, and 4 inches shall have strainers with minimum free drainage area of 5, 11, and 18 square inches, respectively. Provide trap primer connections on all floor drains and hub drains.

2.1.3.2 Floor Sinks

Provide 12 inch by 12 inch floor sinks constructed of cast iron. Floor sinks shall have minimum 6 inch deep sump, non-tilt, loose set half grate with 1/2 inch square openings and anti-splash interior dome strainer. Provide white acid resisting porcelain enamel interior and top, complete with white ABS anti-splash interior bottom dome strainer. Provide trap primer connections on all floor sinks. Floor sinks shall be Zurn model Z1900 or approved equal.

2.1.3.3 Roof Drains

Roof drains shall be low profile type, 15 inch overall diameter with pipe connection sizes as shown on drawings. Drains shall have cast iron body with combined flashing clamp and

gravel stop and a removable cast iron dome. Drains shall have adjustable extension to accommodate insulated roof deck. Provide roof drains with an under-deck clamp. Drains indicated for use as emergency overflow drains shall be provided with 2" internal water dam. Roof drains shall be Zurn model Z100 or approved equal.

2.2 DOMESTIC WATER PIPING

2.2.1 Buried Piping and Aboveground Piping

2.2.1.1 Copper Tubing

ASTM B 88, Type K, with ANSI B16.18 or ANSI B16.22 solder joint fittings using silver solder and flux containing not more than 0.2 percent lead; or with ANSI B16.26 flared joint fittings. ASTM B 88, Type L may be provided for aboveground piping.

2.2.2 Valves

2.2.2.1 Check Valves

MSS SP-80, Class 125, swing check (all valves shall be American made).

2.2.2.2 Ball Valves

Full port design, copper alloy. Valves shall have two-position lever handles. (All valves shall be American made).

2.2.3 Dielectric Connections

Provide at connections between copper and ferrous metal piping materials. ASTM F 441, Schedule 80, CPVC threaded pipe nipples, 4-inch minimum length, may be provided for dielectric connections in pipe sizes 2 inches and smaller.

2.2.4 Water Hammer Arresters

PDI WH201, ANSI A112.26.1M, or ASSE 1010

2.3 MISCELLANEOUS PIPING MATERIALS

2.3.1 Pipe Nipples

ASTM A733, copper alloy for use in copper tubing and hot-dip galvanized Schedule 80 steel pipe for use in steel piping.

2.3.2 Flanges

ANSI B16.1, Class 125, for use in ferrous piping; ANSI B16.22 or ANSI B16.24 for use in copper tubing; with full face flat type synthetic rubber gaskets.

2.3.3 Escutcheon Plates

One piece or split hinge type metal plates for piping passing through floors, walls, and ceilings in exposed spaces, chromium-plated finish on copper alloy plates in finished spaces, paint finish on plates in unfinished spaces, and with set screws or other approved positive means to anchor plates in place securely.

2.3.4 Solder

Use only silver solder for all copper fittings.

2.3.5 Pipe Sleeves

2.3.5.1 Sleeves in Masonry and Concrete Walls, Floors, Roofs

ASTM A 53, Schedule 40 or Standard Weight, hot-dip galvanized steel pipe sleeves. Core drilling of masonry and concrete may be provided in lieu of pipe sleeves when cavities in the core-drilled holes are completely grouted smooth.

2.3.5.2 Sleeves in Non-Masonry or -Concrete Walls, Floors, and Roofs

Hot-dip galvanized steel sheet having a nominal weight of not less than 0.90 pound per square foot. Provide 26 gauge galvanized steel sheet.

2.3.6 Pipe Hangers and Supports

Provide MSS SP-58 and MSS SP-69, Type 1 or 6, of the adjustable type, except as modified herein or indicated otherwise. Attachments to steel W or S beams shall be with Type 21, 28, 29, or 30 clamps. Attachments to steel angles and channels (with web vertical) shall be with Type 20 clamp with a beam clamp channel adaptor. Attachments to steel channel (with web horizontal) shall be with drilled hole on centerline and double nut and washer. Attachments to concrete shall be with Type 18 insert or a drilled hole with expansion anchor. Attachments to wood shall be as indicated. Hanger rods and attachments shall be full size of the hanger threaded diameter. Provide Type 40 insulation protection shields for insulated piping. Provide steel support rods. Provide nonmetallic, hair felt, or plastic piping isolators between copper tubing and the hangers.

2.3.7 Access Doors

Provide 12- by 12-inch factory prefabricated and primed flush face steel access doors including steel door frame with continuous hinges and turn-screw-operated latch. Door frame shall be for installation in plaster and masonry walls. Furnish doors under this section to provide proper access to concealed valves; install doors under the appropriate section of this specification.

2.4 FIXTURES, FITTINGS, ACCESSORIES, AND SUPPLIES

Provide control-stop valves in each supply to each fixture. The finish of fittings, accessories, and supplies exposed to view shall be chromium-plated per ASME A112.18.1M. Provide special roughing-in for wheelchair fixtures. Plumbing fixtures shall be as indicated on drawings, see Plumbing Fixture Schedule.

2.5 AIR ADMITTANCE VALVES

Air admittance valves shall be approved as a vent termination for any individual vent, common vent, circuit vent, loop vent, island fixture vent, vent stack or stack vent that is provided to prevent siphonage of a fixture trap. Air admittance valves shall be installed in an accessible location. Install valves in accordance with the manufacturer’s installation instructions. Valves shall be installed in the vertical, upright position after rough-in and pressure testing of the DWV system. Valves shall have protective screening on the inside and outside to protect the sealing membrane from insects and debris. Air admittance valves shall have a lifetime warranty.

2.6 HOSE BIBBS

A. Hose Bibb (HB): ASSE 1011, Bronze wall faucet with anti-siphon protection and removable handwheel or tee-handle, 0.75 inch external hose thread outlet with automatic draining vacuum breaker. Hose bibbs shall be Woodford Model 24 series or approved equal.

B. Freezeproof Wall Hydrant (FPWH/VB): ASSE 1019, freezeless type wall faucet with anti-siphon protection and removable handwheel or tee-handle, 0.75 inch external hose thread outlet with automatic draining vacuum breaker. Hydrant shall be contained in exterior box with locking cover. Hydrant shall be of sufficient length to extend through walls and place the valve seat inside the building. Bonnet and valve stem shall be removable from outside of the building. Hydrant and box shall have brass finish. Freezeproof wall hydrants shall be Woodford Model B65 series or approved equal.

C. Chrome Plated Hose Bibb (HB/VB): ASSE 1011, Chrome-plated wall faucet with anti-siphon protection and removable handwheel or tee-handle, 0.75 inch external hose thread outlet with automatic draining vacuum breaker. Hose bibbs shall be Woodford Model 24 series or approved equal.

PART 3 EXECUTION

3.1 INSTALLATION

Installation of plumbing systems including fixtures, equipment, materials, and workmanship shall be in accordance with the Florida Plumbing Code, except as modified herein. When fixtures require both hot water and cold water supplies, provide the hot water supply to the left of the cold water supply. Plastic piping shall not penetrate fire walls or fire floors and shall be used on one side of fire walls and fire floors not closer than 6 inches to the penetration. Plastic piping shall not be permitted within return air plenum spaces above ceilings.

3.1.1 Threaded Connections

Jointing compound for pipe threads shall be polytetrafluoroethylene (PTFE) pipe thread tape, pipe cement and oil, or PTFE powder and oil; apply only on male threads. Provide exposed ferrous pipe threads with one coat of primer applied to a minimum dry film thickness of 1.0 mil.

3.1.2 Solder End Valves

Remove stems and washers and other item subject to damage by heat during installation. Reassemble valve after soldering is completed. Valves without heat sensitive arts do not require disassembly but shall be opened at least two turns during soldering.

3.1.3 Pipe Supports (Hangers)

Provide additional supports at the concentrated loads in piping between supports, such as for inline water pumps and flanged valves.

3.1.3.1 Piping to Receive Insulation

Provide temporary wood spacers between the insulation protection shield and the pipe in order to properly slope the piping and to establish final elevations. Temporary wood spacers shall be of the same thickness as the insulation to be provided under Section 23 00 80, "Insulation of Mechanical Systems."

3.1.3.2 Maximum Spacing Between Supports

a. Vertical Piping: Support piping at each floor, but at not more than 10-foot intervals, with pipe riser clamps or offset pipe clamps.

b. Horizontal Piping: Support cast-iron piping at 5-foot intervals, except for pipe exceeding 5-foot length, provide supports at intervals equal to the pipe length but not exceeding 10 feet. Support steel piping and copper tubing as follows:

MAXIMUM SPACING (FEET)

Nominal Pipe Size (inches)	One and under	1.25	1.5	2	2.5	3	3.5	4	5	6
Steel Pipe	7	8	9	10	11	12	13	14	16	17
Copper Tube	6	7	8	8	9	10	11	12	13	14

3.1.4 Installation of Pipe Sleeves

Provide pipe sleeves where piping passes through walls, floors, roofs, and partitions. Secure sleeves in proper position and location during construction. Provide sleeves of sufficient length to pass through entire thickness of walls, floors, roofs, and partitions. Provide not less than 0.25-inch space between exterior of piping or pipe insulation and interior of sleeve or core-drilled hole. Firmly pack space with mineral wool insulation and caulk at both ends of the sleeve or core-drilled hole with plastic waterproof cement which will dry to a firm but pliable mass, or provide a mechanically adjustable segmented elastomeric seal. Seal both ends of penetrations through fire walls and fire floors to maintain fire resistive integrity with UL listed fill, void, or cavity material. Extend sleeves in floor slabs 3 inches above the finished floor, except sleeves are not required where DWV piping passes through concrete floor slabs located on grade.

3.2 FIELD QUALITY CONTROL

3.2.1 Inspections

Prior to initial operation, inspect piping system for compliance with drawings, specifications, and manufacturer's submittals.

3.2.2 Field Testing

Before final acceptance of the work, test each system as in service to demonstrate compliance with the contract requirements. Perform the following tests in addition to the tests specified in the Florida Plumbing Code and as required by the local authority having jurisdiction, except as modified herein. Correct defects in the work provided by the Contractor, and repeat tests until work is in compliance with contract requirements.

3.2.2.1 Domestic Water Piping

Before applying insulation, hydrostatically test each piping system at not less than 100 psig with no leakage or reduction in gauge pressure for 2 hours.

3.2.2.2 DWV Piping

Before the installation of fixtures, cap ends of each system, fill piping with water to the roof, and

allow to stand until a thorough inspection has been made. If the system is tested in sections, each opening shall be plugged and each section tested with not less than a 10-foot head or water. After plumbing fixtures have been set and their traps filled with water, subject the entire sanitary system to a final air pressure test of not more than 1.0 inch of water column. The entire system shall be proven absolutely tight under such test.

3.3 DISINFECTION

Disinfect new water piping in accordance with AWWA C651. Fill piping systems with solution containing minimum of 50 parts per million of available chlorine and allow solution to stand for minimum of 24 hours. Flush solution from the systems with clean water until maximum residual chlorine content is not greater than 0.2 parts per million or residual chlorine content of domestic water supply.

END OF SECTION 22 00 50

SECTION 22 00 60 - PLUMBING FIXTURES AND TRIM

PART 1 - GENERAL

1.1 DESCRIPTION OF WORK

A. Provide fixtures complete with trim.

B. Provide connections to equipment installed in this contract. Connect to roughing indicated.

PART 2 - PRODUCTS

2.1 FIXTURE CONNECTIONS

A. Lavatory connections shall be 1-1/4" type M copper arm with 1-1/4" C-MIP adapter at stack.

B. Sink connections shall be type M copper tube with wrought copper or brass fittings.

2.2 PLUMBING FIXTURES

A. Furnish and install plumbing fixtures indicated or specified, complete with all equipment, fittings, trim and accessories indicated or specified.

B. Exposed piping to fixtures:

1. Exposed piping for water shall be chrome-plated brass, IPS.

C. Stops shall be provided for all fixtures and equipment, and shall be Kohler, McGuire, Eljer, Chicago, Speakman or T&S.

D. All faucets shall be American Standard, Delta, Kohler, Just, Eljer or Central Brass

PART 3 - EXECUTION

3.1 PROTECTION OF FIXTURES

A. Provide plastic cover over fixtures after installation to prevent spilling of paint, abuse by workmen or other defacing of fixtures.

B. All chipped, cracked, deformed, scratched or defaced fixtures shall be replaced. Repaired or painted over enamel cracks or chipped places WILL NOT BE ACCEPTABLE.

3.2 CLEANING OF FIXTURES

A. All fixtures shall be cleaned prior to final inspections. Remove all dirt, paint, grease, etc., from within water closet bowls, lavatories, urinals and sinks. Remove all stains from fixtures.

B. Fixtures that are stained and cannot be cleaned shall be replaced.

C. Clean all aerators and strainers.

3.3 ADJUSTING FIXTURES

A. Adjust water flow through all fixtures to provide proper flushing action with the least amount of water.

END OF SECTION 22 00 60

SECTION 23 00 50 - MECHANICAL GENERAL REQUIREMENTS

PART 1 - GENERAL

1.0 RELATED REQUIREMENTS

This section applies to all sections of Divisions 21, 22 and 23, "Mechanical" of this project specification, unless specified otherwise in the individual section. Any requirements shown or specified on the project drawings related to the equipment of this section also applies to this section. Any conflicts which may arise between the drawings and the specifications shall be interpreted by the Engineer in the best interest of the Owner.

1.1 CONTRACTORS QUALIFICATIONS

1.1.1 General: Wherever the word "sub-contractor" or "firm" is used in these sub-paragraphs, it shall mean the contractor/sub-contractor of record for the installations used for proficiency qualification.

1.1.2 Location: The firm which performs the installation of the work under this section shall be one who maintains an established, experienced organization with a permanent, manned office.

1.1.3 Plumbing Experience: The firm's proficiency in the installation and adjustment of plumbing systems shall have been demonstrated by the successful performance of work as specified herein on at least three commercial or institutional buildings, each containing a minimum of 10 plumbing fixtures. The firm shall have been in business performing services as specified herein, for at least 3 years.

1.1.4 HVAC Experience: The firm's proficiency in the installation, start-up, adjustment, and maintenance of air conditioning systems shall have been demonstrated by the successful performance of work as specified herein on at least three systems each with ducted air distribution, and hydronic and refrigerant piping of 100 tons capacity or greater. The firm shall have been in business performing services as specified herein, for at least 3 years.

1.1.5 Test and Balance: The firm's proficiency in the test and balance of the air conditioning systems shall have been demonstrated by the successful performance of work as specified herein on at least three systems each with ducted air distribution, and refrigerant piping of 100 tons capacity or greater, incremental units excluded. The firm shall have trained personnel, instruments, tools, and equipment to perform the testing and balancing service specified. The firm shall have been in business performing services as specified herein, for at least 3 years and be independent of the mechanical contractor and shall be an active member of AABC or NEBB.

1.2 DEFINITIONS

1.2.1 Manufacturers Representatives: Wherever MANUFACTURERS REPRESENTATIVE is referred to in this division of these specifications, said representative shall be regularly employed by the manufacturer to perform similar activities to those called for herein, which indicates his competence in that field of work.

1.2.2 Concealed: Where the word concealed is used in this division, it shall mean items above ceilings, in attics, in crawl spaces, in chases, in tunnels, in cabinet work, and under counters or equipment so as to be not visible from an elevation of 5 feet at a horizontal distance of 10 feet.

1.2.3 Finished Spaces or Areas: Where finished spaces or areas are referred to in this division, it shall mean all spaces except concealed spaces or mechanical rooms unless otherwise noted.

1.2.4 Extended Warranties: Where extended warranties beyond contractor's one (1) year warranty are specified, the additional warranty time shall start at the end of the contractor's one (1) year warranty.

1.2.5 Provide: Furnish and install.

1.2.6 Control & Interlock Wiring: All wiring, both line voltage and low voltage, other than power wiring from electrical distribution panel, through the primary control device, to the item of equipment.

1.2.7 Primary Control Device: That ONE device for any item of equipment which interrupts power flow during normal operation. Where magnetic starters are provided, they are the primary control. For items not switched by starters, the primary control device will be that ONE thermostat, time clock, manual switch, aquastat, P.E. switch, or relay performing the primary switching.

1.2.8 Code Reference: Where reference is made to a code or ASTM without a date indicated, the date shall be the latest date or edition as of the date of the opening of bids.

1.2.9 Diagrammatic: A drawing that shows arrangement and relationship (as of parts), i.e.: A diagrammatic drawing uses symbols rather than pictorial representation of pipes, ducts, conduit and other items shown and are not necessarily to scale. Arrangement, location and sizes shown are firm.

1.2.10 Readily Accessible: Where items are specified to be readily accessible, they shall be available for maintenance or use in space, above a lay-in ceiling or through an access door from floor elevation, or by standing on an 8-foot ladder.

1.2.11 Noted, Indicated or Shown: Where the terms "Noted", "Indicated" or "Shown" are used in these specifications, the words "in the specifications or on the plans" shall be inferred.

1.2.12 Detail: Where reference is made to a Detail, the Detail shall be on the plans unless otherwise noted.

1.2.13 Specifications: Where reference is made to these specifications, it shall be inferred in this section of specifications.

1.2.14 Notification by Contractor, and Instructions to Contractor: Where reference is made in these specifications to notification by the Contractor or instructions given to the Contractor, it shall be inferred that the Architect/Engineer shall be the instructor or shall be notified, as the case exists.

1.2.15 Division or Section Reference: Where reference is made to another division or section within this division, refer to specifications table of contents for division, section, or page number.

1.2.16 Flow Diagram: A single-line, two-dimension, non-sealed drawing depicting arrangement and sequence of equipment, valves, controls, thermometers, gauges, and other specialty devices in a pipe or duct system.

1.3 CODES AND REGULATIONS

The work shall conform to the following listed codes and regulations:

O.S.H.A., National Electric Code, Florida Building Code, Florida Building Code-Mechanical, Florida Building Code-Plumbing, National Fire Protection Association, ASHRAE Code for Refrigeration Apparatus, ASA Codes for Refrigeration Equipment. Electric motors shall bear NEMA approval. Fans shall bear AMCA label. All electric wiring and electrical devices shall be UL approved. Welding shall be performed by ASME qualified welding mechanics in compliance with ASME Code for pressure piping together with addenda and supplements issued to date. Pressure vessels shall bear ASME label.

1.4 FEES, PERMITS AND TESTING

The Contractor shall obtain and pay for all permits, fees for inspection, and other charges that may be necessary for fully completing the work. The Contractor shall make all necessary tests required by City, County, or State authorities, legal regulations, and/or the Architect, and return to the Architect any certificates of approval issued in this district for plumbing work, etc. signed by the inspector in charge of each particular part of the work. All cost associated with testing shall be paid by the contractor.

1.5 MECHANICAL SHOP DRAWINGS (SUBMITTALS)

1.5.1 Mechanical Room Shop Drawings: The contractor shall provide layout drawings of all piping and ductwork in mechanical rooms and spaces indicating actual equipment submitted. The contractor shall not fabricate nor install any piping, ductwork or equipment in mechanical rooms until these drawings are approved. It is the contractor’s responsibility to include this item in a timely fashion to ensure there are not any construction delays.

1.5.2 General Requirements: Contractor shall check data to ensure compliance with specifications prior to submitting. Submittal shall be assembled in complete sets in hard back three-ring binders, by trade, and bound with numbered index sheets and tabs. Submittal data shall be submitted at one time unless unavailable drawings would delay job progress. Data shall include capacities, complete installation instructions, dimensional data and electrical data, BHP, motor HP, operating weights and load distribution at mounting points.

1.5.3 Identification: All submittal data shall be identified by a cover sheet showing project name, specification sections, drawing or detail number, room number, date, revision date, contractor and subcontractor's organization and project manager with phone number, the model, style and size of item being submitted with manufacturer's representative, salesman (or preparer who can answer questions), and phone number. Manufacturer's standard drawings shall be modified by deletions or additions to show only items applicable to this project.

1.5.4 Review: The Contractor agrees that submittals of equipment and material and shop drawings of equipment and material layouts required under provisions of these specifications and processed by the Architect/Engineer are not Change Orders. The purpose of submittals is to demonstrate that the Contractor understands the design concept of the project by indicating the equipment and materials he intends to furnish and install, and by detailing the installation he intends to achieve.

The Contractor shall conform to the requirements of the Contract Documents unless a change order is issued. The Contractor shall identify on each submittal and in letterform to the Architect/Engineer any and all deviations from the contract documents.

Any submittal or shop drawings not conforming to the Contract Documents without this identification and notification shall be assumed to be marked "Revise and Resubmit" (Contractor acknowledges this by the submission), and the Contractor shall promptly re-submit said submittal so as to be in full compliance with the Contract Documents.

NOTE: Failure of the Contractor to provide this information during the shop drawings phase shall make the Contractor responsible for all changes to achieve compliance with the

Contract Documents without additional compensation.

1.5.5 Items to be Submitted:

Tabulation of Power Wiring Requirements: Within 20 Days of Notice to Proceed, provide a Tabulation of Power Wiring Requirements of all proposed equipment, including H.P., amps, voltage, phase and KW, tabulated on a separate sheet. A copy of the tabulation shall be transmitted independently to the general contractor, Architect/Engineer, and to all affected trades. (Refer to Electrical Drawings for electrical provisions for equipment.)

Plumbing System Components:

Submit all components required for complete installation of Plumbing system designed and specified herein and as required by the engineer of record.

HVAC System Components:

Submit all components required for complete installation of HVAC system designed and specified herein and as required by the engineer of record.

1.6 INCIDENTAL WORK

The following incidental work shall be by the Division 23 contractor under the supervision of the Temperature Control Contractor:

A. Install all automatic temperature control valves and thermal wells. (Valves and wells shall be furnished by Temperature Control Contractor).

B. Furnish and install all necessary valves, pressure taps, strainers, water drains and overflow connections and piping.

C. Furnish and install all necessary piping connections required for flow devices, valve position indicators, etc.

D. Install automatic dampers furnished by the Temperature Control Contractor.

E. Provide the necessary blank-off plates (safing) required to install dampers smaller than the louver size.

F. Provide access to service control equipment covered by the mechanical equipment.

1.7 QUALITY ASSURANCE

1.7.1 Material and Equipment Qualifications

Provide materials and equipment that are standard products of manufacturers regularly engaged in the manufacture of such products, which are of a similar material, design and workmanship. Standard products shall have been in satisfactory commercial or industrial use for 2 years prior to bid opening. The 2-year use shall include applications of equipment and materials under similar circumstances and of similar size. The product shall have been for sale on the commercial market through advertisements, manufacturers' catalogs, or brochures during the 2-year period.

1.7.2 Alternative Qualifications

Products having less than a two-year field service record will be acceptable if a certified record of satisfactory field operation for not less than 6000 hours, exclusive of the

manufacturer's factory or laboratory tests, can be shown. In addition, products not meeting the above service requirements but are named in the documents as ‘basis of design’ equipment shall be exempt from such service requirements.

1.7.3 Engineer Approved Equal

Where the phrase “Engineer Approved Equal” appears in the project specifications it shall mean that the product or equipment must be approved by the Engineer for use in this project. This approval must be attained prior to the Contractor receiving pricing for the product or equipment and prior to the Contractor proposing a price in which an “Engineer Approved Equal” product or equipment is proposed to be utilized. In this sense the phrase “Prior-Approved Equal” may be substituted for the phrase “Engineer Approved Equal” wherever it appears in the project specifications. Failure to attain Engineer Approval prior to proposing the use of a product or equipment is at the Contractor’s risk of subsequent review and Engineer Approval.

1.7.4 Service Support

The equipment items shall be supported by service organizations. Submit a certified list of qualified permanent service organizations for support of the equipment, which includes their addresses and qualifications. These service organizations shall be reasonably convenient to the equipment installation and able to render satisfactory service to the equipment on a regular and emergency basis during the warranty period of the contract.

1.7.5 Manufacturer's Nameplate

Each item of equipment shall have a nameplate bearing the manufacturer's name, address, model number, and serial number securely affixed in a conspicuous place; the nameplate of the distributing agent will not be acceptable.

1.7.6 Modification of References

In each of the publications referred to herein, consider the advisory provisions to be mandatory, as though the word, "shall" had been substituted for "should" wherever it appears.

1.8 DELIVERY, STORAGE, AND HANDLING

Handle, store, and protect equipment and materials to prevent damage before and during installation in accordance with the manufacturer's recommendations, and as approved by the Owner and Engineer. Damaged or defective items, in the opinion of the Owner and Engineer, shall be replaced.

1.9 SAFETY REQUIREMENTS:

1.9.1 Equipment Safety

Provide positive means of locking out equipment in accordance with current OSHA standards so that equipment cannot be accidentally started during maintenance procedures. High-temperature equipment and piping so located as to endanger personnel or create a fire hazard shall be properly guarded or covered with insulation of the type specified. Provide catwalks, maintenance platforms, and guardrails where required for safe operation and maintenance of equipment. Provide ladders or stairways to reach catwalks and maintenance platforms. Ensure that access openings leading to equipment are large enough to carry through routine maintenance items such as filters and tools. Provide covers or guards for all rotating equipment, which could be hazardous.

1.10 ELECTRICAL REQUIREMENTS

Electrical installations shall conform to ANSI C2, NFPA 70, and requirements specified herein.

1.10.1 New Work

Provide electrical components of mechanical equipment, such as motors, motor starters, control or push-button stations, float or pressure switches, integral disconnects, and other devices functioning to control mechanical equipment, as well as control wiring and conduit for circuits rated 100 volts or less, to conform with the requirements of the section covering the mechanical equipment. Extended voltage range motors shall not be permitted. The interconnecting power wiring and conduit, control wiring rated 120 volts (Nominal) and conduit, and the electrical power circuits shall be provided under Division 26, except internal wiring for components of packaged equipment shall be provided as an integral part of the equipment. When motors and equipment furnished are larger than sizes indicated, provide any required changes to the electrical service as may be necessary and related work as a part of the work for the section specifying that motor or equipment."

1.10.2 Modifications to Existing Systems

Where existing mechanical systems and motor-operated equipment require modification, provide electrical components under Division 26."

1.10.3 High Efficiency Motors

1.10.3.1 High Efficiency Single-Phase Motors

Unless otherwise specified, single-phase fractional-horsepower alternating-current motors shall be high efficiency types corresponding to the applications listed in NEMA MG 11.

1.10.3.2 High Efficiency Polyphase Motors

Unless otherwise specified, polyphase motors shall be selected based on high efficiency characteristics relative to the applications as listed in NEMA MG 10. Additionally, polyphase squirrel-cage medium induction motors with continuous ratings shall meet or exceed energy efficient ratings in accordance with Table 12-6C of NEMA MG 1. Motors shall be NEMA Design Type B with NEMA Class B insulation. Motors specified to be high efficiency shall be minimum 92 percent efficient.

1.11 INSTRUCTION TO MAINTENANCE PERSONNEL

Instruct operating personnel designated by Owner in operation and maintenance of systems prior to the request for final inspection. A manufacturer's service representative shall provide the instructions for each piece of equipment on system. A manufacturer's sales representative is not acceptable. (Instructor shall not be a sales person, but shall be one with service experience on a continuing basis, knowledgeable about the subject equipment.) The Contractor shall give notice to the Architect/Engineer not less than 10 days of the anticipated date of instruction to allow planning by the Owner. The Contractor shall request the instruction date not less than 5 days of the desired date for coordination with the Owner. Operating manual for the equipment/systems on which instructions are being given shall be in the possession of the operating personnel not less than 5 days prior to the date of instruction. The Contractor shall give an orientation session to operating personnel for achieving familiarity (not instructions) of the systems approximately 3 days prior to the instruction date. The Contractor's representative giving instruction shall be knowledgeable in

the equipment/systems.

Provide signed statement from operating personnel and owner's representative certifying orientation and instructions have been received. Provide typed sequence of operation to be inserted in the maintenance manuals.

PART 2 - PRODUCTS

Not Used.

PART 3 - EXECUTION

Not Used.

END OF SECTION 23 00 50

SECTION 23 00 80 - INSULATION OF MECHANICAL SYSTEMS

PART 1 - GENERAL

1.1 RELATED REQUIREMENTS

Section 23 00 50, "Mechanical General Requirements," applies to this section, with the additions and modifications specified herein. Any requirements shown or specified on the project drawings related to the materials of this section also applies to this section.

1.2 DEFINITIONS

1.2.1 Finished Spaces

Spaces used for habitation or occupancy where rough surfaces are plastered, paneled, or otherwise treated to provide a pleasing appearance.

1.2.2 Unfinished Spaces

Spaces used for storage or work areas where appearance is not a factor, such as unexcavated spaces and crawl space.

1.2.3 Concealed Spaces

Spaces out of sight. For example, above ceilings; below floors; between double walls; furred-in areas; pipe and duct shafts; and similar spaces.

1.2.4 Exposed

Open to view. For example, pipe running through a room and not covered by other construction.

1.2.5 Fugitive Treatments

Treatment subject to deterioration due to aging, moisture, high humidity, oxygen, ozone, and heat. Fugitive materials are entrapped materials that can cause deterioration, such as solvents and water vapor.

1.2.6 Outside

Open to view up to 5 feet beyond the exterior side of walls, above the roof, and unexcavated or crawl spaces.

1.2.7 Conditioned Space

An area, room or space normally occupied and being heated or cooled for human habitation by any equipment.

1.3 SUBMITTALS

Submit the following:

1.3.1 Manufacturer's Catalog Data

a. Insulation

b. Jackets

c. Casings

d. Vapor-barrier materials

e. Accessory materials

1.3.2 Certificates of Compliance

a. Insulation

b. Jackets

c. Casings

d. Vapor-barrier materials

e. Accessory materials

Submit standards compliance labels on each container or package.

1.4 QUALITY ASSURANCE

Every package or standard container of insulation, jackets, cements, adhesives, and coatings delivered to the project site shall have the manufacturer's stamp or label attached giving name of manufacturer, brand and description of material. Insulation packages and containers shall be asbestos-free.

1.5 FLAME-SPREAD AND SMOKE-DEVELOPED RATINGS

In accordance with NFPA 255, ASTM E84 or UL 723, the materials shall have a flame-spread rating of not more than 25 and a smoke-developed rating of not more than 50.

1.5.1 Materials Tests

Test factory-applied materials as assembled. Field-applied materials may be tested individually. Use no fugitive or corrosive treatments to impart flame resistance. UL label or satisfactory certified test report from a testing laboratory will be required to indicate that fire hazard ratings for materials proposed for use do not exceed those specified. Flameproofing treatments subject to deterioration due to effects of moisture or high humidity are not acceptable.

1.5.2 Materials Exempt From Fire-Resistant Rating Nylon Anchors.

1.5.3 Special Exempt Materials

Materials exempt from fire-resistant rating when installed in outside locations, buried, or encased in concrete: PVC casing and glass-fiber-reinforced plastic casing.

PART 2 - PRODUCTS

2.1 PIPING INSULATION

Piping systems, except buried pipe requiring insulation, types of insulation required, and insulation thickness shall be as listed in Tables I and II herein. Except for flexible unicellular insulation, insulation thickness as specified in Table II shall be one inch greater for insulated

piping systems located outside. Unless otherwise specified, insulate all fittings, flanges, and valves, except valve stems, hand wheels, and operators. Provide factory premolded, precut, or field-fabricated insulation of the same thickness and conductivity as insulation on adjacent piping. Insulation exterior shall be factory cleanable, grease resistant, non-flaking and non-peeling. Pipe insulation shall conform to the referenced publications in Table I.

2.1.1 Flexible Unicellular Insulation

ASTM C534. Provide adhesive as recommended by insulation manufacturer.

2.1.2 Piping Insulation Finishes

2.1.2.1 All-Purpose Jacket

Except unicellular insulation, provide a factory applied all-purpose jacket with or without integral vapor barrier as required by the service. Provide jackets in exposed locations with a white surface suitable for field painting. Allow a maximum water vapor permanence of 0.05 perm in accordance with ASTM E96, a puncture resistance of not less than 50 Beach units, and a minimum tensile strength of 35 pounds-force per inch of width in accordance with ASTM D828. Chilled water piping, fittings, valves and accessories all-purpose jacket shall be provided with integral vapor barrier, and in addition shall be covered with plastic jacket inside of all mechanical rooms and with metal jacket where located outdoors – the plastic jacket shall be applied after the vapor barrier has been completely applied to the pipe insulation and fully cured.

2.1.2.2 Vapor-Barrier Material

Resistant to flame, moisture penetration, and mold growth. Provide vapor-barrier material on pipe insulation as required in Table I.

2.1.2.3 Metal Jackets – apply to all piping, fittings and valves outdoors..

Provide a moisture-barrier lining for metal jackets located outside.

a. Aluminum Jackets: ASTM B209, Alloy 3003 or 3004 Temper H14, 0.016- inch thick, corrugated.

2.1.2.4 Plastic Jackets – apply to hot and chilled water piping, fittings and valves inside all mechanical rooms and all domestic hot and cold water piping, fittings and valves inside all mechanical rooms. Plastic jacketing system shall be CEEL-CO 300 series heavy gage PVC fitting covers and 30 mil thick PVC pipe. See drawings for additional product requirements. Provide color red for hot water, blue for chilled water, green for heat recovery piping, and white for domestic water piping.

2.1.2.5 Vinyl Lacquer

Vinyl lacquer finish or equivalent recommended for unicellular insulation located outside.

2.2 HEATING, VENTILATING, AND AIR CONDITIONING SYSTEMS INSULATION

Provide insulation on ducts, plenums, filter boxes and casings of Heating, Ventilating and Air Conditioning Systems (HVAC).)

2.2.1 Duct Insulation in Concealed Spaces

Blanket flexible mineral fiber insulation conforming to ASTM C553, Type 1, Class B-3, 1.0 pound per cubic foot nominal, 2.0 inches thick. Provide flexible insulation in concealed spaces only.

2.2.2 Duct Insulation Not in Concealed Spaces

Mineral fiber in accordance with ASTM C612, Class 2 (maximum surface temperature 400 degrees F), 6 pcf (pounds per cubic foot) average, one inch thick.

2.2.3 Duct Insulation Finishes

2.2.3.1 All-Purpose Jacket

Provide a factory applied all-purpose jacket with or without integral vapor barrier as required by the service. In exposed locations, provide jackets with a white surface suitable for field painting. All-purpose jacket shall have a maximum water vapor permanence of 0.05 perm per ASTM E96; a puncture resistance of not less than 50 Beach units; and a tensile strength of not less than 35 pounds-force per inch of width in accordance with ASTM D828.

2.2.3.2 Vapor-Barrier Material

Material shall be resistant to flame, moisture penetration, and shall not support mold growth. Provide vapor barrier on HVAC duct insulation.

2.3 EQUIPMENT

Insulate all equipment and accessories as specified in Table III. In outside locations, provide insulation one inch thicker than specified. Increase the specified insulation thickness for equipment only where necessary to equal the thickness of angles or other structural members to make a smooth, exterior surface. Additional insulation is not required for factory-insulated equipment. Factory applied insulation shall meet the flame spread and smoke-developed rating of 25/50.

2.4 ADHESIVES, SEALANTS, AND COATING COMPOUNDS

2.4.1 Insulation and Vapor Barrier Adhesive

Provide ASTM C916, Type I or Type II adhesive for securing insulation to metal surfaces and for vapor barrier lap only in building interior. Provide Type I when an adhesive in which the vehicle is nonflammable in the liquid (wet) state and which will pass the edge-burning test is required. Provide Type II when an adhesive in which the vehicle is nonflammable in the liquid (wet) state and which will not pass the edge-burning test is required.

2.4.2 Lagging Adhesive

For bonding fibrous glass cloth to unfaced fibrous glass insulation; for bonding cotton brattice cloth to faced and unfaced fibrous glass insulation board; for sealing edges of and bounding fibrous glass tape to joints of fibrous glass board; or for bonding lagging cloth to thermal insulation, or Class 2, for attaching fibrous glass insulation to metal surfaces.

2.4.3 Mineral Fiber Insulation Cement

ASTM C195, thermal conductivity 0.85 maximum at 200 degrees F mean when tested in accordance with ASTM C177.

2.5 ACCESSORIES

2.5.1 Staples

ASTM A167, Type 304 stainless steel outside-clinch type.

2.5.2 Insulation Bands

½-inch wide; 0.021-inch galvanized steel or 0.018 inch stainless steel.

2.5.3 Anchor Pins

Provide anchor pins and speed washers recommended by insulation manufacturer.

2.5.4 Glass Cloth and Tape

Tape shall be 4-inch wide rolls. In lieu of glass cloth and tape, open weave glass membrane may be provided.

2.5.5 Wire

Soft annealed stainless steel, 0.047-inch nominal diameter.

PART 3 - EXECUTION

3.1 PREPARATION

Do not insulate materials until system tests have been completed and surfaces to be insulated have been cleaned of dirt, rust, and scale and dried. Insulate return ducts, outside air intakes and supply ducts to the room outlets, flexible runouts, plenums, casings, filter boxes, coils, fans, and the portion of air terminals not in the conditioned spaces. Ensure full range of motion of equipment actuators. Modify insulation to avoid obstruction with valve handles, safety relief's, and other such items. Allow adequate space for pipe expansion. Install insulation with jackets drawn tight and cement down on longitudinal and end laps. Do not use scrap pieces where a full-length section will fit. Insulation shall be continuous through sleeves, wall and ceiling openings, except at fire dampers in duct systems. Extend surface finishes to protect surfaces, ends, and raw edges of insulation. Apply coatings and adhesives at the manufacturer's recommended coverage per gallon. Individually insulate piping and ductwork. Provide a moisture and vapor seal where insulation terminates against metal hangers, anchors and other projections through the insulation on surfaces for which a vapor seal is specified. Keep insulation dry during application of finish. Bevel and seal the edges of exposed insulation. Unless otherwise indicated, do not insulate the following:

a. Factory pre-insulated flexible ductwork;

b. Factory insulated ductwork, plenums, casings, mixing boxes, filter boxes;

c. Vertical portion of interior roof drain pipelines, (unless otherwise noted), chrome plated pipes, and fire protection pipes;

d. Vibration isolating connections;

e. Adjacent insulation;

f. ASME stamps;

g. Fan name plates; and

h. Access plates in fan housings.

3.2 PIPING INSULATION

3.2.1 Pipe Insulation (Except Unicellular Insulation)

Place sections of insulation around the pipe and joints tightly butted into place. The jacket laps shall be drawn tight and smooth. Secure jacket with fire resistant adhesive factory applied self sealing lap, or stainless steel outward clinching staples spaced not over 4 inches on centers and 2 inch minimum from edge of lap. Cover circumferential joints with butt strips, not less than 3 inches wide, of material identical to the jacket material. Overlap longitudinal laps of jacket material not less than 1 2 inches. Adhesive used to secure the butt strip shall be the same as used to secure the jacket laps. Apply staples to both edges of the butt strips. When a vapor barrier jacket is required, as indicated in Table I, or on the ends of sections of insulation that butt against flanges, unions, valves, fittings, and joints, use a vapor barrier coating conforming to manufacturer’s recommendations. Apply this vapor barrier coating at all longitudinal and circumferential laps. Patch damaged jacket material by wrapping a strip of jacket material around the pipe and cementing, stapling, and coating as specified for butt strips. Extend the patch not less than 1 2 inches past the break in both directions. At penetrations by pressure gauges and thermometers, fill the voids with the vapor barrier coating for outside service. Seal with a brush coat of the same coating. Do not use staples to secure jacket laps on pipes carrying fluid medium at temperatures below 35 degrees F. Where penetrating roofs, insulate piping to a point flush with the top of the flashing and seal with the vapor barrier coating. Butt tightly the exterior insulation to the top of the flashing and interior insulation. Extend the exterior metal jacket 2 inches down beyond the end of the insulation. Seal the flashing and counter flashing underneath with the vapor barrier coating. See drawings for jacketing requirements.

3.2.2 Flexible Unicellular Insulation

Bond cuts, butt joints, ends, and longitudinal joints with adhesive conforming to manufacturer's recommendations. Miter 90-degree turns and elbows, tees, and valve insulation. Where pipes penetrate firewalls, provide mineral-fiber insulation inserts and sheet metal sleeves. Insulate flanges, unions, valves, and fittings in accordance with manufacturer's published instructions. Apply two coats of vinyl lacquer finish to flexible unicellular insulation and cover with aluminum jacketing in outside locations.

3.2.3 Hangers and Anchors

Pipe insulation shall be continuous through pipe hangers. Where pipe is supported by the insulation, provide MSS SP-58, Type 40 galvanized steel shields of MSS SP-58, Type 39 protection saddles conforming to MSS SP-69. Where shields are used on pipes 2 inches and larger, provide insulation inserts at points of hangers and supports. Insulation inserts shall be of calcium silicate, cellular glass (minimum 8 pcf), molded glass fiber (minimum 8 pcf), or other approved material of the same thickness as adjacent insulation. Inserts shall have sufficient compressive strength to adequately support the pipe without compressing the inserts to a thickness less than the adjacent insulation. Insulation inserts shall cover the bottom half of the pipe circumference 180 degrees and be not less in length than the protection shield. Vapor-barrier facing of the insert shall be of the same material as the facing on the adjacent insulation. Seal inserts into the insulation with manufacturer's recommended weatherproof coating; or vapor barrier coating, as applicable. Where protection saddles are used, fill all voids with the same insulation material as used on the adjacent pipe. Where anchors are secured to chilled piping that is to be insulated, insulate the anchors the same as the piping for a distance not less than four times the insulation thickness to prevent condensation. Vapor seal insulation around anchors.

3.2.4 Sleeves and Wall Chases

Where penetrating interior walls, extend a metal jacket 2 inches out on either side of the wall and

secure on each end with a band. Where penetrating floors, extend a metal jacket from a point below the back-up material to a point 10 inches above the floor with one band at the floor and one not more than one inch from end of metal jacket. Where penetrating exterior walls, extend the metal jackets through the sleeve to a point 2 inches beyond the interior surface of the wall.

3.2.5 Flanges, Unions, Valves and Fittings for Hot Piping

Flanges, Unions, Valves, and Fittings Insulation (Except Flexible Unicellular) for Hot Piping: Factory fabricated removable and reusable insulation covers may be used. For inside domestic hot water, heating hot water, high temperature hot water, exposed hot water piping and drains in handicap areas, place factory premolded, precut or field-fabricated segmented insulation of the same thickness and conductivity as the adjoining pipe insulation around the flange, union, valve, and fitting abutting the adjoining pipe insulation. If nesting size insulation is used, overlap 2 inches or one pipe diameter, whichever is larger. Use insulating cement to fill voids. Elbows insulated using segments shall have not less than three segments per elbow. Place and joint the segments with manufacturer's recommended water-vapor resistant, fire retardant, and adhesive appropriate for the temperature limit of the service. Upon completion of installation of insulation, apply two coats of lagging adhesive with glass tape embedded between coats. Overlap tape seams one inch. Extend adhesive onto adjoining insulation not less than two inches. The total dry film thickness shall be not less than 1/16 inch. Where unions are indicated not to be insulated, taper the insulation to the union at a 45-degree angle. Coat the insulation and all-purpose jacket with two coats of lagging adhesive and with glass tape embedded between coats. The total dry film thickness shall be not less than 1/16 inch. At the option of the Contractor, factory premolded one-piece PVC fitting covers may be provided in lieu of two coats of adhesive with tape embedded between coats. Factory premolded field-fabricated segment or blanket insert insulation shall be provided under the fitting covers. Install factory premolded one-piece PVC fitting covers over the insulation and secure by stapling, taping with PVC vapor barrier tape, or with metal or plastic tacks made for securing PVC fitting covers. Do not provide PVC fitting covers where exposed to the weather. Provide PVC fitting covers only in ambient temperatures below 150 degrees F. See drawings for jacketing requirements.

3.2.6 Flanges, Unions, Valves, Anchors, Fittings for Cold Piping

Factory-fabricated removable and reusable insulation covers may be provided. For piping insulation inside the building that service domestic cold water above ceilings, chilled water supply and return and roof drain leaders, coat pipe insulation ends with vapor barrier coating not more than 6 inches from each flange, union, valve, anchor or fitting. Place insulation of the same thickness and conductivity as the adjoining pipe insulation, either premolded or segmented, around the item, butting the adjoining pipe insulation. If nesting size insulation is provided overlap the insulation 2 inches or one pipe diameter. Use loose fill mineral wool or insulating cement to fill the voids. Elbows insulated using segments shall not have less than three segments per elbow. Secure insulation by wire or tape until finish coating is applied. Apply two coats of vapor barrier coating with glass tape embedded between coats. Overlap tape seams one inch. Extend the coating out onto the adjoining pipe insulation 2 inches. Where unions are shown not to be insulated, the insulation shall be tapered to the union at a 45-degree angle. Seal the insulation and jacket with two coats of vapor barrier coating with glass tape embedded between coats. Insulate anchors attached directly to the pipe for a sufficient distance to prevent condensation but not less than 6 inches from the insulation surface. At the option of the Contractor, premolded, one-piece polyvinyl chloride (PVC) fitting covers may be provided in lieu of the embedded glass tape. Factory premolded insulation or field-fabricated insulation segments shall be provided under the fitting covers. Do not use fiberglass insulation beneath the covers on chilled water piping. Blanket inserts may be provided. Secure the covers with adhesive and vapor barrier tape with a vapor resistance of maximum 0.05 perm in accordance with ASTM E96, or with tacks made for securing PVC covers. Then coat all tape seams and tacks with Type II vapor barrier coating. Do not use premolded PVC fitting covers where exposed to weather. Provide PVC covers only when medium temperature is not less than 35 degrees F and ambient

temperature is below 150 degrees F. See drawings for jacketing requirements.

3.3 DUCTS (HVAC) INSULATION

3.3.1 Rigid Insulation

Secure rigid insulation by impaling over pins or anchors located not more than 3 inches from joint edges of boards, spaced not more than 12 inches on centers and secure with washers and clips. Spot weld anchor pins or attach with a waterproof adhesive especially designed for use on metal surfaces. Apply insulation with joints tightly butted. Neatly bevel insulation around nameplates and access plates and doors. Each pin or anchor shall be capable of supporting a 20-pound load. Cut off protruding ends of pins, after clips are sealed with coating compound conforming to manufacturer's recommended vapor barrier coating and reinforced with open weave glass membrane.

3.3.2 Flexible Blanket Insulation

Apply insulation with all joints tightly butted. Secure insulation to ductwork with adhesive in 6-inch wide strips on 12-inch centers. Staple laps of jacket with outward clinching staples and seal with foil scrim kraft (FSK) tape. For ductwork over 24 inches on horizontal duct runs, provide pins, washers and clips. Provide pins on sides of vertical ductwork being insulated. Space pins and clips on 18-inch centers and not more than 18 inches from duct corners. Carry insulation over standing seams and trapeze-type hangers. Install speed washers with pins and pin trimmed to washer. Sagging of flexible duct insulation will not be permitted. Cut off protruding ends of pins after clips are secured and sealed with coating compound conforming to manufacturer's recommended vapor barrier coating. In cold air ducts, vapor seal all joints and staple as specified.

3.3.3 Insulation Finishes and Joint Sealing

Fill all breaks, punctures, and voids with vapor barrier coating compound conforming to manufacturer's recommended vapor barrier coating. Vapor seal all joints by embedding a single layer of 3-inch wide open weave glass membrane, 20 by 20 mesh maximum size between two 1/16-inch wet film thickness coats of vapor barrier coating compound. Draw glass fabric smooth and tight with a 1 2-inch overlap. At jacket penetrations such as hangers, thermometers, and damper operating rods, fill voids in the insulation with vapor barrier coating. Brush a coat of vapor barrier coating where required on HVAC ducts. Provide vapor barrier jacket continuous across seams, reinforcing, and projections. Where height of projections is greater than insulation thickness, carry insulation and jacket over the projection.

3.3.4 Access Plates and Doors

On acoustically lined ducts, plenums, and casings, provide insulation on access plates and doors. On externally insulated ducts, plenums, and casings, provide insulation-filled hollow steel panels and doors for access openings. Bevel insulation around access plates and doors.

3.5 FIELD INSPECTION

Visually inspect to ensure that materials provided conform to specifications. Inspect installations progressively for compliance with requirements.

TABLE I

Insulation Material For Piping

Service	Material	Spec	Type	Class	Vapor Barrier Required
Domestic Water All locations (Hot or Cold)	Mineral Fiber	ASTM C547		1	Yes
A/C Condensate Drains & Refrigerant Piping	Flexible Unicellular	ASTM C534		I or II	No

TABLE II

Piping Insulation Wall Thickness

Tube and Pipe Size (Inches)

Service	Material	¼ to 1-1/4	1-1 /2 to 3	3-1/2 to 5	6 to 12
Domestic Water (Hot or Cold)	Mineral Fiber	1	1.5	1.5	1.5
AC Condensate Drains & Refrigerant Piping	Flexible Unicellular	¾	¾	¾	¾

**** Note: Insulation on piping installed outdoors shall be increased by one inch above size shown in Table II.**

END OF SECTION 23 00 80

SECTION 23 01 20 – SPLIT SYSTEM HEAT PUMP UNITS

PART 1 - GENERAL

1.1 RELATED REQUIREMENTS

Section 23 00 50, "Mechanical General Requirements," applies to this section, with the additions and modifications specified herein. Any requirements shown or specified on the project drawings related to the equipment of this section also applies to this section.

1.2 SUBMITTALS

A. Manufacturer's Catalog Data
1. Split System Heat Pump Units

B. Drawings

1. Temperature control systems (Temperature Controls Contractor), including point-to-point electrical wiring diagrams

C. Manufacturer's Instructions

1. Installation manual for each item of equipment.

D. Operation and Maintenance Manuals

1. Split System Heat Pump Units

1.3 SAFETY

Comply with OSHA 29 CFR 1910.

1.4 Refer to Division 26 sections for the following work; not work of this section.

1.4.1 Power supply wiring from power source to power connection on unit. Include starters, disconnects, and required electrical devices, except where specified as furnished, or factory installed by manufacturer.

1.4.2 Interlock wiring between electrically operated equipment units; and between equipment and field-installed control devices.

1.5 CODES AND STANDARDS:

1.5.1 AMCA Compliance:

Test and rate heat pump units in accordance with AMCA standards.

1.5.2 NFPA Compliance:

Provide unit internal insulation, adhesives, and coatings having flame spread rating not over 25 and smoke developed rating no higher than 50; and complying with NFPA 90A "Standard for the Installation of Air Conditioning and Ventilating Systems".

1.5.3 UL and NEMA Compliance:

Provide electrical components required as part of units, which have been listed and labeled by UL and comply with NEMA Standards.

1.5.4 NEC Compliance:

Comply with National Electrical Code (NFPA 70) as applicable to installation and electrical connections of ancillary electrical components of units.

1.5.5 ASHRAE Compliance:

Construct and install refrigerant coils in accordance with ASHRAE 15 "Safety Code for Mechanical Refrigeration".

1.5.6 Coordination:

The contractor shall be responsible for coordinating unit type, orientation, connections, installation clearances, and the like with the manufacturer and in the field. Units shall be placed so that space is available for access to all components requiring regular or infrequent maintenance. Piping and ductwork shall be installed clear of motor service space, filter removal space, access door swings, removable panel space, and the like. Installations, which do not meet these requirements, shall be corrected at no additional cost to the Owner.

PART 2 - PRODUCTS

2.1 SPLIT-SYSTEM HEAT PUMP UNITS

Provide units factory assembled, designed, tested, and rated in accordance with ARI standards. Units shall be ARI certified or listed in ARI Directory. Units shall include fans, evaporator coil, filters, and controls. Outside unit for split systems shall include compressor and condenser. Insulate interior of inside unit casing with manufacturer's standard insulation. Provide guards to protect condenser from damage. Units shall be Trane, American Standard, Carrier, Daikin, Lennox or approved equals.

2.1.1 Filter section

Provide UL listed throwaway 1-inch thick fiberglass filters, standard dust-holding capacity. Provide gasketed access panel with quick opening latches at end of filter rack.

2.1.2 Safety controls

Provide low refrigerant pressure protection and pressure relief device. Provide compressor motor with thermal and overload protection, 5-minute anti-recycle timer, and start capacity kit. Provide compressor with electrical crankcase heater and internal high-pressure protection. The above safety controls are not required when scroll compressors, 8-second time delay, and discharge thermostats are provided.

2.1.3 Indoor Air Handling Unit

Provide factory fabricated and factory tested indoor blower unit with direct drive fan, multi-speed blower motor, direct expansion coil, condensate drain pan, electric heater, connections for supply and return air ductwork and all necessary controls, transformers, etc as required for a complete system and as indicated on the drawings. Air handlers shall be UL listed and internally lined with fiber glass insulation with a minimum thermal insulation value of R-4.2. Coils shall be constructed of copper tubes mechanically expanded into enhanced surface aluminum fins. Fans shall be

forward curved, dynamically and statically balanced with 3-speed direct drive fan motor. Electric heaters shall be factory installed and include all safeties and controls.

2.1.4 Condensing Units

Provide minimum efficiency as indicated on the drawings for heat pump units. Provide units with PVC coated steel coil guard or louvered panels to protect condenser coil from damage. Provide hermetic compressor with contactor and low pressure switch. Units shall have factory installed filter driers and anti-recycle time delays. Units shall have microprocessor controlled defrost control systems. Compressors shall be mounted on rubber isolators to reduce operating sounds. Units shall be capable of cooling down to 30°F outdoor ambient temperatures. Provide electrofin or manufacturer's standard protective "seacoast" coating, factory applied to condenser coil to prevent corrosion.

2.1.5 Space temperature controls

Provide relays, transformers, contactors, and control wiring as required for a complete and functional system. Provide all units with factory 7-day programmable thermostats with "Heat-Cool-Off-Emer Heat" and Fan "On-Auto" controls.

2.16 Warrantee:

Provide full five year warrantee including all parts, labor, travel, etc. as required to completely warrantee all split system heat pumps systems for five years.

2.2 PIPING SYSTEMS

Copper Refrigerant Tubing: Provide ASTM B 280, Type ACR, cleaned, dehydrated, and sealed. Provide ANSI B16.22 solder joint refrigerant fittings and adapters. Provide silver brazing alloy solder and silver brazing alloy flux. During brazing operations bleed a small amount of dry oil-free nitrogen continuously through the refrigerant tubing. Provide ASME B16.26 flared fittings.

2.4 ELECTRICAL

Electrical motors, controllers and contactors: Furnish with respective pieces of equipment. Motors, controllers and contactors shall conform to electrical specifications. Provide controllers and contactors with maximum of 120-volt control circuits, and auxiliary contacts for use with controls furnished. When motors and equipment furnished are larger than sizes indicated the cost of providing additional electrical service and related work shall be included under this section.

PART 3 - EXECUTION

3.1 INSTALLATION

A. HVAC System: Installation of HVAC system including equipment, materials, installation, workmanship, fabrication, assembly, erection, examination, inspection, and testing shall be in accordance with ASME B31.1, ASME B31.5, and NFPA 70.
B. Control System: Temperature Controls Contractor shall provide all controls to ensure a complete, functional system.

3.2 PIPING

A. Inspect, test, and approve piping before burying, covering, or concealing. Provide fittings for changes in direction of piping and for connections. Make changes in piping sizes through tapered reducing fittings; bushings will not be permitted.

1. Threaded connections: Provide polytetrafluoroethylene (PTFE) pipe thread paste only on male threads. Do not thread metal pipe into plastic piping.

2. Pipe hangers and supports: Provide additional pipe hangers and supports at the concentrated loads in piping, such as for in-line water pumps and flanged valves.

3. Cleaning of piping: Keep interior and ends of new piping and existing piping affected by Contractor's operations, cleaned of water and foreign matter during installation by using plugs or other approved methods. When work is not in progress, securely close open ends of pipe and fittings to prevent entry of water and foreign matter. Inspect piping before placing into position.

3.3 ADJUSTMENTS

A. Adjust controls and equipment so as to give satisfactory operation. Adjust entire water temperature control system and place in operation so that water quantities circulated are as indicated. Air duct systems shall be adjusted and balanced so that air quantities at outlets are as indicated and so that distribution from supply outlets is free from drafts and has uniform velocity over the face of each outlet.

3.4 FIELD QUALITY CONTROL

A. Upon completion and before final acceptance of work, test each system in service to demonstrate compliance with the contract requirements. Adjust controls and balance systems for one year after final acceptance of completed systems. Test controls through every cycle of operation. Test safety controls to demonstrate performance of required function. Correct defects in work provided by Contractor and repeat tests.

1. Refrigerant Piping: Perform following when field piping connections are provided.

a. Pressure test: Test refrigerant piping using dry, oil-free nitrogen, and prove tight at 300 psig on the high side and 150 psig on the low side. Maintain pressure for 2 hours with no leakage or reduction in gage pressure

b. Evacuation: Using high vacuum pump and certified micron gage, reduce absolute pressure on both sides of system simultaneously to 300 microns. After reaching this point charge system with proper refrigerant until pressure of zero psig is obtained. Repeat evacuation-charging procedure for two more cycles, totaling to three evacuation-charging cycles. On final totaling to three evacuation-charging cycles. On final evacuation, secure pump and maintain 300 microns for 2 hours before charging with required final refrigerant.

2. Air Ducts. Clean and test ducts in accordance with SMACNA HVACDCS and SMACNA HVACALTM, and obtain approval before applying insulation.

3. Equipment. Test equipment in operation for continuous period of not less than 24 hours under every condition of operation in accordance with manufacturer's recommendation.

END OF SECTION 23 01 20

SECTION 23 06 00 – VRV UNITS

PART 1 – GENERAL

VARIABLE REFRIGERANT VOLUME AIR CONDITIONING SPECIFICATION – Heat Pump

1.1 SYSTEM DESCRIPTION

The variable capacity, heat pump air conditioning system shall be a LG Variable Refrigerant Volume Series (heat/cool model) split system or approved equal by Mitsubishi. The system shall consist of multiple evaporators using PID control and outdoor units. The outdoor units shall be direct expansion (DX), air-cooled heat pump air-conditioning system, variable speed driven compressor multi-zone split system, using R-410A refrigerant. The outdoor unit may connect an indoor evaporator capacity up to 130% to that of the outdoor condensing unit capacity. All indoor units are each capable of operating separately with individual temperature control.

The indoor units shall be connected to the outdoor utilizing the manufacturer's recommended piping arrangement, joints and headers. The refrigerant piping system shall be submitted with the shop drawings for engineer review. The piping system drawings shall indicate all pipe sizes and the locations of all branch selectors.

Operation of the system shall permit either cooling or heating of all of the fan coil units. Each fan coil or group of fan coils shall be able to provide set temperature independently via a local remote controller, an Intelligent Controller, and an Intelligent Manager. The controls shall be web-based and shall be accessible from an internet connection.

1.2 VRV FEATURES AND BENEFITS

A. Voltage Platform – Heat pump condensing units shall be available in 208-230V/1/60, 208/3/60, or 460V/3-ph/60Hz configurations per schedule.

B. Independent Control – Each fan coil shall use a dedicated electronic expansion valve for independent control.

C. VFD Inverter Control – Each condensing unit shall use a high efficiency, variable speed "inverter" compressor coupled with inverter fan motors for superior part load performance. Compressor capacity shall be modulated automatically to maintain a constant suction pressure, while varying the refrigerant volume for the needs of the cooling or heating loads. Indoor fan coil units shall use PID control to control superheat to deliver a comfortable room temperature condition.

D. Flexible Design – Systems shall be capable of up to 540ft (620ft equivalent) of linear piping between the condensing unit and furthest located fan coil unit.
Systems shall be capable of up to 3280ft total "one-way" piping in the piping network. Systems shall have a vertical (height) separation of up to 295ft between the condensing unit and the fan coil units. The outdoor unit shall connect an indoor evaporator capacity up to 130% of the outdoor condensing unit capacity.

E. Simple Wiring – Systems shall use 2 wire, multi-stranded, non-shielded and non-polarized daisy chain control wiring.

F. Outside Air – Systems shall provide outside air capability.

G. Advanced Diagnostics – Systems shall include a self diagnostic, auto-check function to detect a malfunction and display the type and location.

H. Advanced Controls – Each system shall have at least one remote controller capable of controlling up to 16 fan coil units.

I. Low Sound Levels – Each system shall use indoor and outdoor units with quiet operation as low as 25 dB(A).

1.3 QUALITY ASSURANCE

A. The units shall be listed by Electrical Laboratories (ETL) and bear the cETL label.

B. All wiring shall be in accordance with the National Electric Code (NEC).

C. The system will be produced in an ISO 9001 and ISO 14001 facility, which are standards set by the International Standard Organization (ISO). The system shall be factory tested for safety and function.

D. The outdoor unit will be factory charged with R410A.

1.4 DELIVERY, STORAGE AND HANDLING

A. Unit shall be stored and handled according to the manufacturer's recommendations.

1.5 WARRANTY

The units shall have a manufacturer's warranty for a period of one (1) year from date of installation. The units shall have a limited labor warranty for a period of one (1) year from date of installation. The compressors shall have a warranty of six (6) years from date of installation. During the stated period, should any part fail due to defects in material and workmanship, it shall be repaired or replaced at the discretion of the manufacturer. All warranty service work shall be performed by a factory trained service professional.

1.6 INSTALLATION REQUIREMENTS

The system must be installed by a factory trained contractor/dealer. The bidders shall be required to submit training certification proof with bid documents. The mechanical contractor's installation price shall be based on the systems installation requirements. The mechanical contractor bids with complete knowledge of the HVAC system requirements. Untrained contractors who wish to bid this project may contact the local sales representative to arrange training prior to bid day.

PART 2 – PRODUCTS

2.1 PERFORMANCE

The outdoor units shall perform as indicated on the drawings.

A. Operating Range

The operating range in cooling will be 23°F DB ~ 110°F DB.
The operating range in heating will be 0°F DB – 64°F DB / -5°F WB – 60°F WB.

B. Refrigerant Piping

The system shall be capable of refrigerant piping up to 540 actual feet or 620 equivalent feet from the outdoor unit to the furthest indoor unit, a total combined liquid line length of 3,280 feet of piping between the condensing and fan coil units with 165 feet maximum vertical difference, without any oil traps.

C. Basis of Design

The HVAC equipment basis of design is LG, Daikin AC or Mitsubishi. All bidders shall furnish the minimum system standards as defined by the base bid model numbers, model families or as otherwise specified herein. In any event, the contractor shall be responsible for all specified items and intents of this document without further compensation.

2.2 OUTDOOR UNIT

A. General: The outdoor unit is designed specifically for use with VRV III series components.

1. The outdoor unit shall be factory assembled and pre-wired with all necessary electronic and refrigerant controls. The refrigeration circuit of the condensing unit shall consist of scroll compressors, motors, fans, condenser coil, electronic expansion valves, solenoid valves, 4-way valve, distribution headers, capillaries, filters, shut off valves, oil separators, service ports and liquid receivers.

2. Refrigerant lines must be individually insulated between the outdoor and indoor units.

3. The outdoor unit can be wired and piped with outdoor unit access from the left, right, rear or bottom.

4. The connection ratio of indoor units to outdoor unit shall be permitted up to 130%.

5. The outdoor system shall be able to support the connection of multiple indoor units as indicated on the drawings.

6. The sound pressure level standard shall be that value as listed in the manufacturer’s engineering manual for the specified models at 3 feet from the front of the unit. The outdoor unit shall be capable of operating automatically at further reduced noise during night time.

7. The system will automatically restart operation after a power failure and will not cause any settings to be lost, thus eliminating the need for reprogramming.

8. The outdoor unit shall be modular in design and should allow for side-by-side installation with minimum spacing.

9. The following safety devices shall be included on the condensing unit; high pressure switch, control circuit fuses, crankcase heaters, fusible plug, high pressure switch, overload relay, inverter overload protector, thermal protectors for compressor and fan motors, over current protection for the inverter and anti-recycling timers.

10. To ensure the liquid refrigerant does not flash when supplying to the various fan coil units, the circuit shall be provided with a sub-cooling feature.

11. Oil recovery cycle shall be automatic occurring 2 hours after start of operation and then every 8 hours of operation.

12. The outdoor unit shall be capable of heating operation at 0°F dry bulb ambient temperature without additional low ambient controls.

B. Unit Cabinet:

1. The outdoor unit shall be completely weatherproof and corrosion resistant. The unit shall be constructed from rust-proofed mild steel panels coated with a baked enamel finish.

C. Fan:

1. The condensing unit shall consist of one or more propeller type, direct-drive fan motors that have multiple speed operation via a DC (digitally commutating) inverter.

2. The fan shall be a vertical discharge configuration.

3. Nominal sound pressure levels shall be as shown below.

4. The fan motor shall have inherent protection and permanently lubricated bearings and be mounted.

5. The fan motor shall be provided with a fan guard to prevent contact with moving parts.

6. The outdoor unit shall be capable of operating at further reduced sound levels during night time.

D. Condenser Coil:

1. The condenser coil shall be manufactured from copper tubes expanded into aluminum fins to form a mechanical bond.

2. The heat exchanger coil shall be of a waffle louver fin and rifled bore tube design to ensure high efficiency performance.

3. The heat exchanger on the condensing units shall be manufactured from Hi-X seamless copper tube with N-shape internal grooves mechanically bonded on to aluminum fins to an e-Pass Design.

4. The fins are to be covered with an anti-corrosion acrylic resin and hydrophilic film type E1.

5. The pipe plates shall be treated with powdered polyester resin for corrosion prevention. The thickness of the coating must be between 2.0 to 3.0 microns.

E. Compressor:

1. The scroll compressor shall be variable speed (PAM inverter) controlled which is capable of changing the speed to follow the variations in total cooling and heating load as determined by the suction gas pressure as measured in the condensing unit. In addition, samplings of evaporator and condenser temperatures shall be made so that the high/low pressures detected are read every 20 seconds and calculated. With each reading, the compressor capacity shall be controlled to eliminate deviation from target value.

2. The inverter driven compressor in each condensing unit shall be of highly efficient reluctance DC (digitally commutating), hermetically sealed scroll “F-type” with a maximum speed of 6,480 rpm.

3. Neodymium magnets shall be adopted in the rotor construction to yield a higher torque and efficiency in the compressor instead of the normal ferrite magnet type. At complete stop of the compressor, the neodymium magnets will position the rotor into the optimum position for a low torque start.

4. The capacity control range shall be 24% to 100% 4 ton and less units and 7% to 100% for condensing units over 4 tons.

5. The compressor shall be equipped with a crankcase heater, high pressure safety switch, and internal thermal overload protector.

6. Oil separators shall be standard with the equipment together with an intelligent oil management system.

7. The compressor shall be spring mounted to avoid the transmission of vibration.

F. Electrical:

1. The power supply to the outdoor unit shall be as scheduled on the drawings.

2. The control voltage between the indoor and outdoor unit shall be 16VDC non-shielded, stranded 2 conductor cable.

3. The control wiring shall be a two-wire multiplex transmission system, making it possible to connect multiple indoor units to one outdoor unit with one 2-cable wire, thus simplifying the wiring operation.

2.3 WALL MOUNTED UNIT

A. General: Indoor unit shall be a wall mounted fan coil unit, operable with refrigerant R-410A, equipped with an electronic expansion valve, for installation onto a wall within a conditioned space. This compact design with finished white casing shall be available in capacities from 7,500 Btu/h to 24,000 Btu/h. . Computerized PID control shall be used to control superheat to deliver a comfortable room temperature condition. The unit shall be equipped with a programmed drying mechanism that dehumidifies while limiting changes in room temperature when used with remote control. A mildew-proof, polystyrene condensate drain pan and resin net mold resistant filter shall be included as standard equipment. The indoor units sound pressure shall range from 31 dB(A) to 41 dB(A) at low speed measured at 3.3 feet below and from the unit.

B. Indoor Unit:

1. The indoor unit shall be completely factory assembled and tested. Included in the unit is factory wiring, piping, electronic proportional expansion valve, control circuit board, fan motor thermal protector, flare connections, condensate drain pan, self-diagnostics, auto-restart function, 3-minute fused time delay, and test run switch. The unit shall have an auto-swing louver which ensures efficient air distribution, which closes automatically when the unit stops. The remote controller shall be able to set five (5) steps of discharge angle. The front grille shall be easily removed for washing. The discharge angle shall automatically set at the same angle as the previous operation upon restart. The drain pipe can be fitted to from either left or right sides.
2. Indoor unit and refrigerant pipes will be charged with dehydrated air prior to shipment from the factory.
3. Both refrigerant lines shall be insulated from the outdoor unit.

4. Return air shall be through a resin net mold resistant filter.
5. The indoor units shall be equipped with a condensate pan.
6. The indoor units shall be equipped with a return air thermistor.
7. The indoor unit will be separately powered with 208~230V/1-phase/60Hz.
8. The voltage range will be 253 volts maximum and 187 volts minimum.

C. Unit Cabinet:

1. The cabinet shall be affixed to a factory supplied wall mounting template and located in the conditioned space.
2. The cabinet shall be constructed with sound absorbing foamed polystyrene and polyethylene insulation.

D. Fan:

1. The fan shall be a direct-drive cross-flow fan, statically and dynamically balanced impeller with high and low fan speeds available.
2. The fan motor shall operate on 208/230 volts, 1 phase, 60 hertz with a motor output range 0.054 to 0.058 HP.
3. The airflow rate shall be available in high and low settings.
4. The fan motor shall be thermally protected.

E. Coil:

1. Coils shall be of the direct expansion type constructed from copper tubes expanded into aluminum fins to form a mechanical bond.
2. The coil shall be of a waffle louver fin and high heat exchange, rifled bore tube design to ensure highly efficient performance.
3. The coil shall be a 2-row cross fin copper evaporator coil with 14 fpi design completely factory tested.
4. The refrigerant connections shall be flare connections and the condensate will be 11/16 inch outside diameter PVC.
5. A thermistor will be located on the liquid and gas line.
6. A condensate pan shall be located in the unit.

F. Electrical:

1. A separate power supply will be required of 208/230 volts, 1 phase, 60 hertz. The acceptable voltage range shall be 187 to 253 volts.
2. Transmission (control) wiring between the indoor and outdoor unit shall be a maximum of 3,280 feet (total 6,560 feet).
3. Transmission (control) wiring between the indoor unit and remote controller shall be a maximum distance of 1,640 feet.

G. Control:

1. The unit shall have controls provided by the manufacturer to perform input functions necessary to operate the system.
2. The unit shall be capable of interfacing with a BMS system.

H. Provide with the following options:

1. Remote “in-room” sensor kit.

2. A condensate pump.

B. ELECTRICAL CHARACTERISTICS

1. General: From each circuit board to the controls, the electrical voltage shall be 16 volts DC.

2. Wiring: Control wiring shall be installed in a daisy chain configuration from indoor unit to indoor unit then to the branch selector box and outdoor unit. Control wiring shall run from the indoor unit terminal block to the specific controller for that unit.

3. Wiring Size: The wire shall be a non-shielded, 2-core sheathed vinyl cord or cable, size AWG18-2.

C. CONTROLLER CHARACTERISTICS

1. Individual Zone Controller – Wired Remote Controller

a. The wired remote controller shall be able to control 1 group (maximum of 16 fan coil units) and shall be able to function as follows:

1)The controller shall have a maximum wiring length of 1,640 feet.
2)The controller shall have a self diagnosis function that constantly monitors the system for malfunctions (total of 80 components).
3)The controller shall be able to immediately display fault location and condition.
4)An LCD digital display will allow the temperature to be set in 1°F units.
5)The controller shall allow the user to select cool / heat / fan operation mode with indoor remote controller of choice without using the cool / heat selector.
6)The wall mounted controller shall be equipped with a temperature sensor to control operation of the fan coil. Control by unit mounted temperature sensors is not acceptable when untreated outside air is ducted into the fan coil unit.
7)The controller shall display set point and ambient temperature.

2. Available Web browser functions are: Real time status monitoring/Operation/Malfunction history display/ User password setting and schedule setting.
3. Malfunction reports can be sent via email to a cell phone or a PC.
4. Non LG units can be started / stopped and general alarm reported using Digital Input or Digital Input/Output units.
5. Power Supply to controller: 24V AC (transformer to be field supplied)

2.5 BASIS OF DESIGN

The Basis of Design is LG system. Alternate systems by Daikin or Mitsubishi are acceptable, but the mechanical contractor shall be responsible for any and/or all changes to the system design as a result of using the alternate product and shall bear all the liability as a result of these changes. This shall include but not be limited to changes in the piping systems, electrical systems, drains, equipment/service requirements and system capacities- An alternate system design, if required, shall be the responsibility of this contractor, and all changes shall be approved by the Architect and Engineer.

Equipment suppliers shall furnish a complete drawing package to the mechanical contractor 14 days prior to bid day for bidding and installation. The equipment supplier shall prepare the

following drawings:

HVAC Refrigerant Piping Plan
HVAC Refrigerant Piping/Controls Details

The equipment supplier shall draft all piping circuits, components, overall building control schematic, detailed control wiring diagrams, system details and schedules for their system. The drawings shall convey all requirements to successfully install the alternate equipment suppliers system.

PART 3 - EXECUTION

3.1 INSTALLATION

Install air distribution equipment as indicated and in accordance with the manufacturer's instructions. Provide clearance for inspection, repair, replacement, and service. Electrical work shall conform to NFPA 70 and Division 26, "Electrical." Provide overload protection in the operating disconnect switches and magnetic starters.

3.2 PROTECTION OF EQUIPMENT

Deliver equipment to site in sealed containers or weatherproof wrap. Mechanical equipment spaces shall be ready to receive units prior to shipment. Follow manufacturer's printed instructions for unloading and moving equipment. Handle and place equipment with care to avoid damage to casing or structural components. Protect equipment during construction with coverings, and build temporary catwalks over units when workmen require overhead access in unit location.

The contractor shall be fully responsible for protection of heat pump units throughout the construction process and until final acceptance by the Engineer. Damaged units shall be removed and replaced by the contractor with new units meeting the requirements of these specifications. The replacement shall be at no additional cost to the Owner and with no increase in the contract time.

3.3 GENERAL

Examine areas and conditions under which heat pump units are to be installed. Do not proceed with work until unsatisfactory conditions have been corrected in manner acceptable to Installer. Install heat pump units where indicated, in accordance with equipment manufacturer's published installation instructions, and with recognized industry practices, to ensure that units comply with requirements and serve intended purposes.

3.4 COORDINATION

Coordinate with other work, including ductwork, floor construction and piping, as necessary to interface installation of air handling units with other work.

3.5 ACCESS

Provide access space around air handling units for service as indicated, but in no case less than that recommended by manufacturer.

3.6 ELECTRICAL WIRING

Install electrical devices furnished by manufacturer but not specified to be factory mounted. Furnish copy of manufacturer's wiring diagram submittal to electrical Installer. Verify that electrical wiring installation is in accordance with manufacturer's submittal and installation requirements of Division-26 sections. Do not proceed with equipment start-up until wiring installation is acceptable to equipment installer.

3.7 PIPING CONNECTIONS

Provide piping, valves, accessories, gages, and supports as recommended by the manufacturer. Provide trapped, condensate drain piping from each drain connection and extend independently to disposal point as part of this section's work.

3.8 DUCT CONNECTIONS

Refer to Division-23 Air Distribution sections and the drawings. Provide ductwork, accessories, and filter racks as indicated.

3.9 TESTING

Upon completion of installation of heat pump units, start-up and operate equipment to demonstrate capability and compliance with requirements. Field correct malfunctioning units, then retest to demonstrate compliance.

3.10 START-UP PROCEDURES:

A. Contractor Responsibilities:

1. The contractor shall use nitrogen during all brazing operations to eliminate ash formation inside the refrigerant piping system. Failure to use nitrogen during brazing operations will result in the rejection of the refrigerant piping system and shall require complete replacement.
2. The refrigerant piping system shall be pressure tested a 500 psi for a minimum of 24 hours. Notify the engineer one week prior to pressure testing. Pressure test shall be witnessed by the engineer at both the beginning and end of the 24 hour period.
3. The refrigerant piping system shall be evacuated to 500 microns in 3 separate stages. The piping system shall be purged with nitrogen between each stage to remove moisture. Maintain 500 microns for a minimum of 2 hours.

   At a minimum the Contractor shall perform the following start-up checks, coordinate with the manufacturer of the heat pump unit furnished for additional start-up items to be performed:

   a. Check that the unit is completely and properly installed with ductwork connected.
   b. Check that all construction debris is removed and filters are clean.
   c. Check that all electrical work is complete and properly terminated.
   d. Check that all electrical connections are tight and that the proper voltage is connected. Phase imbalance must not exceed 2%. (call electrical contractor for correction)
   e. Check that the condensate drain is trapped and meets Engineer’s depth requirements.
   f. Rotate the shaft by hand to be sure it is free.
   g. Start and run fan. Observe the rotation. If the fan operates backward, have the electrical contractor reverse two legs of the three-phase supply power.

3.11 TESTING AND BALANCING

After specified start-up procedures and preliminary tests are complete the Contractor shall test, adjust, and balance the heat pump unit and air distribution equipment in accordance with Section 23 09 50, "Testing, Adjusting, and Balancing HVAC Systems".

3.12 FACTORY TRAINING

The manufacturer shall provide pre-installation training for the contractor’s installation personnel. Training shall cover all aspects of equipment, piping, and wiring installation and preparation for system commissioning.

Equipment manufacturer shall provide on-site start-up training and assistance for the contractor’s service technicians. Contractors that have attended installation and commissioning training courses at the manufacturers training facilities are exempt from this requirement.

Provide factory training for selected owner personnel in accordance with Section 23 00 50.

3.13 FACTORY PARTS AND SERVICE

Manufacturer must maintain replacement parts inventory and factory trained service availability within 2 hours of this installation.

END OF SECTION 23 06 00

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SECTION 23 07 50 - EXHAUST FANS

PART 1 – GENERAL

1.1 GENERAL REQUIREMENTS

Section 23 00 50, "Mechanical General Requirements," applies to this section with the additions and modifications specified herein. Any requirements shown or specified on the project drawings related to the equipment of this section also applies to this section.

1.2 SUBMITTALS

Submit the following:

1.2.1 Manufacturer's Catalog Data

a. Exhaust Fans

Include sound rating data and sound power level for all octave-band center frequencies or loudness level.

1.2.2 Operation and Maintenance Manuals

a. Exhaust Fans

1.3 SAFETY

Comply with OSHA 29 CFR 1910.

1.4 Refer to Division-26 sections for the following work; not work of this section.

1.4.1 Power supply wiring from power source to power connection on unit. Include starters, disconnects, and required electrical devices, except where specified as furnished, or factory installed by manufacturer.

1.4.2 Interlock wiring between electrically operated equipment units; and between equipment and field-installed control devices.

1.5 Control wiring specified as work of Division-23 for Automatic Temperature Controls is work of that section.

1.6 CODES AND STANDARDS:

1.6.1 AMCA Compliance:

Test and rate air terminal units and exhaust fans in accordance with AMCA standards.

1.6.2 ARI Compliance:

Test and rate air terminal units and exhaust fans in accordance with applicable ARI standards (latest published editions), and ARI 410 for coils, display certification symbol on units of certified models.

1.6.3 NFPA Compliance:

Provide air terminal unit internal insulation, adhesives, and coatings having flame spread rating not over 25 and smoke developed rating no higher than 50; and complying with NFPA 90A "Standard for the Installation of Air Conditioning and Ventilating Systems". Kitchen hoods shall comply with the latest edition of NFPA 96.

1.6.4 UL and NEMA Compliance:

Provide electrical components required as part of equipment, which have been listed and labeled by UL and comply with NEMA Standards.

1.6.5 NEC Compliance:

Comply with National Electrical Code (NFPA 70) as applicable to installation and electrical connections of ancillary electrical components of air handling equipment.

1.6.6 Coordination:

The contractor shall be responsible for coordinating air terminal unit and exhaust fan type, orientation, connections, installation clearances, and the like with the manufacturer and in the field. Units shall be placed so that space is available for access to all components requiring regular or infrequent maintenance. Ductwork shall be installed clear of motor service space, access door swings, removable panel space, and the like. Installations, which do not meet these requirements, shall be corrected at no additional cost to the Owner.

PART 2 – PRODUCTS

2.1 FANS

Sound rating per AMCA 300; statically and dynamically balanced, with air capacities, brake horsepowers, fan types, fan arrangement, sound power levels or loudness level, and static pressure, as indicated on the drawings. Provide guard (bird) screens for outdoor inlets and outlets. Equip all fans with automatic (backdraft) dampers. Have thermal overload protection in the operating disconnect switches within the building. Construct housings and fan wheels of aluminum or steel, except as specified otherwise. Provide factory fabricated roof curbs with fans (except when drawings indicate existing curbs). Curbs shall be designed to accommodate for structural roof slope where required. Curbs shall be minimum of 18 inches high. Where fans are indicated to be interlocked with thermostats, the mechanical contractor shall supply the thermostat and coordinate installation with the electrical contractor.

2.1.1 Ceiling Mounted Exhaust Fans:

Ceiling mounted exhaust fans shall be of the centrifugal direct drive type. The fan housing shall be constructed of heavy gauge galvanized steel. The housing interior shall be lined with ½ inch acoustical insulation. The outlet duct collar shall include an aluminum back draft damper and shall be adaptable for horizontal or vertical discharge. The designer grille shall be constructed of high-impact non-yellowing polystyrene.

The access for wiring shall be external. The motor disconnect shall be internal and of the plug-in type. The motor shall be mounted on vibration isolators. The fan wheel(s) shall be of the forward curved centrifugal type and dynamically balanced. All fans shall bear the AMCA Certified Ratings Seal for sound and air performance and shall be UL/cUL Listed.

Where indicated on drawings, provide solid-state speed controller, factory mounted and wired within or on the cabinet for test and balancing.

Ceiling Mounted Exhaust Fans shall be manufactured by Loren Cook, Greenheck or engineer approved equal. All wall caps, louvers, roof caps and roof curbs required by these fans, shall be furnished by the Contractor.

2.2 DUCTWORK

Section 15895, "Ductwork and Ductwork Accessories."

2.3 MOTORS AND MOTOR STARTERS

NEMA MG 1, NEMA ICS 2, and NEMA ICS 6, respectively, with electrical characteristics as indicated. Motors shall be open drip proof.

PART 3 – EXECUTION

3.1 INSTALLATION

Install air distribution equipment as indicated and in accordance with the manufacturer's instructions. Provide clearance for inspection, repair, replacement, and service. Electrical work shall conform with NFPA 70 and Division 26, "Electrical." Provide overload protection in the operating disconnect switches and magnetic starters.

3.2 PROTECTION OF EQUIPMENT

Deliver equipment to site in sealed containers or weatherproof wrap. Mechanical equipment spaces shall be ready to receive units prior to shipment. Air handling units shall not be stored outdoors. Follow manufacturer's printed instructions for unloading and moving equipment. Handle and place equipment with care to avoid damage to casing or structural components. Protect equipment during construction with coverings, and build temporary catwalks over equipment when workmen require overhead access in unit location.

The contractor shall be fully responsible for protection of air handling equipment throughout the construction process and until final acceptance by the Engineer. Damaged equipment shall be removed and replaced by the contractor with new equipment meeting the requirements of these specifications. The replacement shall be at no additional cost to the Owner and with no increase in the contract time.

3.3 GENERAL

Examine areas and conditions under which air handling equipment is to be installed. Do not proceed with work until unsatisfactory conditions have been corrected in manner acceptable to Installer. Install air handling equipment where indicated, in accordance with equipment manufacturer's published installation instructions, and with recognized industry practices, to ensure that units comply with requirements and serve intended purposes.

3.4 COORDINATION

Coordinate with other work, including ductwork, floor construction and piping, as necessary to

interface installation of air handling units with other work.

3.5 ACCESS

Provide access space around air handling equipment for service as indicated, but in no case less than that recommended by manufacturer.

3.6 ELECTRICAL WIRING

Install electrical devices furnished by manufacturer but not specified to be factory mounted. Furnish copy of manufacturer's wiring diagram submittal to electrical Installer. Verify that electrical wiring installation is in accordance with manufacturer's submittal and installation requirements of Division-26 sections. Do not proceed with equipment start-up until wiring installation is acceptable to equipment installer.

3.7 DUCT CONNECTIONS

Refer to Division-23 Air Distribution sections and the drawings. Provide ductwork, accessories, and flexible connections as indicated.

Field installed flexible duct connectors are not required if air handling equipment is provided with factory installed internal fan discharge flexible connectors.

3.8 TESTING

Upon completion of installation of air handling units, start-up and operate equipment to demonstrate capability and compliance with requirements. Field correct malfunctioning units, then retest to demonstrate compliance.

3.9 TESTING AND BALANCING

After preliminary tests, test, adjust, and balance the air handling and distribution equipment in accordance with Section 23 09 50, "Testing, Adjusting, and Balancing HVAC Systems".

END OF SECTION 23 07 50

SECTION 23 08 50 - DUCTWORK AND DUCTWORK ACCESSORIES

PART 1 - GENERAL

1.1 RELATED REQUIREMENTS

Section 23 00 50, "Mechanical General Requirements," applies to this section with the additions and modifications specified herein. Any requirements shown or specified on the project drawings related to the equipment of this section also applies to this section.

1.2 SUBMITTALS

Submit the following.

1.2.1 Manufacturer's Catalog Data

1. Dampers
2. Flexible ducts and connectors
3. Diffusers, registers and grilles
4. Fire Dampers

1.3 QUALITY ASSURANCE

SMACNA Duct Construction Manuals: The SMACNA recommendations shall be considered as mandatory requirements. Substitute the word "shall" for the word "should" in these manuals.

1.4 PRESSURE-VELOCITY CLASSIFICATION

SMACNA HVACDCS, Section 1, and as indicated.

PART 2 - PRODUCTS

2.1 BASIC MATERIALS

2.1.1 Galvanized Steel Sheets

ASTM A527/527M; coating designation G90.

2.1.2 Galvanized Steel Hot Dipped After Fabrication

ASTM A123.

2.1.3 Corrosion Resisting (Stainless) Steel Sheets

ASTM A167.

2.1.4 Duct-Liner Adhesives

SMACNA HVACDCS, fire-resistant adhesive.

2.2 DUCTS OF PRESSURE CLASSES 3-INCH OR LESS WATER GAUGE

Construction, metal gauge, hangars and supports, and reinforcements shall conform with SMACNA HVACDCS. Ductwork shall be airtight and shall not vibrate or pulsate when system is in operation. Air leakage shall be less than 5 percent of the system capacity. Construct ductwork of galvanized steel. All major duct runs shall be pressure tested for leakage prior to insulating. Coordinate with test and balance contractor.

2.2.1 Curved Elbows

Make a centerline radius not less than 1 ½ times the width or diameter of the duct.

2.2.2 Joints

Make airtight. No dust marks from air leaks shall show at duct joints or connections to grilles, registers, and diffusers. All duct joints and sealing of duct joints shall comply with applicable sections of the current Florida Mechanical Code.

2.2.3 Laps

Make laps at joints in the direction of airflow. Space button-punch or bolt-connection in standing seams at fixed centers not greater than 6 inches. Longitudinal locks or seams, known as "button-punch snap-lock," may be used in lieu of Pittsburg Lock, but will not be permitted on aluminum ducts.

2.2.4 Fittings

All rectangular elbows shall have double wall turning vanes. Elbows, take-offs, branch connections, transitions, splitters, volume dampers, fire dampers, flexible connections, and access doors shall conform with SMACNA HVACDCS, Section 2.

2.3 NOT USED

2.4 FLEXIBLE DUCTS AND CONNECTORS

UL 181, Class I, UL listed, SMACNA HVACDCS, and additional requirements herein specified. Use to connect between rigid ducts and outlets or terminals. Core material shall be an acoustical transparent PE fabric supported by helically wound galvanized steel. The fabric shall be mechanically fastened to the steel helix without the use of adhesive. The core shall maintain its free area and a center line radius of 1.0 or better. Flex duct shall be suitable for operating temperatures of at least 250 degrees F, rated for a velocity of at least 5,500 feet per minute, maximum internal working pressure of at least 10 inches W.G. positive pressure and 5 inches W.G. negative pressure.

2.4.1 Materials

Corrosion resistant galvanized steel helix formed and mechanically locked to fabric. Liner shall be constructed of a PE inner film with sound attenuating properties. Flexible ducts shall be Flexmaster Type 1MR6 or approved equal.

2.4.2 Insulation and Vapor Barrier

Factory insulate flex duct with flexible fiberglass insulation with a minimum R-value of at least 6.0 at a mean temperature of 75 degrees F. Sheathe the insulation with a fire retardant reinforced aluminum material vapor barrier having a maximum water vapor permeance of 0.05 perm in

accordance with ASTM E96, Procedure A. Coat ends of insulation with cement to prevent erosion and delamination.

2.5 DIFFUSERS, REGISTERS, AND GRILLES

2.5.1 Material and Finishes

Construct diffusers, registers, and grilles of steel. Exterior and exposed edges shall be rolled, or otherwise stiffened and rounded. Steel parts shall be factory zinc phosphate treated prior to priming and painting or have a baked-on enamel finish. Colors shall be selected or approved by Architect. Location of all diffusers, registers and grilles shall be as indicated on reflected ceiling plans. Manufacturers shall be Titus, Nailor, or Price.

2.5.2 Room NC Criteria

All supply / exhaust / return / relief air diffusers, registers and grilles shall not exceed the following room noise criteria (NC) as published in manufacturer's catalog test data:

All Spaces 25

2.5.3 Ceiling Diffusers

Equip with baffles or other devices required to provide proper air distribution pattern. Except for linear air diffusers, internal parts shall be removable through the diffuser neck for access to the duct and without the use of special tools.

2.5.3.1 Ceiling Diffusers (CD)

Construct each ceiling diffuser of four or more concentric elements designed to deliver air in a generally horizontal direction without excess smudging of the ceiling. Ceiling diffusers shall be four-way blow unless otherwise indicated on drawings with arrows. The interior elements of ceiling diffusers shall be square. Diffusers for lay-in 2' X 2' ceiling grid shall be provided with extended panel. Diffusers for gypsum ceilings shall be provided with plaster rings for easy installation and removal. Round duct connection and face size shall be as shown on drawings. Diffusers shall be Titus TDC or approved equal.

2.5.3.2 Curved Blade Ceiling Register (CR)

Curved blade ceiling registers shall be of the sizes and mounting types shown on the plans. Registers shall have curved deflectors which are individually adjustable from the face of the register to regulate air volume and angle of discharge. Registers shall be built in 1, 2, 3, or 4-way discharge patterns. The registers shall be constructed of 0.051 aluminum with miscellaneous steel components.

The register finish shall be # 26 white. The finish shall be an anodic acrylic paint, baked 315 degrees F for 30 minutes. The pencil hardness must be HB to H. The paint must pass a 100 hour ASTM D117 Corrosive Environments Salt Spray Test without creepage, blistering, o deterioration of film. The paint must pass a 250 hour ASTM-870 Water Immersion Test. The paint must also pass the ASTM D-2794 Reverse Impact Cracking Test with a 50 inch pound force applied.

Opposed blade volume damper shall be constructed of heavy gauge steel and shall be operable from the face of the register.

The manufacturer shall provide published performance data for the diffuser. The diffuser shall be tested in accordance with ANSI/ASHRAE Standard 70-1991. Curved blade ceiling

diffusers shall be Titus model 250-AA or approved equal. Provide registers with extended panel designed to install in 2x2 lay-in ceiling.

2.5.4 Return Registers– 35 degree Louvers (RAR)

Louvered face steel return registers shall have 3/4" blade spacing of the sizes and mounting types shown on the plans. The fixed deflection blades shall be parallel to the long dimension of the grille. Construction shall be of steel with a 1-1/4" wide border on all sides. Screw holes shall be countersunk for a near appearance. Corners shall be welded with full penetration resistance welds. For return air grilles shown in lay-in ceilings the manufacturer shall provide a 24"x24" extended panel for lay-in installation.

Deflection blades shall be contoured to a specifically designed and tested cross-section to meet published test performance data. Blades shall be firmly held in place by mullions from behind the grille and fixed to the grille by welding in place. Blade deflection angle shall be 35 degrees.

Provide registers with opposed blade volume damper constructed of heavy gauge steel. Damper shall be operable from the face of the grille.

The grille finish shall be # 26 white. The finish shall be an anodic acrylic paint, baked 315 degrees F for 30 minutes. The pencil hardness must be HB to H. The paint must pass a 100 hour ASTM D117 Corrosive Environments Salt Spray Test without creepage, blistering, o deterioration of film. The paint must pass a 250 hour ASTM-870 Water Immersion Test. The paint must also pass the ASTM D-2794 Reverse Impact Cracking Test with a 50 inch pound force applied.

The manufacturer shall provide published performance data for the grille. The grille shall be tested in accordance with ANSI/ASHRAE Standard 70-1991. Steel return grilles shall be Titus model 350RL or approved equal.

2.5.5 Return Grilles– 35 degree Louvers (RAG) or (TG) or (EG)

Construct and finish as specified above for return air registers, except that volume dampers shall be omitted.

2.5.6 Side Wall Supply Air Register (SWR)

Aluminum supply registers shall be of the double deflection type for the sizes and mounting types shown on the plans. The deflection blades shall be parallel to the short dimension of the register. All supply grilles shall be constructed with a 1-1/4" heavy aluminum border having a minimum thickness of 0.040" – 0.050". Outer borders shall be assembled and interlocked at the four corners and mechanically staked to form a rigid frame. Screw holes shall be recessed for a neat appearance.

Blades shall be constructed of heavy duty aluminum and shall be contoured to a specifically designed airfoil cross-section to meet published performance data. Hollow blades are not acceptable – blades must be solid. Blades shall be spaced ¾" apart and shall extend completely through the side frame on each side to ensure stability throughout the complete CFM range of the register. Blades shall be individually adjustable without loosening or rattling and shall be securely held in place with tension wire.

Opposed blade volume damper shall be constructed of heavy gauge steel and shall be operable from the face of the register.

The grille finish shall be # 26 white. The finish shall be an anodic acrylic paint, baked 315 degrees F for 30 minutes. The pencil hardness must be HB to H. The paint must pass a 100 hour ASTM

D117 Corrosive Environments Salt Spray Test without creepage, blistering, o deterioration of film. The paint must pass a 250 hour ASTM-870 Water Immersion Test. The paint must also pass the ASTM D-2794 Reverse Impact Cracking Test with a 50 inch pound force applied.

The manufacturer shall provide published performance data for the grille. The register shall be tested in accordance with ANSI/ASHRAE Standard 70-1991. Side wall supply air registers shall be Titus model 272FS or approved equal.

2.5.7 Heavy Duty Bar Return Air Grilles

Heavy duty bar return air grilles shall be constructed of aluminum and shall have 1-3/8" wide border. Grilles shall have ½ inch bar spacing and thirty degrees of deflection. Bars shall be horizontal. Provide without opposed blade damper. Grilles shall be Titus model 63FL or approved equal by Price.

2.6 DUCT SLEEVES AND PREPARED OPENINGS

2.6.1 Duct Sleeves and Closure Collars

Fabricate from minimum 20-gauge galvanized steel.

2.6.2 Prepared Openings

Provide one-inch clearance between the duct and the sleeve.

2.7 DEFLECTORS

For round ducts taking off from rectangular ducts, provide factory fabricated, galvanized sheet metal, side take-off fittings. These fittings shall have butterfly dampers and locking quadrant operators and shall have 45-degree entry fitting (no scoops) to minimize turbulence.

2.8 ACCESS DOORS

Weld doorframe in place. Door shall be rigid and airtight with neoprene gaskets and two or more steel hinges and tension fasteners. Provide doors as large as practical. Mount doors, if possible, so that air pressure holds them closed.

2.9 DAMPERS

The HVAC Contractor shall furnish all louvers on this project including those louvers not connected to ductwork. Construct dampers and louvers with two gauges heavier than ducts in which installed. Except as modified herein, the construction shall be of aluminum or galvanized steel with interlocking edges and maximum 10-inch blade width. Conform with SMACNA HVACDCS. Dampers shall be opposed-blade type. All louvers, whether or not connected to ductwork, shall be the responsibility of the Mechanical Contractor and shall be provided in accordance with this section.

2.9.1 Back draft Dampers (Gravity Dampers or Shutters)

Factory-fabricated, with statically and dynamically balanced blades that open automatically when the fan starts and close by gravity when the fan stops. Provide the edges of blades with felt or rubber strips to prevent rattling.

2.9.2 Splitter and Manual Volume Dampers

Balancing, factory-fabricated type. Equip dampers with accessible mechanism such as quadrant operators or 3/16-inch rods brought through the side of ducts with locking setscrew and bushing. Where quadrant operators are used they shall be chrome plated or enamel painted with all exposed edges rounded. See drawings for requirements for manual volume dampers.

PART 3 - EXECUTION

3.1 INSTALLATION

Installation shall conform to NFPA 90A, SMACNA HVACDCS and Florida Building Code, Mechanical. Provide mounting and supporting of ductwork and accessories including, but not limited to, structural supports, hangers, vibration isolators, stands, clamps and brackets, access doors, and dampers. Use electrical isolation between dissimilar metals. Electrical isolation may be fluorinated elastomers or sponge-rubber gaskets. Install ductwork accessories as indicated in accordance with the manufacturer's printed instruction. Allow clearance for inspection, repair, replacement, and service.

3.1.1 Ductwork

When air distribution systems are operated, there shall be no chatter, vibration, or dust marks. After ducts are thermally or acoustically insulated, ensure airflow area equal to duct cross section dimensions indicated.

3.1.1.1 Field Changes to Ductwork

Those required to suit the sizes of factory-fabricated equipment actually furnished, shall be designed to minimize expansion and contraction. Use gradual transitions in field changes as well as modifications to connecting ducts. Provide jumper ducts for discharging air into duct junctions as indicated.

3.1.1.2 Dampers

When installed on ducts to be thermally insulated, equip each damper operator with stand-off mounting brackets, bases, or adapters to provide clearance between the duct and operator not less than the thickness of insulation. Standoff mounting items shall be integral with the operator or standard accessory of damper manufacturer.

3.1.1.3 Deflectors

Provide in square elbows, duct-mounted supply outlets, take-off or extension collars to supply outlets, and tap-in branch-off connections. Adjust supply outlets to provide air volume and distribution as indicated or specified.

3.1.1.4 Access Doors

Provide for automatic dampers, volume dampers, fire dampers, coils, thermostats, temperature controllers, valves, and other concealed apparatus requiring service and inspection in the duct systems. Access doors shall be provided on both the entering and leaving sides of duct mounted hot water or electric heating coils for inspection and cleaning.

3.1.1.5 Duct Sleeves and Prepared Openings

Provide for ductwork penetrations through which metallic ductwork passes.

1. Duct Sleeves: Allow one-inch clearance between duct and sleeve or one-inch clearance between insulation and sleeve for insulated ducts, except at grilles, registers, and diffusers.

2. Prepared Openings: Allow one-inch clearance between duct and opening or one-inch clearance between insulation and opening for insulated ducts, except at grilles, registers, and diffusers.

3. Closure Collars: Provide minimum 4 inches wide on each side of the ductwork penetrations where sleeves or prepared openings are installed. Fit collars snugly around ducts and insulation. Grind smooth edges of collar to preclude tearing or puncturing insulation covering or vapor barrier. Use nails with maximum 6-inch centers on collars.

4. Fire Partitions: Seal duct penetrations of fire rated partitions (not requiring fire dampers) tight with U.L. classified form type sealant having a flame spread rating of 20 in accordance with ASTM E-84-80. See drawing for fire/smoke wall penetration notes.

3.1.1.6 Packing

Pack with mineral fiber in spaces between sleeve or opening and duct or duct insulation.

3.1.2 Duct Hangers and Supports

SMACNA HVACDCS, Section 4. Unless otherwise indicated, provide not less than two one-by 1/16-inch galvanized strap-iron hangers spaced one on each side of duct. Anchor risers in the center of the vertical run to allow ends of riser free vertical movements. Attach supports only to structural framing members and concrete slabs. Do not anchor supports to metal decking unless a means is provided and approved for preventing the anchors from puncturing the metal decking. Where supports are required between structural framing member, provide suitable intermediate metal framing. Where C clamps are used, use retainer clips.

3.1.2.1 Flexible Ducts

Support ducts by hangers every 3 feet, unless supported by ceiling construction. Use stretch flexible air ducts to smooth out corrugations, and long radius elbows, where possible, using a minimum length to make connections. Flexible duct installation shall comply with general duct installation notes on the project drawings.

3.1.2.2 Flexible Connectors

Provide flexible connectors between fans and ducts or casings and where ducts are of dissimilar metals. For round ducts, securely fasten flexible connectors by zinc-coated steel clinch-type draw-bands. For rectangular ducts, lock flexible connectors to metal collars.

3.1.3 Inspection Plates and Test Holes

Provide, where required, in ductwork or casings for all balance measurements. Test holes shall be factory fabricated, airtight, and non-corrosive with screw cap and gasket. Extend cap through insulation.

3.1.4 Acoustical Duct Lining

SMACNA HVACDCS, Section 2. Apply the lining in cut-to-size pieces attached to interior of

ducts with fire-resistant adhesive. Top and bottom pieces shall lap the sidepieces. Secure pieces together with welded pins or clips. Do not distort the ducts, burn through or mar the finish surface of ducts. Pins and washers shall be flush with the surface of duct liners. Seal breaks and punctures of duct-liner coating with fire-resistant adhesive. Coat exposed edges of the liner at duct ends and other joints where lining will be subject to erosion with a heavy brush coat of fire-resistant adhesive, to prevent de-lamination of glass fibers. Duct liners may also be applied to flat sheet metal with fire-resistant adhesive, at top and bottom surface of ducts; then secure duct liners by welded pins or adhered clips.

3.1.5 Flashings

Provide waterproof flashings where ducts pass through exterior walls and roofs.

3.1.6 Cleaning of Ducts

Remove all debris and dirt from ducts and wipe clean. Before installing air outlets, use air handler to blow dry air through entire system at maximum attainable velocity. Provide temporary air filters for this operation.

3.2 FIELD QUALITY CONTROL

The Contractor is responsible for the administration and direction of tests. Furnish instruments, equipment, connecting devices, and personnel for the tests. Notify Architect 5 days before inspection or testing is scheduled. Correct all defects in work. Repeat tests until the work is in compliance.

3.2.1 Air Duct Leakage Tests

Comply with SMACNA HVACALTM. Test ducts, plenums, and casings for air leakage. Prior to application of insulation, subject new ductwork to static pressure equivalent to that indicated. Before installing outlets, apply temporary caps where outlets will be connected. Connect a test blower temporarily to inlet end of duct and, by throttling its intake, adjust static pressure in duct to required value. Read voltage and current to blower motor and total static pressure across blower wheel. Apply data to AMCA certified performance table for the test blower to derive volumetric flow rate (cfm) of air injected into duct. Remove temporary caps and test blower. Verify the maximum allowable air leakage of the total air that duct is required to deliver. Perform the measurement of leakage using a calibrated orifice tube with its individual calibration curve. Leakage tests should be verified by the Engineer.

3.2.2 Balancing and Testing of Air Systems

Air and water systems shall be tested and adjusted by a certified Test and Balance Contractor. The Mechanical Contractor shall coordinate and provide assistance to test and balance contractor as required.

END OF SECTION 23 08 50

SECTION 23 09 50 - TESTING ADJUSTING AND BALANCING

PART 1 - GENERAL

1.1 DESCRIPTION OF WORK

The work includes testing, adjusting, and balancing (TAB) of heating, ventilating, and cooling (HVAC) air distribution systems including equipment, ducts, and piping which are located within, on, under, between, and adjacent to buildings. The test and balance contractor shall be a subcontractor to the mechanical contractor.

1.1.1 Air Distribution Systems - Scope of systems to be TAB'd per contract drawings.

Systems shall be tested, adjusted, and balanced (TAB'd) in compliance with this section.

1.2 DEFINITIONS

A. Field check group: One or more systems of the same basic type; the subgroup of a "field check group" is a "system."

B. Out-of-tolerance data: Pertains only to field checking of certified TAB report. The term is defined as a measurement taken during field checking which does not fall within the range of plus 5 to minus 5 percent of the original measurement reported on the certified DALT or TAB report for a specific parameter.

1.3 SUBMITTALS

Submit following:

1.3.1 Statements

A. Independent TAB agency personnel qualifications.

B. Design review report.

C. Advanced notice for TAB fieldwork.

D. Final certified TAB report.

1.3.1.1 Independent TAB Agency Personnel Qualifications

Submit following for approval.

A. Independent AABC or NEBB certified TAB agency:

(1) TAB agency: AABC registration number and expiration date of current certification; or NEBB certification number and expiration date of current certification.

(2) TAB team supervisor: Name and copy of AABC or NEBB TAB supervisor certificate and expiration date of current certification.

(3) Current certificates: Registrations and certifications shall be current, and valid for the duration of this contract. Certifications, which expire prior to completion of the TAB work, shall be renewed in a timely manner so that there is no lapse in registration or certification. TAB agency or TAB team personnel without a current registration or current certification shall not perform TAB work on this contract.

1.3.1.2 Design Review Report

Submit typed report describing omissions and deficiencies in the HVAC system's design that would preclude the TAB team from accomplishing the duct leakage testing work and the TAB work requirements of this section. Provide a complete explanation including supporting documentation detailing the design deficiency. State that no deficiencies are evident if that is the case.

1.3.1.3 Advanced Notices

A. Submit "Advanced Notice of Commencement of TAB Field Work" in writing.

1.3.2 Field Test Reports

Submit certified reports in the specified format including the following data.

A. Certified TAB report

1.3.2.1 Certified TAB Report

A. Temperatures: On each TAB report form reporting TAB work accomplished on HVAC thermal energy transfer equipment, include the indoor and outdoor dry bulb temperature range and indoor and outdoor wet bulb temperature range within which the TAB data was recorded.

B. Instruments: List the types of instruments actually used to measure the tab data. Include in the listing each instrument's unique identification number, calibration date, and calibration expiration date.

C. Certification: Include the typed name of the TAB supervisor and the dated signature of the TAB supervisor.

1.4 QUALITY ASSURANCE

1.4.1 Modifications of References

Accomplish work in accordance with referenced publications of AABC or NEBB except as modified by this section. In the references referred to herein, consider the advisory or recommended provisions to be mandatory, as though the word "shall" had been substituted for the words "should" or "could" or "may" wherever they appear.

PART 2 - PRODUCTS

Not used.

PART 3 - EXECUTION

3.1 TAB PROCEDURES

3.1.1 TAB Field Work

Test, adjust, and balance the listed HVAC systems to the state of operation indicated on and specified in the contract design documents. Provide instruments and consumables required to accomplish the TAB work. Conduct TAB work, including sound measurement work, on the listed HVAC systems in conformance with the AABC NSTSB, or NEBB PSTABES, and NEBB PSMSV, except as modified by this section:

A. Maintenance and calibration of instruments.

B. Accuracy of measurements.

C. Air distribution systems TAB work:

(1) Air handling unit systems – As required on contract drawings.

D. TAB work within seasonal limitations:

(1) Performance tests: Accomplish proportionate balancing TAB work on the air distribution systems and water distribution systems, in other words, accomplish adjusting and balancing of the air flows and water flows, any time during the duration of this contract, subject to the limitations specified elsewhere in this section. However, accomplish, within the following seasonal limitations, TAB work on HVAC systems, which directly transfer thermal energy.

(2) Season of maximum load: Visit the contract site for at least two TAB work sessions for TAB field measurements. Visit the contract site during the season of maximum heating load and visit the contract site during the season of maximum cooling load, the goal being to TAB the operational performance of the heating systems and cooling systems under their respective maximum outdoor environment-caused loading. During the seasonal limitations, TAB the operational performance of the heating systems and cooling systems.

(1) Ambient temperatures: On each tab report form used for recording data, record the outdoor and indoor ambient dry bulb temperature range and the outdoor and indoor ambient wet bulb temperature range within which the report form's data was recorded. That is, record these temperatures at beginning and at the end of data taking.

E. Workmanship: Conduct TAB work on specified HVAC systems until measured parameters are within plus or minus 10 percent of the design values, that is, the values specified or indicated on the contract documents.

F. Deficiencies: Strive to meet the intent of this section to maximize the performance of the equipment as designed and installed. However, if deficiencies in equipment design or installation prevent TAB work from being accomplished within the range of design values provide written notice as soon as possible to the Owner and Engineer describing the deficiency and recommended correction. Responsibility for correction of installation deficiencies is the Mechanical Contractor's. If a deficiency is in equipment design, call the TAB team supervisor for technical assistance. Responsibility for reporting design deficiencies to the Mechanical Contractor is the TAB team supervisor's.

3.1.2 Data From TAB Field Work

After completion of the TAB fieldwork, prepare the TAB field data for TAB supervisor's review and certification. The TAB work and thereby the TAB report shall be considered incomplete until the TAB work is accomplished to within the accuracy range specified in the paragraph titled, "Workmanship".

3.2 MARKING OF SETTINGS

Permanently mark the settings of HVAC adjustment devices including valves, splitters, and dampers so that adjustment can be restored if disturbed at any time. The permanent markings shall indicate the settings on the adjustment devices, which result in the data, reported on the submitted certified TAB report.

3.3 MARKING OF TEST PORTS

The TAB team shall permanently and legibly mark and identify the location points of the duct test ports. If the ducts have exterior insulation, these markings shall be made on the exterior side of the duct insulation.

END OF SECTION 23 09 50

SECTION 26 00 00 - ELECTRICAL GENERAL PROVISIONS

PART 1 - GENERAL

The General and Supplementary conditions, Section 1 and 2 of these specifications, shall apply to and form a part of this section as if written in full herein.

1.1 APPLICABLE CODES AND STANDARDS

All equipment, materials, installation, and workmanship shall be in accordance with the mandatory and advisory provisions of NFPA 70 (National Electrical Code), NFPA 101 (Life Safety Code), other applicable NFPA standards, Standard Building Code, State Requirements for Educational Facilities and all other referenced standards.

1.2 SCOPE OF WORK

The work covered by this section of the specifications shall include the furnishing of all labor, equipment, supplies, tools and materials, and the performance of all operations necessary for the installation of complete wiring systems, lighting, power, connections to equipment specified in other sections, electric service connections, and electrical equipment in strict accordance with this section of the specifications and applicable drawings.

1.3 RELATED WORK SPECIFIED ELSEWHERE

Mechanical - Division 23

1.4 DEFINITIONS

Provide means to furnish and install.

1.5 SUBMITTALS AND WARRANTY

The Contractor shall submit a list of principal material items, giving manufacturers' names and catalog cuts. Approval of the submittal data shall be obtained from the Architect before orders are placed. Submittals shall be furnished as required by the individual sections.

Material submittals shall be all-inclusive with all items requiring submittals being submitted at the same time. Individual submittals will not be accepted. Six sets of submittals are required.

Contractor shall fully instruct Owner in operation and maintenance of electrical system.

Contractor shall assemble and bind manufacturers' operation and maintenance literature for inclusion in Maintenance Manual. Literature shall include record shop drawings, wiring diagrams, instruction sheets, replacement parts list, warranties, and guarantee for all equipment furnished under this section of the specifications. Three sets of such literature shall be provided.

Contractor shall warrant all work for a period of one year from date of substantial completion. Contractor shall rectify any defects due to faulty materials or workmanship and pay for any damage to other work resulting therefrom, which occurs within, said period. Work shall be performed by journeyman skilled in trade involved and with new materials as approved by the Engineer. The Owner will give notice of observed defects with reasonable promptness. The above warranty is in addition to any guarantee of equipment by a manufacturer.

Contractor shall furnish written warranty that all systems have been installed complete and are functioning properly and that all material and workmanship are free from defects.

The General Conditions and special conditions to the overall specifications are made a part of the electrical specifications where applicable.

1.6 DRAWINGS

The drawings are schematic showing relative locations and connections and shall not be scaled for exact locations. Unless specified dimensions are shown, the structural, architectural and site conditions shall govern the exact locations.

Should any difficulty occur in the running of conduits, setting of cabinets, outlets, fixtures or any other devices or connections at the points shown, provide necessary minor deviations therefrom as approved without additional cost.

Where conflicts occur between the requirements of the drawings, specifications, and applicable codes, the Contractor shall provide an installation that conforms with the most stringent requirement and the most expensive procedure.

1.7 AS-BUILT DRAWINGS AND RECORDS

Maintain a complete set of electrical prints for indicating all changes. Use a colored pen or pencil to mark changes at the time of execution. Deliver the set to the Owner's representative upon completion. Elevations and dimensioned locations of underground work shall be indicated. Dimension to permanent references.

1.8 INSTRUCTION TO SCHOOL PERSONNEL

Where specified in the technical sections, furnish the services of competent instructors to give full instruction to designated school personnel in the adjustment, operation, and maintenance of the specified systems and equipment, including pertinent safety requirements as required. Instructors shall be thoroughly familiar with all parts of the installation and shall be trained in operating theory as well as practical operation and maintenance work. Instruction shall be given during the first regular workweek after the equipment or system has been accepted and turned over to the school for regular operation. The number of man-days (8 hours per day) of instruction furnished shall be as specified in the individual section. When significant changes or modifications in the equipment or system are made under the terms of the contract, provide additional instructions to acquaint the operating personnel with the changes or modifications.

PART 2 - PRODUCTS

2.1 MATERIALS

Materials and equipment shall be new, standard current products of manufacturers regularly engaged in the production of such equipment, and shall be the manufacturer's latest design.

All materials shall bear the label of the Underwriter's Laboratory for the intended use or shall be materials approved by the code enforcing authorities and the Engineer.

Materials shall be delivered to the site in the manufacturer's original unopened containers except where prior approval and inspection is obtained from the Engineer. Materials shall be inspected prior to storage. Damaged, defective, or improper equipment shall be replaced or repaired at the expense of the Contractor and in a manner meeting with approval of the Engineer. Electrical cables shall be handled and stored carefully to avoid damage to the insulation and damage from weather. All metallic materials shall be suitably protected against corrosion.

Specific references to any article, device, product, material, fixture, form or type of construction by name, make, or catalog number shall be interpreted as establishing a standard of quality and shall not be construed as limited competition. The Contractor may use any article, device, product, material, fixture, form or type of construction which in the judgement of the Engineer expressed in writing is equal to that specified.

The Contractor shall coordinate sizes indicated for electrical components such as circuit breakers, disconnects, feeders and starters with requirements for equipment actually provided and shall notify the Architect if any item is inadequate in size for equipment installed or proposed. Contractor shall install as a minimum the size indicated unless he receives in writing from the Engineer directions to reduce the component in size. When the equipment to be installed has a requirement, which is greater than shown, the Contractor shall increase the size of the electrical component as work under the section of this specification, which installs the equipment requiring the same.

2.2 HARDWARE

All hardware and accessory fittings shall be of a type designed, intended or appropriate for the use, and complement the items with which they are used, and shall have corrosion protection suitable for the atmosphere in which they are installed. All such hardware shall be U.S. Standard sizes.

2.3 EQUIPMENT

Equipment of a similar nature shall be identical. Example: All safety switches shall be of the same manufacturer and of the same style.

2.4 MATERIAL PROTECTIONS

Store and protect all materials from injury prior to installation. Materials shall not be stored directly on the ground or floor, shall be kept clean and dry as possible and free from damage or deteriorating elements. Damaged materials shall not be installed.

PART 3 - EXECUTION

3.1 INSTALLATION

All work will be installed in accordance with regulations of the NFPA 70 National Electrical Code and ordinances of the state and local governments.

Contractor shall obtain all necessary permits and inspections as required and pay all charges for same, and shall turn over to the Architect Certificate of final inspection. Should any part of the design fail to comply with such requirements, discrepancy shall be called to the attention of the Engineer prior to submission of bid.

Follow the installation directions and recommendations of the material and equipment manufacturers.

Materials damaged during installation shall be repaired to a new condition or shall be replaced. Finishes on equipment, which have been scratched or marred shall be touched up to match finish or shall be completely refinished.

3.2 SCHEDULING OF WORK

Electrical feeders, branch, wiring, signal wiring, or other similar work shall be scheduled to correspond with the sequence of work necessary to construct new work.

Electrical work shall be scheduled to provide an orderly installation without causing any delays in the overall construction of the project.

3.3 IDENTIFICATION

Identify all equipment as to its source, its use and what it serves and characteristics. Equipment includes safety switches, starters, transformers, panels, terminal boxes, motors and special outlets. Identification shall correspond to the terminology of the Contract Documents.

Use Brady markers on conductors. Use Manufacturer's nameplates and directories where available. Use of Dymo Labels will not be permitted. Use phenolic nameplates 0.125-inch thick with ¼" white letters on black background. Nameplates shall be attached to equipment with screws.

3.4 TEMPORARY SERVICE AND SUPERVISION

Temporary power and construction lighting shall be provided as needed under this section of the specifications. Both shall be provided in a safe and sufficient manner for the orderly completion of the work. The cost of power shall be paid for by the general contractor.

All work shall be performed under the direct supervision of a journeyman electrician.

3.5 SITE VISIT

The Contractor is encouraged to visit the proposed job site prior to bid, as modifications to existing facilities necessary to accommodate new work are part of this contract.

3.6 UNDERGROUND SERVICE

Gulf Power Company is to receive compensation for their work as part of this contract and will be paid by the Contractor. This sum will be for the difference in cost between a normal overhead service installation and the cost of the underground service, as designed.

The Contractor shall, prior to bidding, affirm with the Power Company that the location, arrangement and connection to electric utility service as well as required metering equipment is in accordance with the requirements of the Power Company. If they are at variance with these drawings or specifications, their requirements shall take precedence over these drawings and specifications, and the contract price shall include all costs necessary to meet these requirements without extra cost to the Owner after a contract is entered into. Any variances noted prior to bidding shall be brought to the attention of the Engineer.

Cost Difference: The Contractor shall include in his bid a cost payable to Gulf Power Company for cost difference between overhead and underground service. This cost figure will be provided in an addendum.

END OF SECTION 26 00 00

SECTION 26 20 00 - LOW-VOLTAGE SWITCHBOARD

PART 1 - GENERAL

1.1 DESCRIPTION OF WORK:

This section includes the furnishing of a low-voltage switchboard, instruments, interconnection wiring and accessories, and concrete pad for complete installation ready for operation.

1.2 RELATED REQUIREMENTS

Section 26 01 00, "Electrical General Provisions," applies to this section, with the additions and modifications specified herein.

1.3 SUBMITTALS

Submit the following in accordance with Section, "Submittals."

1.3.1 Manufacturer's Catalog Data

a. Switchboard

Each submittal shall include data on fuses, circuit breakers, switches, meters, instrument transformers, surge arresters, and associated accessories.

1.3.2 Drawings:

a. Switchboards

Furnish drawings that include, but are not limited to, the following:

Overall dimensions, front view, and sectional views.

Ampere ratings of bus bars.

Maximum short-circuit bracing.

Circuit breaker type, interrupting rating, trip setting.

Ratings and sizes of lugs, impedance, and taps.

Provisions for future extension.

Elementary diagrams and wiring diagrams with terminals identified, and indicating prewired interconnections between items of equipment and the interconnection between the items.

1.3.3 Operation and Maintenance Manuals

a. Switchboard

Submit Operation and Maintenance Manuals in accordance with Section, "Operation and

Maintenance Data."

PART 2 - PRODUCTS

2.1 PRODUCT COORDINATION

Products and materials not considered to be switchboards and related accessories are specified in Section 16402, "Interior Wiring Systems".

2.2 SWITCHBOARDS

NEMA PB 2, dead-front, metal-enclosed, self-supported type. Main bus shall be rated as indicated on the drawings. Switchboard shall be UL listed as service entrance equipment. Devices shall be front accessible and shall be completely isolated between sections by vertical steel barriers. Align sections of switchboard so that the back of the complete structure may be placed flush against a wall. Provide switchboard in NEMA ICS 6 Type 1 enclosure. Switchboard shall be completely factory engineered and assembled, including protective devices and equipment indicated with necessary interconnections, instrumentation, and control wiring. Switchboard shall consist of main and distribution sections. Switchboard shall have provisions for future extension.

A. Bus Bars: Aluminum with tin-plated contact surfaces. Plating shall be a minimum of 0.0002 inch thick. Make bus connections and joints with hardened steel bolts. Additionally, use pressure (Belleville) washers on aluminum bus connections and joints. A full-capacity (100% rated) bus shall connect sections together, with provisions for future expansion. Buses shall be completely insulated from the devices so that the only exposed energized parts will be at the point of connection to devices. Locate each bus horizontally in the rear of each section behind the components and vertically centered. Support and brace the buses for the short-circuit current specified. Provide and secure ground bus to each vertical switchboard section and extend ground bus to the entire length of the structure. Size neutral bus 100 percent of full load amperes. The ground bus shall be sized per UL Standard 891 and be of the same material as the through bus.

B. Main Protective Device: Individually mounted stationary main circuit breaker removable from the front of the switchboard.

1. Molded-Case Circuit Breaker: UL 489. Manually operated, rated as indicated, with a minimum short-circuit-current rating equal to the short-circuit-current rating of the switchboard in which the circuit breaker will be mounted. Series rated circuit breakers are unacceptable. Breaker shall be equipped with solid-state trips, with current sensors and solid-state logic circuits integral to the circuit breaker frame. The solid-state current control shall provide adjustable ampere setting, adjustable long time delay, short time delay, ground fault and adjustable instantaneous trip. Settings shall be located behind cover to deter tampering.

C. Digital Meters

IEEE C37.90.1 for surge withstand. Provide true rms, plus/minus one percent accuracy, programmable, microprocessor-based meter enclosed in sealed cases with a simultaneous three line, twelve value LED display. Meters shall have 0.56 inch, minimum, LEDs. The meters shall accept input from standard 5A secondary instrument transformers and direct voltage monitoring range to 600 volts, phase to phase. Programming shall be via a front panel display and a communication interface with a computer. Password secured programming shall be stored in non-volatile EEPROM memory. Digital communications shall be Modbus ASCII protocol via a RS485 serial port and an independently addressable RS485 serial port. The meter shall calculate and store average max/min demand values for all

readings based on a user selectable sliding window averaging period. The meter shall have programmable hi/low set limits with two Form C dry contact relays when exceeding alarm conditions. Meter shall provide Total Harmonic Distortion (THD) measurement to the thirty-first order. Historical trend logging capability shall include ability to store up to 100,000 data points with intervals of 1 second to 180 minutes. The unit shall also store and time stamp up to 100 programmable triggered conditions. Event waveform recording shall be triggered by the rms of 2 cycles of voltage or current exceeding programmable set points. Waveforms shall be stored for all 6 channels of voltage and current for a minimum of 10 cycles prior to the event and 50 cycles past the event.

1. Multi-Function Meter: Meter shall simultaneously display a selected phase to neutral voltage, phase to phase voltage, percent phase to neutral voltage THD, percent phase to phase voltage THD; a selected phase current, neutral current, percent phase current THD, percent neutral current; selected total PF, kW, KVA, kVAR, FREQ, kVAh, kWh. Detected alarm conditions include over/under current, over/under voltage, over/under KVA, over/under frequency, over/under selected PF/kVAR, voltage phase reversal, voltage imbalance, reverse power, over percent THD. The meter shall have a Form C KYZ pulse output relay.

2. Power Meter: Meter shall simultaneously display Watts, VARs, and selected KVA/PF. Detected alarm conditions include over/under KVA, over/under PF, over/under VARs, over/under reverse power.

3. Volt Meter: Meter shall be selectable between simultaneous display of the three phases of phase to neutral voltages and simultaneous display of the three phases of the phase to phase voltages. Detected alarm conditions include over/under voltage, over/under voltage imbalance, over percent THD.

4. Ammeter: Meter shall simultaneously display phase A, B, and C currents. Detected alarm conditions include over/under current, over percent THD.

5. Digital Watthour Meter: Meter shall have a single selectable display for watts, total kilowatt hours (kWh) and watt demand (Wd). The meter shall have a Form C KYZ pulse output relay.

D. Distribution Section: Provide group mounted devices arranged to allow removal and interchanging from the front of the switchboard without disturbing adjacent devices. Where indicated, "space for future" or "space" shall mean to include bus, device supports, and connections. Group mounted devices shall be mounted in a panelboard arrangement.

1. Feeder Breakers: Molded-case type of sizes and capacity indicated. Breakers shall have a minimum short-circuit-current rating equal to the short-circuit-current rating of the switchboard in which the breaker will be mounted. Series rated breakers are unacceptable.

E. Finish: Light gray No. 61 or No. 49 in accordance with ASTM D 1535 for exterior surfaces of switchboard assembly.

F. Insulated Barriers

Where insulated barriers are required by reference standards, provide barriers in accordance with

NEMA LI 1, Type GPO-3, 0.25-inch minimum thickness.

G. Corrosion Protection

Bases, frames, and channels of and switchboard which come in contact with concrete shall be corrosion resistant and shall be fabricated of hot-dip galvanized steel.

1. Galvanized Steel

ASTM A 123, ASTM A 525 G90 coating, and ASTM A 153, as applicable. Galvanize after fabrication where practicable. Galvanizing repair paint shall conform to DOD-P-21035.

H. Terminal Boards

Provide with engraved plastic terminal strips and screw type terminals for external wiring between components and for internal wiring between removable assemblies. Terminal boards associated with current transformers shall be short-circuiting type. Terminate conductors for current transformers with ring-tongue lugs. Terminal board identification shall be identical in similar units. External wiring shall be color coded consistently for similar terminal boards.

I. Wire Marking

Mark control and metering conductors at each end. Provide factory-installed, white, plastic tubing, heat stamped with black block type letters on factory-installed wiring. On field-installed wiring, provide white, preprinted, polyvinyl chloride (PVC) sleeves, heat stamped with black block type letters. Each sleeve shall contain a single letter or number, shall be elliptically shaped to securely grip the wire, and shall be keyed in such a manner to ensure alignment with adjacent sleeves. Provide specific wire markings using the appropriate combination of individual sleeves. Each wire marker shall indicate the device or equipment, including specific terminal number to which the remote end of the wire is attached.

2.3 NAMEPLATES

Provide as specified in Section 16010, "Electrical General Provisions."

2.4 AVAILABLE FAULT CURRENT

Service Entrance Equipment shall be legibly marked in the field with the maximum available fault current, in accordance with article 110.24 of the National Electrical Code (NEC).

PART 3 - EXECUTION

3.1 INSTALLATION

Electrical installations shall conform to ANSI C2, NFPA 70, and to the requirements specified herein.

3.2 GROUNDING

NFPA 70 and ANSI C2.

A. Grounding and Bonding Equipment

UL 467, except as indicated or specified otherwise.

3.3 INSTALLATION OF EQUIPMENT AND ASSEMBLIES

Install and connect switchboards furnished under this section as indicated on project drawings, the approved shop drawings, and as specified herein.

A. Switchboard

NEMA PB 2.1.

B. Meters and Instrument Transformers

ANSI C12.1.

C. Galvanizing Repair

ASTM A 780, using galvanizing repair paint for galvanizing damaged by handling, transporting, cutting, welding, or bolting. Do not heat surfaces that repair paint has been applied to.

3.4 FOUNDATION FOR EQUIPMENT AND ASSEMBLIES

A. Interior Location

Mount switchboard on concrete slab. Unless otherwise indicated, the slab shall be at least 4 inches thick. The top of the concrete slab shall be approximately 4 inches above finished floor. Edges above floor shall have 1/2-inch chamfer. The slab shall be of adequate size to project at least 8 inches beyond the equipment. Provide conduit turnups and cable entrance space required by the equipment to be mounted. Seal voids around conduit openings in slab with water- and oil-resistant caulking or sealant. Cut off and bush conduits 3 inches above slab surface.

3.5 FIELD QUALITY CONTROL

A. Performance of Acceptance Checks and Tests

Perform in accordance with the manufacturer's recommendations, NFPA 70B, NETA ATS, and referenced ANSI standards. Perform visual and mechanical inspections and electrical tests specific to instrument transformers, and grounding system in accordance with NETA ATS. Perform tests to obtain information about the performance of the breakers, meters, wiring, and instrument transformers together as a unit, as well as separately. Remove wedges, ties, and blocks installed by the manufacturer to prevent damage during shipment. Perform changes of connection, insertion, and removal of instruments and meters so that the secondary circuits of energized current transformers are not opened momentarily.

B. Follow-up Verification

Upon completion of acceptance checks, settings, and tests, the Contractor shall show by demonstration in service that circuits and devices are in good operating condition and properly performing the intended function. Circuit breakers shall be tripped by operation of each protective device. Test shall require each item to perform its function not less than three times. As an exception to requirements stated elsewhere in the contract, the Architect shall be given 5 working days' advance notice of the dates and times for checks, settings, and tests.

END OF SECTION 26 20 00

SECTION 26 40 20 - INTERIOR WIRING SYSTEMS

PART 1 - GENERAL

1.1 RELATED REQUIREMENTS

Section 26 00 10, "Electrical General Provisions," applies to this section with additions and modifications specified herein.

1.2 SUBMITTALS

Submit the following in accordance with Section "Submittals."

A. Manufacturer's Catalog Data

1. Receptacles
2. Circuit breakers
3. Switches
4. Conduit and fittings (each type)
5. Device plates
6. Insulated conductors
7. Outlet, junction boxes, and pull boxes
8. Transformers

B. Drawings

1. Panelboards
2. Transformers

C. Field Test Reports

1. 600-volt wiring test
2. Grounding System Test

1.3 QUALITY ASSURANCE

In each standard referred to herein, consider the advisory provisions to be mandatory, as though the word "shall" has been substituted for "should" wherever it appears. Interpret references in these standards to "authority having jurisdiction," or words of similar meaning, to mean The Architect.

PART 2 - PRODUCTS

2.1 MATERIALS AND EQUIPMENT

Materials, equipment, and devices shall, as minimum, meet requirements of UL, where UL standards are established for those items, and requirements of NFPA 70 2005 Edition.

2.2 CONDUIT AND FITTINGS

Shall be rigid steel (zinc-coated) conduit, rigid nonmetallic conduit, intermediate metal conduit (IMC), electrical metallic tubing (EMT), plastic coated rigid steel and IMC conduit, and flexible metal conduit, liquid tight flexible conduit, conforming to the following:

A. Rigid Steel Conduit (Zinc-coated)

ANSI C80.1, UL 6.

B. Rigid Nonmetallic Conduit

PVC Type EPC-40, in accordance with NEMA TC2.

C. Intermediate Metal Conduit (IMC)

UL 1242, zinc-coated steel only.

D. Electrical Metallic Tubing (EMT)

UL 797, ANSI C80.3.

E. Plastic-coated Rigid Steel and IMC Conduit

NEMA RN1, Type 40 (40 mils thick).

F. Flexible Metal Conduit
UL 1.

G. Liquid-tight Flexible Metal Conduit, Steel
UL 360.

H. Fittings for Metal Conduit, EMT, and Flexible Metal Conduit

UL 514B. Ferrous fittings shall be cadmium- or zinc-coated in accordance with UL 514B.

1. Fittings for Rigid Metal Conduit and IMC Threaded-type. Split couplings unacceptable.

2. Fittings for EMT

All steel Compression type. (set screw fittings will not be accepted).

3. Fittings for Rigid Nonmetallic Conduit

NEMA TC3.

I. All conduit shall be color-coded every 10 feet.

2.3 OUTLET BOXES AND COVERS

UL 514A, cadmium- or zinc-coated, if ferrous metal. UL 514C, if nonmetallic.

A. Floor Outlet Boxes

Boxes shall be adjustable and concrete tight. Each outlet shall consist of cast-metal body with threaded openings for conduits, adjustable ring, brass flange ring, and cover plate with ¾ inch threaded plug. Telephone outlets shall consist of surface-mounted, horizontal aluminum or stainless steel housing with one-inch bushed side opening; outlets shall have provisions to accommodate 10-wire telephone terminal block. Receptacle outlets shall consist of surface-mounted, horizontal aluminum or stainless steel housing with duplex-type receptacle. Provide gaskets where necessary to ensure watertight installation.

2.4 CABINETS, JUNCTION BOXES, AND PULL BOXES

Volume greater than 100 cubic inches, UL 50, hot dip, zinc-coated, if sheet steel. All junction boxes shall have circuit numbers identified on cover and color-coded as follows:

White	208Y/120 volt
Orange	480 Volt

2.5 WIRES AND CABLES

Wires and cables shall meet applicable requirements of NFPA 70 2005 Edition and UL for type of insulation, jacket, and conductor specified or indicated. Wires and cables manufactured more than 12 months prior to date of delivery to site shall not be used.

A. Conductors

Conductors' No. 8 AWG and larger diameter shall be stranded. Conductors' no. 10 AWG and smaller diameter shall be solid, except that conductors for remote control and signal circuits, classes 1, 2, and 3, may be stranded. All conductors shall be copper.

1. Minimum Conductor Sizes

Minimum size for branch circuits shall be No. 12 AWG; for Class 1 remote control and signal circuits, No. 14 AWG; and for Class 2 low-energy, remote control and signal circuits, No. 16 AWG.

B. Color Coding

Provide for service, feeder, branch, control, and signaling circuit conductors. Color shall be green for grounding conductors and white for neutrals; except where neutrals of more than one system are installed in same raceway or box, other neutral shall be white with colored (not green) stripe. Color of ungrounded conductors in different voltage systems shall be as follows:

1. 208/120 volt, 3-phase:

(a) Phase A - black

(b) Phase B - red

(c) Phase C - blue.

2. 480/277 volt, 3-phase

(a) Phase A – Brown

(b) Phase B – Orange

(c) Phase C – Yellow

C. Insulation

Unless specified or indicated otherwise or required by NFPA 70 2005 Edition, power and lighting wires shall be 600-volt, Type THWN conforming to -UL 83- or Type RHW conforming to -UL 44-, except that grounding wire may be Type TW conforming to -UL 83-; remote-control and signal circuits shall be Type TW or TF, conforming to UL 83. Where lighting fixtures require 90-degree Centigrade (C) conductors, provide only conductors with 90-degree C insulation or better.

D. Bonding Conductors

ASTM B1, solid bare copper wire for sizes No. 8 AWG and smaller diameter; ASTM B8, Class B, stranded bare copper wire for sizes No. 6 AWG and larger diameter.

2.6 SPLICES AND TERMINATION COMPONENTS

UL 486A for wire connectors and UL 510 for insulating tapes. Connectors for No. 10 AWG and smaller diameter wires shall be insulated, pressure-type in accordance with UL 486A or UL 486C (twist-on splicing connector). Provide solderless terminal lugs on stranded conductors.

2.7 DEVICE PLATES

Provide UL listed one-piece device plates for outlets and fittings to suit the devices installed. For metal outlets and fittings, plates on unfinished walls and on fittings shall be of zinc-coated sheet steel or cast metal having round or beveled edges. Plates on finished walls shall be satin finish stainless steel, minimum 0.03-inch thick. Screws shall be vandal-resistant machine-type with countersunk heads in color to match finish of plate. Sectional-type device plates will not be permitted. Plates installed in wet locations shall be gasketed and UL listed for "wet locations”.

2.8 SWITCHES

A. Toggle Switches

FS W-S-896 totally enclosed with bodies of thermosetting plastic and mounting strap. Handles shall be ivory. Wiring terminals shall be screw-type, side-wired. Switches shall be rated quiet-type ac only, 120/277 volts, with current rating and number of poles indicated.

B. Disconnect Switches

NEMA KS1. Provide heavy duty-type switches. Switches serving, as motor-disconnect means shall be horsepower rated. Provide switches in NEMA 1 or 3R, enclosure per -NEMA ICS 6-.

2.9 RECEPTACLES

UL 498 and NEMA WD1, general grade, heavy-duty grounding-type. Ratings and configurations shall be as indicated. Dimensional requirements shall be per -NEMA WD 6. Provide screw-type, side-wired wiring terminals. Connect grounding pole to mounting strap.

A. Weatherproof Receptacles

Provide in cast metal box with gasketed, weatherproof, cast-metal cover plate and gasketed cap over each receptacle opening. Provide caps with a spring-hinged flap. Provide UL listed receptacle in "wet locations."

B. Ground-fault Circuit Interrupter (GFCI) Receptacles

UL 943, duplex type for mounting in standard outlet box. Device shall be capable of detecting current leak of 6 milliamperes or greater and tripping per requirements of UL 943 for Class A GFCI devices.

2.10 PANELBOARDS

UL 67 and UL 50. Panelboards for use as service disconnecting means shall additionally conform to UL 869. Panelboards shall be circuit breaker-equipped. Design shall be such that individual breakers can be removed without disturbing adjacent units or without loosening or removing supplemental insulation supplied as means of obtaining clearances as required by UL. Where "space only" is indicated, make provisions for future installation of breaker sized as indicated. Panelboard locks shall be keyed same. Directories shall indicate load served by each circuit of panelboard. Directories shall also indicate source of service to panelboard. Type directories and mount in holder behind transparent protective covering. Provide nameplates for panelboards rated for use on non-linear loads to read “SUITABLE FOR NON-LINEAR LOADS”.

A. Panelboard Buses

Support bus bars on bases independent of circuit breakers. Main buses and back pans shall be designed so that breakers may be changed without machining, drilling, or tapping. Provide isolated neutral bus in each panel for connection of circuit neutral conductors. Provide separate ground bus identified as equipment grounding bus per UL 67 for connecting grounding conductors; bond to steel cabinet. In addition to equipment grounding bus, provide second "isolated" ground bus, where indicated. Panelboard neutrals for Non-Linear Loads shall be heat rise tested in accordance with UL 67, except with the neutral assembly installed and carrying 200 percent of the phase current during testing. Two neutral assemblies paralled together with cable is not acceptable.

B. Circuit Breakers

FS W-C-375, UL 489, thermal magnetic-type with interrupting capacity as indicated. Breaker terminals shall be UL listed as suitable for type of conductor provided. Plug-in circuit breakers unacceptable.

1. Multipole Breakers

Provide common trip-type with single operating handle. Breaker design shall be such that overload in one pole automatically causes all poles to open. Maintain phase sequence throughout each panel so that any three adjacent breaker poles are connected to Phases A, B, and C, respectively.

2. Ground Fault Circuit Interrupters

UL 943. Breakers equipped with ground fault circuit interrupters shall have ground fault class, interrupting capacity, and voltage and current ratings as indicated.

2.11 TRANSFORMERS

NEMA ST20, general purpose, dry-type, self-cooled, ventilated. Provide transformers in NEMA 1 enclosure. Transformer shall have 220 degrees C insulation system, with temperature rise not exceeding 115 degrees C under full-rated load in maximum ambient of 40 degrees C. Transformer of 150 degrees C temperature rise shall be capable of carrying continuously 100 percent of nameplate kVA without exceeding insulation rating. Transformers shall be quiet type with maximum sound level

of minimum 3 decibels less than NEMA standard level for transformer ratings indicated.

Provide transformers for non-linear loads in accordance with the following:

a. Transformer insulation: UL recognized 220 degrees C system. Neither the primary nor the secondary temperature is allowed to exceed 220 degrees C at any point in the coils while carrying their full rating of non-sinusoidal load.
b. Transformers are to be UL listed and labeled for K-13 in accordance with UL 1561.
c. Transformers evaluated by the UL K-Factor evaluation: Listed for 115 degrees C average temperature rise only.
d. Transformers with K-Factor ratings with temperature rise of 150 degrees C rise are not acceptable.
e. K-Factor rated transformers impedance: Allowed range of 3 percent to 5 percent, with a minimum reactance of 2 percent to prevent excessive neutral current when supplying loads with large amounts of third harmonic.

2.12 GROUNDING AND BONDING EQUIPMENT

UL 467.

2.13 NAMEPLATES

FS L-P-387. Provide as specified in Section "Electrical General Provisions."

2.14 SOURCE QUALITY CONTROL

Provide firestopping around electrical penetrations in accordance with Section "Firestopping."

2.15 WARNING SIGNS

Provide warning signs for flash protection in accordance with NFPA 70, NFPA 70E and NEMA z535.4 for switchboards and panelboards. Provide calculations for arc flash study with submittals. Provide field installed signs to warn qualified persons of potential electric arc flash hazards when warning signs are not provided by the manufacturer. The marking shall be clearly visible to qualified persons before examination, adjustment, servicing, or maintenance of the equipment.

PART 3 - EXECUTION

3.1 INSTALLATION

Electrical installations shall conform to requirements of NFPA 70 and to requirements specified herein.

A. Wiring Methods

Provide insulated conductors installed in conduit, except where specifically indicated or specified otherwise or required by NFPA 70 2011 Edition to be installed otherwise. Provide insulated, green equipment grounding conductor in feeder and branch circuits, including lighting circuits. Grounding conductor shall be separate from electrical system neutral conductor. Provide bare or insulated, green conductor for grounding conductors installed in conduit or raceways. Minimum conduit size shall be ¾ inches in diameter for lighting and power circuits.

1. Restrictions Applicable to EMT:

a. Do not install underground.

b. Do not encase in concrete.

c. Do not use in areas subject to severe physical damage including but not limited to mechanical equipment rooms and electrical equipment rooms.

d. Do not use outdoors.

2. Nonmetallic Conduit

a. PVC Schedule 40 and PVC Schedule 80.

(1) Do not use above finished grade or floor slab.

3. Underground Conduit

Plastic-coated rigid steel; plastic-coated steel IMC; PVC, Type EPC-40. Convert nonmetallic conduit to rigid steel conduit or steel IMC before rising through floor slab.

4. Conduit in Floor Slabs

Rigid steel; steel IMC; fiberglass, or PVC, Type EPC-40.

B. Conduit Installation

Unless indicated otherwise, conceal conduit within finished walls, ceilings, and floors. Keep conduit minimum 6 inches away from parallel runs of flues and steam or hot water pipes. Install conduit parallel with or at right angles to ceilings, walls, and structural members where located above accessible ceilings and where conduit will be visible after completion of project. Run conduits in crawl space under slab as if exposed.

1. Conduit Through Floor Slabs

Where conduits rise through floor slabs, curved portion of bends shall not be visible above finish slab.

2. Conduit Support

Support conduit by 2-hole pipe straps, wall brackets, hangers, or ceiling trapeze. Fasten by wood screws to wood; by toggle bolts on hollow masonry units; by concrete inserts or expansion bolts on concrete or brick; and by machine screws, welded threaded studs, or spring-tension clamps on steelwork. Threaded C-clamps may be used on rigid steel conduit only. Do not weld conduits or pipe straps to steel structures. Load applied to fasteners shall not exceed one-fourth proof test load. Fasteners attached to concrete ceiling shall be vibration-resistant and shock-resistant. Holes cut to depth of more than 1 2 inches in reinforced concrete beams or to depth of more than: inch in concrete joints shall not cut main reinforcing bars. Fill unused holes. In partitions of light steel construction, use sheet metal screws. In suspended-ceiling construction, run conduit above ceiling. Do not support conduit by ceiling support system. Conduit and box systems must be supported independently of both (a) tie wires supporting ceiling grid system, and (b) ceiling grid system into which ceiling panels are placed. Supporting means shall not be shared between electrical raceways and mechanical piping or ducts. Installation shall be coordinated with above-ceiling mechanical systems to assure maximum accessibility to all systems. Where conduit crosses building expansion joints, provide suitable watertight expansion fitting that maintains conduit electrical continuity by bonding

jumpers or other means.

3. Directional Changes in Conduit Runs

Make changes in direction of runs with symmetrical bends or cast-metal fittings. Make field-made bends and offsets with hickey or conduit-bending machine. Do not install crushed or deformed conduits. Avoid trapped conduits. Prevent plaster, dirt, or trash from lodging in conduits, boxes, fittings, and equipment during construction. Free clogged conduits of obstructions.

4. Pull Wire

Install pull wires in empty conduits in which wire is to be installed by others. Pull wire shall be plastic having minimum 200-pound tensile strength. Leave minimum 12 inches of slack at each end of pull wire.

5. Locknuts and Bushings

Fasten conduits to sheet metal boxes and cabinets with two locknuts where required by NFPA 70 2005 Edition, where insulated bushings are used, and where bushings cannot be brought into firm contact with the box; otherwise, use at least minimum single locknut and bushing. Locknuts shall have sharp edges for digging into wall of metal enclosures. Install bushings on ends of conduits, and provide insulating type where required by NFPA 70 2005 Edition.

6. Stub-ups

Provide conduits stubbed up through concrete floor for connection to freestanding equipment with adjustable top or coupling threaded inside for plugs, set flush with finished floor. Extend conductors to equipment in rigid steel conduit, except that flexible metal conduit may be used 6 inches above floor. Where no equipment connections are made, install screwdriver-operated threaded flush plugs in conduit end.

7. Flexible Connections

Provide flexible connections of short length, 6-foot maximum, for recessed and semirecessed lighting fixtures; for equipment subject to vibration, noise transmission, or movement; and for motors. Install flexible conduit to allow slack. Provide liquid-tight flexible conduit in wet locations. Provide separate ground conductor across flexible connections.

C. Boxes, Outlets, and Supports

Provide boxes in wiring or raceway systems wherever required for pulling of wires, making connections, and mounting of devices or fixtures. Boxes for metallic raceways shall be cast-metal, hub-type when located in wet locations, when surface mounted on outside of exterior surfaces, when installed exposed up to 7 feet above interior floors. Boxes in other locations shall be sheet steel. Each box shall have volume required by NFPA 70 2005 Edition for number of conductors enclosed in box. Boxes for mounting lighting fixtures shall be minimum 4 inches square, or octagonal, except that smaller boxes may be installed as required by fixture configurations, as approved. Boxes for use in masonry-block or tile walls shall be square-cornered, tile-type, or standard boxes having square-cornered, tile-type covers. Provide gaskets for cast-metal boxes installed in wet locations and boxes installed flush with outside of exterior surfaces. Provide separate boxes for flush or recessed fixtures when required by fixture terminal operating temperature; fixtures shall be readily removable for

access to boxes unless ceiling access panels are provided. Support boxes and pendants for surface-mounted fixtures on suspended ceilings independently of ceiling supports, or make adequate provisions for distributing load over ceiling support members in an approved manner. Fasten boxes and supports with wood screws on wood, with bolts and expansion shields on concrete or brick, with toggle bolts on hollow masonry units, and with machine screws or welded studs on steel. Threaded studs driven in by powder charge and provided with lockwashers and nuts or nail-type nylon anchors may be used in lieu of wood screws, expansion shields, or machine screws. In open overhead spaces, cast boxes threaded to raceways need not be separately supported except where used for fixture support; support sheet metal boxes directly from building structure or by bar hangers. Where bar hangers are used, attach bar to raceways on opposite sides of box, and support raceway with approved-type fastener maximum 24 inches from box. When penetrating reinforced concrete members, avoid cutting reinforcing steel.

1. Boxes

   Boxes for use with raceway systems shall be minimum 1-½" deep, except where shallower boxes required by structural conditions are approved. Boxes for other than lighting fixture outlets shall be minimum 4 inches square, except that 4-by-2-inch boxes may be used where only one raceway enters outlet.

2. Pull Boxes

   Construct of at least minimum size required by NFPA 70 2005 Edition of code-gauge galvanized sheet steel, except where cast-metal boxes are required in locations specified herein. Furnish boxes with screw-fastened covers. Where several feeders pass through common pull box, tag feeders to indicate clearly electrical characteristics, circuit number, and panel designation.

D. Mounting Heights

Mount panelboards, circuit breakers, and disconnecting switches so height of operating handle at its highest position is maximum 78 inches above floor. Mount lighting switches 44 inches above finished floor, receptacles 18 inches above finished floor, and other devices as indicated. Measure mounting heights of wiring devices and outlets to center of device or outlet.

E. Conductor Identification

Provide conductor identification within each enclosure where tap, splice, or termination is made. For conductors No. 6 AWG and smaller diameter, color-coding shall be by factory-applied, color-impregnated insulation. For conductors No. 4 AWG and larger diameter color-coding shall be by plastic-coated, self-sticking markers; colored nylon cable ties and plates; or heat shrink-type sleeves. Identify control circuit terminations in accordance with Section "Space Temperature Control Systems."

F. Splices

Make splices in accessible locations. Make splices in conductors No. 10 AWG and smaller diameter with insulated, pressure-type connector. Make splices in conductors No. 8 AWG and larger diameter with solderless connector, and cover with insulation material equivalent to conductor insulation.

G. Covers and Device Plates

Install with edges in continuous contact with finished wall surfaces without use of mats or

similar devices. Plaster fillings are not permitted. Install plates with alignment tolerance of 1/16 inch. Use of sectional-type device plates are not permitted. Provide gasket for plates installed in wet locations.

H. Electrical Penetrations

Openings around electrical penetrations through fire resistance-rated walls, partitions or ceilings shall be sealed in accordance with Section Firestopping."

I. Grounding and Bonding

In accordance with NFPA 70 2005 Edition, ground-exposed, non-current-carrying metallic parts of electrical equipment, metallic raceway systems, grounding conductor in metallic and nonmetallic raceways, and neutral conductor of wiring systems. Make ground connection at main service equipment.

1. Grounding Conductor

Provide bare or insulated, green equipment grounding conductor in feeder and branch circuits, including lighting circuits. Grounding conductor shall be separate from electrical system neutral conductor. Provide bare or insulated, green conductor for grounding conductors installed in conduit or raceways.

2. Resistance

Maximum resistance-to-ground of grounding system shall not exceed 10 ohms under dry conditions. Where resistance obtained exceeds 10 ohms, contact the Architect for further instructions.

3.2 FIELD QUALITY CONTROL

Furnish test equipment and personnel and submit written copies of test results. Give Contracting Officer working days notice prior to each test.

A. Devices Subject to Manual Operation

Each device subject to manual operation shall be operated at least five times, demonstrating satisfactory operation each time.

B. 600-Volt Wiring Test

Test 600-volt wiring to verify that no short circuits or accidental grounds exist. Perform insulation resistance tests on wiring No. 6 AWG and larger diameter using instrument, which applies voltage of approximately 500 volts to provide direct reading of resistance. Minimum resistance shall be 250,000 ohms.

C. Grounding System Test

Test grounding system to ensure continuity and that resistance to ground does not exceed 10 ohms. Test each ground rod for resistance to ground before making connections to rod; tie grounding system together and test for resistance to ground. Make resistance measurements in dry weather, not earlier than 48 hours after rainfall. Submit written results of test to the Architect.

END OF SECTION 16402

SECTION 26 51 00 - INTERIOR LIGHTING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes interior lighting fixtures, lamps ballasts, emergency lighting units, and accessories. This Section covers also exterior fixtures mounted on building surfaces.

B. Related Sections: The following Division 16 Sections contain requirements that relate to this section:

1. Section 26 01 00, "Electrical General Provisions," applies to this section, with the additions and modifications specified herein.

2. Materials not considered to be lighting equipment or lighting fixture accessories are specified in Section 26 40 20, "Interior Wiring Systems."

1.3 DEFINITIONS

A. Average Life

Time after which 50 percent will have failed and 50 percent will have survived under normal conditions.

1.4 SUBMITTALS

Submit the following in accordance with Section "Submittals." Data, drawings, and reports shall employ the terminology, classifications, and methods prescribed by the IES LHBK, as applicable, for the lighting system specified.

A. Manufacturer's Catalog Data

1. Fluorescent lighting fixtures
2. Fluorescent lamps
3. Fluorescent core and coil ballasts
4. High-Intensity-Discharge (HID) lighting fixtures
5. HID Ballasts
6. Support hangers for lighting fixtures

PART 2 - PRODUCTS

2.2 HIGH-INTENSITY-DISCHARGE (HID) LIGHTING FIXTURES

UL 1572.

A. HID Ballasts

UL 1029 and ANSI C82.4 and shall be constant wattage auto- transformer (CWA) or

regulator, high power factor type. Provide single-lamp ballasts, which shall have a minimum starting temperature of minus 30 degrees C. Ballasts shall be:

1. Designed to operate on the voltage system to which they are connected.

2. Designed for installation in a normal ambient temperature of 40 degrees C.

3. Constructed so that open circuit operation will not reduce the average life.

2.3 RECESS- AND FLUSH-MOUNTED FIXTURES

Provide type that can be relamped from the bottom. Access to ballast shall be from the bottom. Trim for the exposed surface of flush-mounted fixtures shall be as indicated.

2.4 SUSPENDED FIXTURES

Provide hangers capable of supporting twice the combined weight of the fixtures supported by the hangers. Hangers shall allow fixtures to swing within an angle of 20 degrees. Brace pendants 4 feet or longer to limit swinging. Single-unit suspended fluorescent fixtures shall have twin-stem hangers. Multiple-unit or continuous row fluorescent fixtures shall have a tubing or stem for wiring at one point and a tubing or rod suspension provided for each unit length of chassis, including one at each end. Rods shall be a minimum 3/16-inch diameter.

2.5 EXIT SIGNS

UL 924, NFPA 70, and NFPA 101. Exit signs shall be self-powered type.

2.6 SUPPORT HANGERS FOR LIGHTING FIXTURES IN SUSPENDED CEILINGS

A. Wires

ASTM A 853, composition 1010, annealed, light zinc-coated finish, 0.1055 inches in diameter (12 gauge).

B. Wires, for Humid Spaces

ASTM A580, composition 302 or 304, condition annealed stainless steel or FS QQ-N-281, Class A nickel-copper alloy, 0.1055 inches in diameter (12 gauge).

2.7 LED LIGHT FIXTURES

A. LED Light Source

1. Correlated Color Temperature CCT shall be in accordance with NEMA ANSLG C78-377.

2. Color Rendering Index CRI shall be greater than or equal to 70 for 4000 degrees K light sources.

3. Color consistency. Manufacturer shall utilize a maximum 4-step MacAdam ellipse binning tolerance for color consistency of LEDs used in luminaires.

B. LED Power Supply Unit Drivers

UL 131C LED Power Supply Unit Drivers shall meet the following requirements:

1. Minimum efficiency shall be 85 percent.

2. Drive Current to each individual LED shall not exceed 600mA, plus or minus 10%.

3. Shall be rated to operate between ambient temperatures of 22 degrees F and 104 degrees F.

4. Shall be designed to operate on the voltage system to which they are connected, typically ranging from 120V to 480V nominal.

5. Operating frequency shall be 60 Hz.

6. Power Factor PF shall be greater than or equal to 0.90.

7. Total Harmonic Distortion THD current shall be less than or equal to 20 percent.

8. Shall meet requirements of 47 CFR 15, Class B.

9. Shall be RoHS-compliant.

10. Power supplies in luminaires mounted under covered structure such as a canopy or where otherwise appropriate shall be UL listed with a sound rating A.

11. Shall be dimmable and compatible with standard diming control circuit of 0-10V or approved dimming system.

12. Shall be equipped with over-temperature protection circuit that turns light source off until normal operating temperature is achieved.

C. LED Luminaire Surge Protection

Provide surge protection integral to luminaire to meet C Low waveforms as defined by IEEE C62 41 2, Scenario 1 Location Category C.

PART 3 - EXECUTION

3.1 INSTALLATION

Set lighting fixtures plumb, square, and level with ceiling and walls, in alignment with adjacent lighting fixtures, and secure in accordance with manufacturers' directions and approved drawings. The installation shall meet requirements of NFPA 70. Mounting heights specified or indicated shall be to bottom of fixture for ceiling-mounted fixtures and to center of fixture for wall-mounted fixtures. Obtain approval of the exact mounting for lighting fixtures on the job before commencing installation and, where applicable, after coordinating with the type, style, and pattern of the ceiling being installed. Recessed and semi-recessed fixtures may be supported from suspended ceiling support system ceiling tees when the ceiling system support wires are provided at a minimum of four wires per fixture and located not more than 6 inches from each corner of each fixture. For recessed fixtures, provide support clips securely fastened to ceiling grid members, a minimum of one at or near each corner of each fixture. For round fixtures or fixtures smaller in size than the ceiling grid, provide a minimum of four wires per fixture and locate at each corner of the ceiling grid in which the fixture is located. Do not support fixtures by ceiling acoustical panels. Where fixtures of sizes less than the ceiling grid are indicated to be centered in the acoustical panel, support such fixtures independently or with at least two: -inch metal channels spanning, and secured to, the ceiling tees. Provide wires for lighting fixture support in this section.

A. Exit and Emergency Lights

Wire exit and emergency lights ahead of the switch to the normal lighting circuit located in the same room or area.

3.2 FIELD QUALITY CONTROL

Upon completion of the installation, conduct an operating test to show that equipment operates in accordance with requirements of this Section.

END OF SECTION 26 51 00

ECTION 313116 - TERMITE CONTROL

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes the following:

1. Soil treatment with termiticide.

B. Related Sections include the following:

1. Division 06 Section "Rough Carpentry" for wood preservative treatment by pressure process.

1.3 PERFORMANCE REQUIREMENTS

A. Service Life of Soil Treatment: Soil treatment by use of a termiticide that is effective for not less than five years against infestation of subterranean termites.

1.4 SUBMITTALS

A. Product Data: For termiticide.

1. Include the EPA-Registered Label for termiticide products.

B. Product Certificates: For termite control products, signed by product manufacturer.

C. Qualification Data: For Installer of termite control products.

D. Soil Treatment Application Report: After application of termiticide is completed, submit report for Owner's record information, including the following:

1. Date and time of application.
2. Moisture content of soil before application.
3. Brand name and manufacturer of termiticide.
4. Quantity of undiluted termiticide used.
5. Dilutions, methods, volumes, and rates of application used.
6. Areas of application.
7. Water source for application.

E. Warranty: Special warranty specified in this Section.

1.5 QUALITY ASSURANCE

A. Installer Qualifications: A specialist who is licensed according to regulations of authorities having jurisdiction to apply termite control treatment and products in jurisdiction where Project is located.

B. Regulatory Requirements: Formulate and apply termiticides according to the EPA-Registered Label.

C. Source Limitations: Obtain termite control products through one source from a single manufacturer for each product.

D. Preinstallation Conference: Conduct conference at Project site to comply with requirements in Division 01 Section "Project Management and Coordination" to schedule application of termiticide products.

1.6 PROJECT CONDITIONS

A. Environmental Limitations: To ensure penetration, do not treat soil that is water saturated or frozen. Do not treat soil while precipitation is occurring. Comply with requirements of the EPA-Registered Label and requirements of authorities having jurisdiction.

1.7 COORDINATION

A. Coordinate soil treatment application with excavating, filling, grading, and concreting operations. Treat soil under footings, grade beams, and ground-supported slabs before construction.

1.8 WARRANTY

A. Special Warranty: Manufacturer's standard form, signed by Applicator and Contractor certifying that termite control work, consisting of applied soil termiticide treatment, will prevent infestation of subterranean termites. If subterranean termite activity or damage is discovered during warranty period, re-treat soil and repair or replace damage caused by termite infestation.

1. Warranty Period: Five years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

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

1. Termiticides:

a. Aventis Environmental Science USA LP; Termidor.
b. Bayer Corporation; Premise 75.
c. Dow AgroSciences LLC; Dursban TC.
d. FMC Corporation, Agricultural Products Group; Torpedo.
e. Syngenta; Demon TC.

2.2 SOIL TREATMENT

A. Termiticide: Provide an EPA-registered termiticide complying with requirements of authorities having jurisdiction, in an aqueous solution formulated to prevent termite infestation. Provide quantity required for application at the label volume and rate for the maximum termiticide concentration allowed for each specific use, according to product's EPA-Registered Label.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Applicator present, for compliance with requirements for moisture content of soil, interfaces with earthwork, slab and foundation work, landscaping, and other conditions affecting performance of termite control.

1. Proceed with application only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. General: Comply with the most stringent requirements of authorities having jurisdiction and with manufacturer's written instructions for preparation before beginning application of termite control treatment. Remove all extraneous sources of wood cellulose and other edible materials such as wood debris, tree stumps and roots, stakes, formwork, and construction waste wood from soil within and around foundations.

B. Soil Treatment Preparation: Remove foreign matter and impermeable soil materials that could decrease treatment effectiveness on areas to be treated. Loosen, rake, and level soil to be treated except previously compacted areas under slabs and footings. Termiticides may be applied before placing compacted fill under slabs if recommended in writing by termiticide manufacturer.

1. Fit filling hose connected to water source at the site with a backflow preventer, complying with requirements of authorities having jurisdiction.

3.3 APPLICATION, GENERAL

A. General: Comply with the most stringent requirements of authorities having jurisdiction and with manufacturer's EPA-Registered Label for products.

3.4 APPLYING SOIL TREATMENT

A. Application: Mix soil treatment termiticide solution to a uniform consistency. Provide quantity required for application at the label volume and rate for the maximum specified concentration of termiticide, according to manufacturer's EPA-Registered Label, to the following so that a continuous horizontal and vertical termiticidal barrier or treated zone is established around and under building construction. Distribute treatment evenly.

1. Slabs-on-Grade: Under ground-supported slab construction, including footings, building slabs, and attached slabs as an overall treatment. Treat soil materials before concrete footings and slabs are placed.
2. Foundations: Adjacent soil including soil along the entire inside perimeter of foundation walls, along both sides of interior partition walls, around plumbing pipes and electric conduit penetrating the slab, and around interior column footers, piers, and chimney

bases; also along the entire outside perimeter, from grade to bottom of footing. Avoid soil washout around footings.

3. Masonry: Treat voids.
4. Penetrations: At expansion joints, control joints, and areas where slabs will be penetrated.

B. Avoid disturbance of treated soil after application. Keep off treated areas until completely dry.

C. Protect termiticide solution, dispersed in treated soils and fills, from being diluted until ground-supported slabs are installed. Use waterproof barrier according to EPA-Registered Label instructions.

D. Post warning signs in areas of application.

E. Reapply soil treatment solution to areas disturbed by subsequent excavation, grading, landscaping, or other construction activities following application.

END OF SECTION 313116

SECTION 301110 - ENVIRONMENTAL PROTECTION

1.01 SCOPE OF WORK

A. The Work covered by this Section consists of furnishing all labor, materials and equipment and performing all Work required for the prevention of environmental pollution in conformance with applicable laws and regulations, during and as the result of construction operations under this Contract. For the purpose of this Specification, environmental pollution is defined as the presence of chemical, physical, or biological elements or agents which adversely affect human health or welfare; unfavorable alter ecological balances of importance to human life; affect other species of importance to man; or degrade the utility of the environment for aesthetic and/or recreational purposes; or violate any applicable environmental laws, rules, codes or regulations.

B. The control of environmental pollution requires consideration of air, water and land, and involves management of noise, odor, and solid waste, as well as other pollutants.

C. These Specifications are intended to ensure that construction is achieved with a minimum of disturbance to the existing ecological balance between a water resource and surroundings. These are general guidelines. It is the CONTRACTOR'S responsibility to determine the specific construction techniques to meet these guidelines.

D. The CONTRACTOR shall secure, if required, at its own cost, a surface water management permit from the Northwest Florida Water Management District (NWFWMD) and approvals from Bay County and/or Panama City Beach for any construction dewatering activities associated with this project.

1.02 APPLICABLE REGULATIONS

The CONTRACTOR shall comply with all applicable Federal, State and local laws and regulations concerning environmental pollution control and abatement.

1.03 NOTIFICATIONS

The OWNER through the PROJECT REPRESENTATIVE will notify the CONTRACTOR in writing immediately following identification of any non-compliance with the foregoing provisions or of any environmentally objectionable acts and any required corrective action to be taken by CONTRACTOR. State or local agencies responsible for verification of certain aspects of the environmental protection requirements may notify the CONTRACTOR of any non-compliance with State or local requirements.

The CONTRACTOR shall, after receipt of such notice from the regulatory agency shall immediately notify the PROJECT REPRESENTATIVE in writing and immediately take correction action. If the CONTRACTOR fails or refuses to comply promptly, the OWNER may issue an order stopping all or part of the Work until satisfactory corrective action has been taken. No part of the time lost due to any such stop orders shall be made the subject of a claim for extension of time or for excess costs or damages by the CONTRACTOR unless it is later determined that the CONTRACTOR was in compliance and subject to the other terms of the Contract Documents.

1.04 IMPLEMENTATION

A. Prior to commencement of the Work, the CONTRACTOR shall meet with the PROJECT REPRESENTATIVE to develop mutual understandings relative to compliance with this specification and administration of the environmental pollution control program.

B. The CONTRACTOR shall remove temporary environmental control features, when approved by the PROJECT REPRESENTATIVE, and incorporate permanent control features into the Project at the earliest practicable time, consistent with the approved construction schedule.

1.05 EROSION CONTROL

A. The CONTRACTOR shall ensure sufficient precautions are taken during construction to minimize the run-off of polluting substances such as silt, clay, fuels, oils, bitumens, calcium chloride, or other polluting materials harmful to humans, fish, or other life, into the supplies and surface waters of the State. Control measures must be adequate to assure that turbidity in the receiving water will not be increased more than 10 nephelometric turbidity units (NTU), or as otherwise required by the State or other controlling body, in water used for public water supply or fish unless limits have been established for the particular water. In surface water used for other purposes, the turbidity must not exceed 25 NTU unless otherwise permitted. Special precautions shall be taken in the use of construction equipment to prevent operations which promote erosion.

Erosion evident within the limits of construction shall be the responsibility of the CONTRACTOR during the full term of the Contract and for the full 1 year guarantee period. Areas subject to erosion during this time shall be fully restored to original or design conditions (as applicable) within 10 days of notice to the CONTRACTOR.

B. The CONTRACTOR shall provide positive means of erosion control such as shallow ditches around construction to carry off surface water. Erosion control measures, such as siltation basins, hay check dams, mulching, jute netting and other equivalent techniques, shall be used as appropriate. Flow of surface water into excavated areas shall be prevented.

Ditches around construction area shall be used to carry away water resulting from dewatering of excavated areas. At the completion of the Work, ditches shall be backfilled and the ground surface restored to original condition.

C. The CONTRACTOR shall schedule and conduct all Work in a manner that will minimize the erosion of soils in the area of the Work. Erosion control measures shall be provided such as diversion channels, sedimentation or filtration systems, berms, staked hay bales, seeding, mulching or other special surface treatments as are required by regulatory authorities to prevent silting and muddying of streams, rivers, canals, impoundments, lakes, etc. All erosion control measures shall be in place prior to any construction activity in any area of the Work.

1.06 PROTECTION OF LAND RESOURCES

A. Land resources within the Project boundaries and outside the limits of permanent Work shall be restored by CONTRACTOR to a condition, after completion of construction that will appear to be natural and not detract from the appearance of the project.

B. Outside of areas requiring earthwork for the construction of the new facilities, the CONTRACTOR shall not deface, injure, or destroy trees or shrubs, nor remove or cut them without prior approval. No ropes, cables, or guys shall be fastened to or attached to any existing nearby trees for anchorage unless specifically authorized by the PROJECT REPRESENTATIVE. Where such special emergency use is permitted, first wrap the trunk with a sufficient thickness of burlap or rags over which softwood cleats shall be tied before any rope, cable, or wire is placed. The CONTRACTOR shall in any event be responsible for any damage resulting from such use.

C. Where trees may possibly be defaced, bruised, injured, or otherwise damaged by the CONTRACTOR'S equipment, dumping or other operations, CONTRACTOR shall protect such trees by placing board, planks, or poles around them. Monuments and markers shall be similarly protected by CONTRACTOR before beginning operations near them.

D. Any trees or other landscape feature scarred or damaged by the CONTRACTOR'S equipment or operations shall be restored as nearly as possible to its original condition. The PROJECT REPRESENTATIVE will decide what method of restoration shall be used and whether damaged trees shall be treated and healed or removed and disposed of.

All scars made on trees by CONTRACTOR's equipment, construction operations, or by the removal of limbs by CONTRACTOR larger than 1 inch in diameter shall be coated as soon as possible with an approve tree wound dressing.

All trimming or pruning by CONTRACTOR shall be performed in an approved manner by experienced workmen with saws or pruning shears. Tree trimming with axes will not be permitted.

Climbing ropes shall be used where necessary for safety. Trees that are to remain, either within or outside established clearing limits, that are subsequently damaged by the CONTRACTOR and are beyond saving in the opinion of a certified nurseryman, shall be immediately removed and replace in kind and maintained until growth is assured.

E. The locations of the CONTRACTOR's lay down area, storage and other construction buildings, required temporarily in the performance of the Work, shall require written concurrence of the PROJECT REPRESENTATIVE. The preservation of the landscape and public perception shall be an imperative consideration in the selection of the lay down area and in the provision of any buildings. Drawings showing the lay down area and any buildings shall be submitted by CONTRACTOR for approval of the PROJECT REPRESENTATIVE.

F. If temporary roads or embankments and excavations for plant and/or work areas are proposed, the CONTRACTOR shall submit the following for approval by the PROJECT REPRESENTATIVE at least ten days prior to scheduled start of such temporary work.

1. A layout of all temporary roads, excavations and embankments to be constructed within the work area.

2. Details of temporary road construction.

3. Drawings and cross sections of proposed embankments and their foundations, including a description of proposed materials.

4. A landscaping drawing showing the proposed restoration of the area. Removal of any trees and shrubs outside the limits of existing clearing area shall be indicated. The drawing shall also indicate location of required guard posts or barriers required to control vehicular traffic passing close to trees and shrubs to be maintained undamaged. The drawing shall provide for the obliteration of construction scars as such and shall provide for a natural appearing final condition of the area. Modification of the CONTRACTOR'S approved drawings shall be made only with the written concurrence of the PROJECT REPRESENTATIVE.

No unauthorized road construction, excavation or embankment construction including disposal areas will be permitted.

G. The CONTRACTOR shall remove all signs of temporary construction facilities such as haul roads, work areas, structures, foundations of temporary structures, stockpiles of excess materials, or any other vestiges of construction as requested by the PROJECT REPRESENTATIVE. Any construction disturbed area shall be restored to near natural conditions.

H. All debris and excess material will be disposed of by CONTRACTOR outside wetland or floodplain areas in an environmentally sound and lawful manner.

1.07 PROTECTION OF AIR QUALITY

A. The use of burning for the disposal of refuse and debris will not be permitted.

B. The CONTRACTOR shall maintain all excavations, embankment, stockpiles, access roads, plant sites, waste areas, borrow areas, and all other work areas within or without the project boundaries free from dust which could cause the standards for air pollution to be exceeded, and which would cause a hazard or nuisance to others.

C. An approved method of stabilization consisting of sprinkling or other similar methods will be permitted to control dust. The use of petroleum products is prohibited. The use of chlorides may be permitted with concurrence from the appropriate regulatory authority.

D. Sprinkling must be repeated at such intervals as to keep all parts of the disturbed area at least damp at all times, and the CONTRACTOR must have sufficient competent equipment on the job to accomplish needed sprinkling. Dust control shall be performed as the work proceeds and whenever a dust nuisance or hazard occurs.

1.08 MAINTENANCE OF POLLUTION CONTROL FACILITIES DURING CONSTRUCTION

During the life of this Contract, CONTRACTOR shall maintain all facilities constructed for pollution control as long as the operations creating the particular pollutant are being carried out or until the material concerned has become stabilized to the extent that pollution is no longer being created. All pollution control devices shall be inspected regularly to ensure they are operating correctly.

1.09 NOISE CONTROL

A. The CONTRACTOR shall make every effort to minimize noises caused by operations. Equipment shall be equipped with silencers or mufflers designed to operate with the least possible noise in compliance with State and Federal Regulations.

B. Sound levels measured by the PROJECT REPRESENTATIVE shall not exceed 55 dBA from 8:00 PM to 7:00 AM or 65 dBA from 7:00 AM to 8:00 PM. This sound level to be measured at the OWNER'S property line. Sound levels of equipment shall not exceed 95 dBA at any time. Sound levels in excess of these values are sufficient cause to have the Work halted until equipment can be quieted to acceptable levels. Work stoppage for excessive noise shall not relieve the CONTRACTOR of the other portions of this specification including, but not limited to Contract Time and Contract Price.

PART 2 – PRODUCTS (Not Applicable)

PART 3 – EXECUTION (Not Applicable)

END OF SECTION 01110

SECTION 301116 - WATER DISTRIBUTION SYSTEM

16.1 INTENT

It is the intent of these specifications to provide supplemental information to the contents of the construction drawings on the quality of materials, execution, measurement, etc. These specifications are general in nature and may contain products and requirements which are not applicable to the project. Discrepancies between these specifications and the construction drawings, either imaged or real, shall be brought to the attention of the Owner's Engineer for clarification.

16.2 DESCRIPTION OF WORK

Extent of work is shown on the drawings.

Domestic water system work includes but is not limited to: Water mains, fire hydrants, valves, service laterals, appurtenances.

Comply with the requirements of applicable Division 2 sections for excavation and backfilling required in connection with water distribution system work.

Comply with requirements of applicable Division 2 sections for concrete work required in connection with water distribution system work.

16.3 QUALITY ASSURANCE

Codes and Standards: Perform all work in compliance with applicable requirements of governing authorities having jurisdiction and the applicable standards of the American Water Works Association (AWWA).

Testing and Inspection Service: Employ, at Contractor's expense, testing laboratory to perform bacteriological testing of water mains.

It will be the responsibility of the Contractor to coordinate all testing and inspections. The Contractor shall notify the Owner's Engineer, testing service, and applicable agency inspectors 48 hours in advance of testing and inspections.

16.4 SUBMITTALS

Prior to construction commencement, the Contractor shall submit for approval by the Owner's Engineer manufacturer's certifications and cut sheets for the following items: fire hydrant assemblies, valves, water main pipe, fittings, water services, tapping sleeves, appurtenances.
Test Reports: Submit the following applicable reports directly to the Engineer from the testing services with copy to Contractor: Bacteriological Test Reports.

16.5 PRODUCTS

General: All materials shall be accordance with the Material Standard and shall, in no event, be less than that necessary to conform to the requirements of any applicable law, ordinances, and codes.

All materials shall be new, unused, and correctly designed. They shall be of standard, first grade quality and intended for the use for which they are offered. Materials or equipment which, in the opinion of the Owner's Engineer, are inferior or of a lower grade than indicated, specified, or required will not be accepted.

16.6 WATER MAINS

General: Water main pipe shall be as shown on the drawings.

16.7 DUCTILE IRON PIPE - PUSH ON JOINTS

Pipe: Pipe shall be of ductile iron and manufactured in accordance with AWWA Standard C-150, in nominal 18 or 20 foot laying lengths having minimum metal physicals of 60-42-10. Minimum pipe wall thickness class shall be Thickness Class 51 for pipe six inches and larger and Thickness Class 51 for three inch or four inch pipe.

Joints: Joints for ductile iron pipe shall be of the push-on type; "Super Bell Tite", Tyton", and "Fastite" joints are acceptable. All joints shall be in accordance with AWWA Standard C-111, and all joint accessories shall be furnished with all pipe.

Coating: All pipe furnished shall be cement mortar lined and seal coated in accordance with AWWA Standard C-104. The lining thickness shall be "standard" thickness.

16.8 DUCTILE IRON PIPE - MECHANICAL JOINTS

Pipe: All pipe shall be of ductile iron and manufactured in accordance with AWWA Standard C-150/A21.51, in nominal 18 or 20 foot laying lengths having minimum metal physicals of 60-42-10. Minimum pipe wall thickness class shall be Thickness Class 51 for six inch pipe and larger and Thickness Class 51 for three inch and four inch.

Joints: Joints shall be mechanical joints in accordance with AWWA Standard C-111, with exceptions noted herein. All joint accessories shall be furnished with the pipe. Mechanical joint bolts and nuts shall be manufactured of high-strength, low-alloy steel such as "Corten", "Usalloy", or "Acipalloy".
The gasket shall be for a standard mechanical joint, of BUNA-S (SBR Buna) in accordance with ANSI A21.4, AWWA C-104. The follower gland shall be manufactured from ductile iron (at least ASTM A536, Grade 70-50-05) in accordance with ANSI, A21.11, AWWA C-111, where applicable.

Coating: All fittings furnished shall be cement mortar lined and coated in accordance with AWWA Standard C-104, latest revision. The lining thickness shall be "standard" thickness.

16.9 POLYVINYL CHLORIDE (PVC) PIPE - 4" THROUGH 12"

Pipe: PVC pipe shall be manufactured in accordance with AWWA Standard C900, latest edition. All PVC pipe shall be pressure class 200 and must meet dimension requirements of dimension ratio (DR) 14 for four inch through twelve inch pipe.

All PVC pipe shall be marked using a solid No. 10 copper wire buried between 3 and 6 inches above the top of the pipe. Backfill shall be carefully placed to a depth of 3 inches by hand to assure that the wire is secured in place over the pipe. It is the intent of the paragraph to provide a means to locate PVC pipe using standard pipe location equipment. The wire shall be carried up through valve boxes and terminated at least 2 feet above the ground line to permit connecting of location equipment. Excess wire at valve boxes shall be neatly rolled and stored in the valve box for easy accessibility. Number 10 locating wire splice shall be heat sealed or water proof splicing connector.

Joints: Joints shall be "push-on" and shall meet all requirements of ASTM Standard D-3139. Each bell shall be an integral wall section joint assembly using elastomeric-gasket seals. All gaskets shall meet all requirements for performance as specified by ASTM Standard F-477. Push-on joints and pipe shall be equal to Supermain 900 water main as manufactured by Clow Corporation.

16.10 POLYVINYL CHLORIDE (PVC) PIPE - SMALLER THAN 4"

Pipe: All PVC pipe less than four inches in diameter shall be manufactured in accordance with ASTM D-2241, with a standard dimension ratio (SDR) of SDR 26, rated pressure 200 psi, and bear the National Sanitation Foundation Seal for potable water pipe.

All PVC pipe shall be marked using a solid No. 10 copper wire buried between 3 and 6 inches above the top of the pipe. Backfill shall be carefully placed to a depth of 3 inches by hand to assure that the wire is secured in place over the pipe. It is the intent of the paragraph to provide a means to locate PVC pipe using standard pipe location equipment. The wire shall be carried up through valve boxes and terminated at least 2 feet above the ground line to permit connecting of location equipment. Excess wire at valve boxes shall be neatly rolled and stored in the valve box for easy accessibility. Number 10 locating wire splice shall be heat sealed or water proof splicing connector.
Joints: Joints shall be "push-on" and shall meet all requirements of ASTM Standard D-3139. Each bell shall be an integral wall section joint assembly using elastomeric-gasket seals. All gaskets shall meet all requirements for performance as specified by ASTM Standard F-477.

Pipe Marking: All pipe shall be marked as prescribed in ASTM 3-2241, i.e., nominal pipe size, type of plastic pipe material, pipe dimension ratio, pressure rating, ASTM specification designation number manufacturer's name and code, and the National Sanitation Foundation Seal for potable water.

16.11 FITTINGS

General: Fittings three inches and larger shall be ductile iron manufactured in accordance with AWWA Standard C-110/A21.10 or C-153/A21.53. The minimum pressure rating for fittings shall be 250 psi.

Coating: All fittings furnished shall be cement mortar lined and coated in accordance with AWWA Standard C-104.

Anchoring Devices: All anchoring devices shall be suitable for use with mechanical joint fittings meeting ANSI/AWWA Standards C-110, and/or C-111.

All anchoring devices shall be constructed of ductile iron (at least ASTM A536 Grade 70-50-05) and manufactured in accordance with ANSI/AWWA C-110 and/or C-111.

All anchoring devices shall have a sufficient number of set screws so as to properly restrain various fittings or pipes at the rated pressure without the need for additional thrust restraint.

Retainer Glands: Mechanical joint restraint shall be incorporated in the design of the follower gland and shall include a restraining mechanism which, when actuated, imparts multiple wedging action against the pipe, increasing its resistance as the pressure increases. Flexibility of the joint shall be maintained after burial. Glands shall be manufactured of ductile iron conforming to ASTM A 536-80. Restraining devices shall be of ductile iron heat treated to a minimum hardness of 370 BHN. Dimensions of the gland shall be such that it can be used with the standardized mechanical joint bell and tee-head bolts conforming to ANSI/AWWA A21.11 and ANSI/AWWA C153/A21.53 of latest revision. Twist-off nuts shall be used to insure proper actuating of the restraining devices.

The mechanical joint restraining device shall have a working pressure of at least 350 psi with a minimum safety factor of 2:1 and shall be EBAA Iron, Inc., MEGALUG or equal.
Push-on joint restraints shall be similar to EBAA iron, series 800 or approved equal.

Coatings: Coatings shall be as follows:

Flange adapters shall be provided with a painted "shop coat".

Retainer glands shall be provided with a bituminous coat.

Push-on restraints shall be provided with a bituminous coat.

16.12 PRECAST THRUST BLOCKS

General: Precast concrete thrust blocks shall be manufactured to provide the minimum dimensions and construction shown on the plans. Precast thrust blocks will be subject to approval by the Owner's Engineer.

Concrete: Refer to applicable Division 2 specification.

16.13 GATE AND TAPPING VALVES

General: Gate and tapping valves shall be resilient seat and shall comply with all requirements of AWWA Standard C-509 and the following supplemental requirements:

Valves 12 inches and smaller shall be bubble-tight at 200 psi water working pressure. Test pressure shall be twice the rated working pressure and at all times zero leakage will be maintained.

All valves shall be Class B gray iron body, non-rising stem, water valves suitable for buried vertical mounting.

Non-rising stems shall be in full compliance with AWWA specifications with cast integral stem collar and furnished of bronze conforming to ASTM B132 Alloy A.

Stem nuts shall be independent of wedge and shall be of solid bronze conforming to ASTM B-62.

Sealing mechanism shall be either a replaceable, internally-reinforced, specially-contoured, molded rubber disc seat ring attached to the face of the disc with self-locking stainless steel screws or a sealing surface permanently bonded with resilient material to meet ASTM D-429. Replaceable seat rings shall be designed such that it cannot be installed improperly.

Stuffing boxes shall be O-ring seal type with two rings located in the stem.

Low friction torque reduction thrust bearings shall be located both above and below the stem collar.

All valves shall open by turning a two-inch square AWWA operating nut counterclockwise.

Joints: Joints shall be mechanical joints and shall conform to AWWA Standard C-111, and all bolts and nuts for mechanical joints shall be high-strength, low-alloy steel in accordance with Section 11-6.5 of AWWA C-111. All gaskets shall be for a standard mechanical joint of BUNA-S (SBR Buna) in accordance with ANSI A21.4 and AWWA C-111. All mechanical joint accessories shall be furnished with the valves.

All valves shall be furnished with operating nuts and two (2) operating wrenches.

All tapping valves shall have flange by mechanical joint ends.

All tapping valves shall be interchangeable with other makes of tapping sleeves.

Coating: Body and cover bolts and nuts shall meet specifications ASTM A-307 and be rust proof. Valve interior shall have protective coating meeting AWWA Standard C-550.

16.14 BUTTERFLY VALVES

General: All butterfly valves and operators shall meet all requirements of AWWA Standard C-504, for Class 150B, buried service valves and the following criteria:

Mechanical joint valve ends shall be in accordance with AWWA C-111.

Accessories (bolts, gaskets, etc.) shall be supplied by the valve manufacturer, and the joint bolts and nuts shall be a high-strength, low-alloy such as "Corten", "Usalloy", "Acipalloy" or approved equal.

Valve Seat: The valve seat shall be located on the valve body or disc and shall provide drip-tight shutoff for pressure differential of 150 psi versus 0 psi in either direction. The seat shall be of Buna N rubber and shall be clamped, mechanically secured, bonded, or vulcanized to the valve body or disc.

Valve Shafts and Disc: The valve shaft shall be a one-piece unit extending completely through the valve disc or may be stub shaft construction. Shaft materials shall conform to AWWA Standard C-504, Section 3.3. No deviation will be accepted. The valve disc shall have no external ribs transverse to the flow and shall be constructed of material as specified in AWWA C-504, Section 3.4, latest revision. No deviation will be accepted.

Valve Shaft Seals: Shaft seals shall be standard "O" ring or "V" packing seals, and all seals shall be replaceable without disassembly of the valve.

Operators: The operator shall be manual type opening to the right and equipped with two inch AWWA operating nut. The operator shall be gear type or traveling nut type. All operators shall be totally enclosed, sealed, gasketed, and lubricated for underground service. The operator shall also be able to output torque required to operate the valve under adverse conditions without exceeding input torque as allowed under AWWA Standard C-504. It shall also be capable of withstanding overload input torque as specified in AWWA Standard C-504, latest revision.

16.15 TAPPING SLEEVES

General: Tapping sleeves shall be constructed of heavy gray cast iron, ductile cast iron, or high-strength steel and in two halves. All tapping sleeves shall be suitable for Class C and D gray cast iron, ductile cast iron pipe, and all pipe manufactured in accordance with ANSI S 21 standards.

Joints: Tapping sleeves shall seal to the pipe by the use of a confined "O" ring gasket and able to withstand a pressure test of 150 psi with no leakage in accordance with AWWA C-110. A 3/4 inch NPT test plug shall be provided for pressure testing. All bolts joining the two halves shall be high-strength, low-alloy steel in accordance with Section 11-6.5 of AWWA C-111, and shall be included with the sleeve.

The outlet branch flange shall be a 125# flange joint suitable for attachment by all other makes of tapping valves meeting AWWA standards.

Coatings: All gray cast iron and ductile cast iron sleeves shall have an outside bituminous coating in accordance with AWWA C-110 and an inside cement-mortar lining in accordance with AWWA C-104. All steel sleeves shall be finished with an epoxy coating both inside and outside.

16.16 TAPPING SADDLES

General: Tapping saddles shall be constructed of heavy gray cast iron or ductile cast iron, with the attachment straps, nuts, and washers constructed of corrosion-resistant, alloy steel in accordance with AWWA C-111. All tapping saddles shall be suitable for Class C & D gray cast iron, ductile cast iron pipe, and all pipe manufactured in accordance with ANSI A 21 Standards.

Joints: Tapping saddles shall seal to the pipe by the use of a confined "O" ring gasket and be able to withstand a pressure test of 150 psi with no leakage in accordance with AWWA C-110. A 3/4 inch NPT test plug shall be provided for pressure testing.

The outlet branch flange shall be a 125# flange joint suitable for attachment by all other makes of tapping valves meeting AWWA standards.

Coatings: Tapping saddles shall have outside bituminous coating in accordance with AWWA C-110 and an inside cement-mortar lining in the branch run in accordance with AWWA C-104.

16.17 DRY-BARREL FIRE HYDRANT

All fire hydrants shall comply fully with all provisions of AWWA C502, latest edition. Hydrants shall be the dry barrel type which prevents the operating threads from coming into contact with the service water. Hydrants shall be of the compression type, opening against the line pressure and closing with the line pressure. The hydrant shall be equipped with a weather shield to protect the operating nut. An oil or a grease reservoir and lubrication system that automatically circulates lubricant to all operating stem threads and bearing surfaces each time the hydrant is operated shall be provided. The system shall be completely sealed from the waterway by means of “O” ring seals. The hydrant shall be the traffic breakaway type with a safety stem coupling and flangible segments that permit full 360 degree rotation of the nozzle. The main valve opening of the hydrant shall not be less than 5-1/4 inches in size. Hose and steamer connection threads shall be National Standard type. The hydrant shall be designed to permit removal of all working parts from the hydrant up through the barrel of the hydrant without disturbing the earth around the hydrant or disassembling the barrel. An all bronze hydrant valve seat ring shall thread directly into an all bronze drain ring and shall be located between the lower hydrant barrel and base, securely retained in position, or it may be threaded into a heavy bronze bushing in the hydrant base. The valve seat ring and drain ring shall have no less than two bronze drain ports and two bronze drain outlets. The hydrant shall be designed with an anti-friction bearing located so that it will reduce the torque required to operate the hydrant. Both the operating nut and the nozzle cap wrench nut shall be National Standard type. All hydrants shall be shop tested in accordance with AWWA C502, latest edition. The interior of the hydrant foot shall be coated with a fusion-bonded epoxy coating of a minimum of at least six mils. Hydrant exterior shall be painted with two coats of high-visibility red enamel paint.

Approved models are American Darling B-84-B; Mueller Centurion; M&H A-129 or Clow Medallion. No substitutions will be allowed.

16.18 WATER SERVICES

Service Lines: Water service shall be polyethylene Class 200 SDR9 manufactured in accordance with AWWA C-902 or cross linked polyethylene Pipe (PEXa) manufactured in accordance with AWWA C904. Contractor will terminate services five feet from building locations with a curb stop. For subdivisions a mark shall be scribed permanently in concrete curbs etc. for location of services. Water service separations between storm sewer and sanitary sewer shall be the same as for water mains.

Curb Stop: Ford style B43-444 for 1" meter valve or approved equal.
Corporation Stop: No FB 1000 (CC type) or equal.

Fittings: All fittings shall be manufactured of brass, cast with full port of full open valve and machined in accordance with AWWA Standard C-800.

The fittings shall be as manufactured by Mueller Company, Hays Manufacturing Company, Ford Meter Box Company, James Jones Company, or A.Y. McDonald Manufacturing Company, or approved equal.

Service Saddles: All service saddles shall be used for tapping water distribution pipes to provide a connection for service lines. Ford Style 202 or approved equal.

Service saddles for pipe less than three inches shall be a single band which is hinged or split from the saddle body and is anchored by bolting one or more bolts between the band and saddle body.

Service saddles for pipe greater than three inches shall vary in bolt patterns and band numbers based on the type of pipe to be tapped.

Service saddles for six inch and eight inch PVC C-900 pipe shall be a double-wide single flexible band, or two bands, sized exactly for six inch and eight inch PVC C-900 pipe and is to be anchored by a minimum four bolt pattern on the saddle body.

Service saddles for ANSI/AWWA C-150 ductile iron pipe shall be at least a single band, two bolt pattern saddle anchoring or hinged wide single strap with one bolt assembly.

All other service saddles for pipe greater than three inches shall use a double wide single flexible band, or two bands, with a minimum of a four bolt pattern anchoring. These service saddles shall provide for a variable range in diameter per nominal size of pipe.

16.19 HANDLING PIPE

General: All material, unless otherwise directed, shall be unloaded at the job site and distributed at the site of the project by the Contractor. Materials shall be handled with care to avoid damage. In loading and unloading, pipe shall be lifted by hoists or slid or rolled on skidways in such a manner as to avoid shock. Under no circumstances shall pipe be dropped. Pipe handled on skidways must not be allowed to roll against pipe already on the ground. The Contractor shall be responsible for the safe handling of all materials. Damaged materials will not be installed.

Pipe shall be handled so as to avoid damage to the coating and lining. If, however, any part of the coating or lining is damaged by the Contractor, the repair shall be made by the Contractor at his expense in a manner satisfactory to the Owner's Engineer before installation.

Pipe shall be distributed on the site of the work parallel with and opposite or near the place it is to be laid in the trench and with bell ends facing the directions in which the installation will proceed unless otherwise directed.

16.20 INSTALLATION OF PIPE

General: Upon satisfactory installation of the pipe bedding, as specified in the "Excavation and Backfill for Utility Systems" section of these specifications, a continuous trough for the pipe barrel and recesses for the pipe joints shall be excavated by hand digging so that, when the pipe is laid in the trench true to line and grade, the pipe barrel will receive continuous, uniform support, and the joint will receive no pressure from the trench bottom.

The interior of all pipe shall be thoroughly cleaned of all foreign material before being lowered into the trench and shall be kept clean during laying operations by means of plugs or other approved methods.

All pipe, fittings, valves, and hydrants shall be carefully lowered into the trench, piece by piece, by means of derrick, ropes, or other suitable tools or equipment, in such a manner as to prevent damage to pipe, pipe coating, and pipe lining. Under no circumstances shall pipe or accessories be dropped or dumped into the trench.

The gasket material for the joint shall be properly positioned before the pipe is lowered into the trench. The joining of the pipe shall proceed in accordance with the manufacturer's requirements.

Watertight plugs shall be installed in the open ends of the pipe at all times when pipe laying is not in progress. At no time shall trench water be permitted to enter pipe.

Cutting of pipe for inserting valves, fittings, or closure pieces shall be done in a neat and workmanlike manner without damage to the pipe. Wherever it is necessary to cut gray or ductile cast iron pipe which is equipped with a push-on joint type bell end, the cut end of the pipe shall be adequately beveled so as to prevent the edge of the cut pipe from cutting or tearing the gasket as the plain end is inserted into the bell of the adjoining pipe or fitting. All field-cut pipe shall be beveled by the Contractor, and the pipe "short" shall be used as part of the pipeline construction.
Whenever necessary to deflect pipe after proper homing from a straight line, either in the vertical or horizontal plane to avoid obstructions, the maximum allowable deflection shall be in accordance with the following:

Push-on Joint Pipe

Size	Maximum Deflection
4" thru 12"	3/4" per foot
16" thru 36"	1/2" per foot

Only after the pipe has been properly homed will it be allowed to deflect.

No pipe shall be laid in water or when the trench conditions or the weather is unsuitable for such work.

Water mains to provide a horizontal distance of (3) three feet between the water main and any vacuum-type sanitary sewer, storm sewer, stormwater force main, or pipeline conveying public-access reclaimed water and a horizontal distance of (6) six feet between the water main and any gravity or pressure-type sanitary sewer, wastewater force main, or pipeline conveying non-public-access reclaimed water.

Water mains crossing any gravity or vacuum-type sanitary sewer or storm sewer may be laid so the water main crosses (6) six inches above or (12) twelve inches below the other pipeline, and water mains crossing any pressure type sanitary sewer, stormwater, or wastewater force main, or pipeline conveying reclaimed water laid so the water main crosses only (12) twelve inches above or below the other pipeline.

All sewer lines and laterals shall be located a minimum of 36 inches below grade.

Any pipe which is disturbed or found to be defective after laying shall be taken up and re-laid or replaced.

Prior to connecting new work to existing lines or appurtenances, the Contractor shall verify location and elevation of existing connection point and notify Owner's Engineer of any conflicts or discrepancies.

Joints: Before laying the pipe, all lumps, blisters, and excess coal-tar coating shall be removed from the bell and plain ends of each length of pipe. The pipe ends shall then be wire brushed and wiped until clean and dry. Where mechanical joints or push-on joints are specified, oil and grease also shall be removed. Pipe ends shall be kept clean until joints are made. The plain end of pipe for mechanical joints shall be lubricated with a soapy solution before installing the gaskets.

In making up the push-on type joint, the gasket shall be placed in the socket with a large, round end entering first so that the groove fits over the bend in the seat. A thin film of lubricant (approved by the pipe manufacturer) shall then be applied to the inside surface of the gasket that will come in contact with the entering pipe. The plain end of the pipe to be entered shall be thoroughly brushed with a wire brush and placed in alignment with the bell of the pipe to which it is to be joined. The joint shall be made up by exerting sufficient force on the entering pipe so that the plain end is moved past the gasket until it seats as per manufacturer's recommendation.

Backhoe buckets or excavation equipment are not to be applied directly to the pipe.

Mechanical joints shall be centered in the bells. Soapy water shall be brushed over the gasket just prior to installation. The gasket and gland shall be placed in position, the bolts inserted, and the nuts tightened finger-tight. Mechanical joints shall be assembled in accordance with AWWA Standards.

The bolts shall be tightened on opposite sides of the pipes by means of a torque wrench in such a manner that the gland shall be brought up evenly into the joint. The following range of bolt torques shall be applied:

Bolt Size (Inches)	Range of Torque
3/4" Diameter	85 to 95 ft.-lbs.
1" Diameter	95 to 100 ft.-lbs.

If effective seal is not obtained at a maximum torque listed above, the joint shall be disassembled and reassembled after thorough cleaning.

If a joint is defective, it shall be cut out and entirely replaced or, if permission is given by the Owner's Engineer, it may be repaired by a suitable clamp.

16.21 INSTALLATION OF FITTINGS, VALVES AND TAPS

Fittings: Fittings shall be handled with care to avoid damage. All fittings shall be loaded and unloaded by lifting, and under no circumstances shall fittings be dropped, skidded, or rolled. Fittings shall not be placed, under any circumstances, against pipe or other fittings in such a manner that damage could result. Slings, hooks, or tongs used for lifting shall be padded in such a manner as to prevent damage to exterior surface or interior lining of fittings. If any part of the fittings' coating or lining is damaged by the Contractor, the repair or replacement shall be made by the Contractor, at his expense, in a manner satisfactory to the Owner's Engineer before installing. Fittings shall also be stored at all times in a safe manner to prevent damage and kept free of dirt, mud, or other foreign matter. All fitting gaskets shall be stored and placed in a cool location out of direct sunlight and out of contact with petroleum products. All gaskets shall be used on a first-in, first-out basis.

Fittings shall be set and joined to the pipe in a manner specified previously for joint assembly. When conditions warrant, fittings should be provided with special support trussing and blocking.

16.22 ANCHORAGE OF BENDS, TEES, AND PLUGS

General: Adequate precautions shall be taken to prevent the separation of joints at bends, tees, and plugged ends.

Details: Details of design, construction, applications, installation, and number of joints necessary for the restraint of a given thrust shall be as shown in the Construction Details. Under no circumstances will gray iron pipe be used at restrained joints. Ductile iron pipe will be used unless otherwise specified by the Owner's Engineer.

Thrust Blocking: Where reaction or thrust blocking is required, it shall be of concrete of a mix not leaner than one cement, two and one-half sand, five stone and having a compressive strength of not less than 3,000 pounds per square inch after 28 days and shall have a minimum curing time of three days. The poured concrete shall be left exposed for a minimum of 24 hours before backfilling, but not more than 48 hours. Before concrete thrust blocks are covered, contractor will have City inspect placement.

Blocking shall be placed between undisturbed earth and the fitting to be anchored; the area of bearing on pipe and on ground in each instance shall be that shown in the Construction Details. The blocking shall, unless otherwise directed, be so placed that the pipe and fitting joints will be accessible for repair.

Precast thrust blocks may be used in lieu of poured-in-place blocks on eight inch and smaller water mains only. Approval by the Department must be obtained. This type of block must be manufactured in accordance with the Construction Details. The Owner's Engineer has the authority to reject any damaged block or any block considered to be of questionable quality. Placement will be in accordance with standard procedures for restraining thrust. Earth behind such blocks will be either undisturbed or compacted to a minimum of 95% AASHTO T-180.

16.23 INSTALLATION OF VALVES

General: Valves shall be handled with care to avoid damage. All valves shall be loaded and unloaded by lifting, and under no circumstances shall valves be dropped, skidded, or rolled. Valves shall not be placed, under any circumstances, against pipe or other fittings in such a manner that damage could result. Slings, hooks, or tongs used for lifting shall be padded in such a manner as to prevent damage. If any part of the valve's coating and lining is damaged by the Contractor, the repair or replacement shall be made by the Contractor, at his expense, in a manner satisfactory to the Owner's Engineer before installing. Valves shall also be stored at all times in a safe manner to prevent damage and kept free of dirt, mud, or other foreign matter. All valve gaskets shall be stored and placed in a cool location out of direct sunlight and out of contact with petroleum products. All gaskets shall be used on a first-in, first-out basis.

Gate valves and butterfly valves shall be set and joined to new pipe in the manner heretofore specified for cleaning, laying, and joining pipe.

Valve Boxes: Cast iron valve boxes shall be firmly supported and maintained centered and plumb over the operating nut of the valve by the Contractor with box cover flush with the surface of the finished pavement or at such other level as may be directed. All valve boxes set in non-paved areas shall have concrete pads poured around the top section of the valve box. The pad shall be 24 inches square or 24 inches in diameter and shall be centered on the valve box. All water department valve covers shall be painted safety blue as prescribed by the American Public Works Association (APWA) uniform color code for utility systems.

Blow-Offs: Blow-offs shall not be connected to any sewer or submerged in any stream or be installed in any other manner that will permit back-siphonage of contaminated water .

The valve and valve box shall be installed so water department personnel can insert a valve key through the valve box and completely open and close the valve.

16.24 INSTALLATION OF TAPS BY CONTRACTOR

General: All material supplied, and drilling and tapping equipment used to make taps, will be sterilized in accordance with AWWA Standards.

After the tapping sleeve and valve have been installed and before the tap is made, the sleeve will be tested to ensure a watertight joint. A test plug will be provided in the sleeve and after the sleeve has been installed it will be filled with water and the pressure increased between 150 psi and 190 psi. All leaking joints will be repaired to the satisfaction of the Owner's Engineer at the Contractor's expense.

16.25 INSTALLATION OF FIRE HYDRANTS

General: Hydrants shall be located in such a manner as to provide complete accessibility and to minimize the possibility of damage from vehicles or injury to pedestrians. Unless otherwise directed, the setting of any hydrant shall be described in the Construction Details.

All fire hydrants shall be thoroughly cleaned of dirt or foreign material before installation.

All hydrants shall stand plumb and shall have their pumper nozzle perpendicular to the curb. They shall conform to the established grade with nozzles at least 18 to 24 inches above the ground.

Each hydrant shall be connected to the water main with a six inch branch controlled by an independent six inch resilient wedge gate valve, hydrant shut-off valve. Line from fire hydrant to water main tee shall be Ductile Iron.

All hydrants shall be anchored by thrust blocks and/or restrained fittings as shown in the construction Details.

16.26 TESTING AND INSPECTION REQUIREMENTS

It will be the responsibility of the Contractor to coordinate all testing and inspections. The Contractor shall notify the Owner's Engineer and applicable agency inspectors 48 hours in advance of testing and inspections.

16.27 HYDROSTATIC TEST

Hydrostatic Test: A hydrostatic test shall be performed on all mains and fittings for a minimum of two hours at 150 psi in accordance with AWWA M23. Test shall occur at any convenient time upon backfill of lines and after all piping has been thoroughly cleaned and flushed to clear the lines of all foreign matter. Prior to test, allow adequate curing time for reaction blocking.

Gauges and Recorders: The Contractor shall, upon request of the Engineer, furnish certified test data for pressure gauges and recorders used on hydrostatic test equipment. At the option of the Engineer, flow meters and/or pressure gauges used for hydrostatic testing shall be equipped by the Contractor with approved strip or round chart recorders. Tests shall be made in sections not exceeding one-half mile.

Each valved section of pipe to be tested shall be slowly filled with water, and a test pump shall be installed at the low point of the section being tested. All air in line will be expelled before applying specified test pressure. To accomplish this, taps will be made, if necessary, at point of highest elevation and afterward tightly stopped with tapered brass plugs, all at the Contractor's expense.

After installation and filling of the line as specified, the hydrostatic test, which will be at least two hours in duration (two hour test period), shall proceed as follows:

The Contractor will pump his line to a pressure greater than 150 psi. At no time shall the test or line pressure exceed 190 psi. If required by the Owner's Engineer, pump test equipment shall be equipped with pressure relief valves pre-set to 190 psi.

Throughout the duration of the test, the Contractor is required to maintain a minimum pressure in excess of 150 psi. The Contractor is advised that, should the line pressure fall to or below 150 psi any time during the two-hour test, the test will be considered invalid and a re-test according to this procedure will be required. Therefore, he is advised to pump water into the line as the line pressure approaches 150 psi. The test will be conducted with a pressure variation of not more than 5 psi for the duration of the test.

At the end of the two-hour test period, the Contractor will be required to pump the pipe lines back up to the highest pressure obtained during the duration of the test period. If chart records are required for the hydrostatic test, the Contractor shall furnish flow and/or pressure charts as a condition of concluding the test.

The allowable leakage, as specified below, will be defined as any volume of water required to maintain a minimum pressure in excess of 150 psi during the duration of the test period plus that volume of water required at the conclusion of the test to bring the line pressure back up to the highest pressure obtained during the duration of the test period.

Two Hour Hydrostatic Test Allowable Leakage

Allowable Leakage for AWWA PVC Pipe

Average Test Pressure In Line, PSI					
Nominal pipe size in.	50	100	150	200	250
	Allowable Leakage Per 1000 Ft or 50 Joints, gal/hr (L/hr)				
4	.19 (.72)	.27(1.02)	.33 (1.25)	.38 (1.44)	.43 (1.63)
6	.29 (1.10)	.41 (1.55)	.50 (1.89)	.57 (2.16)	.64 (2.42)
8	.38 (1.44)	.54 (2.04)	.66 (2.50)	.76 (2.88)	.85 (3.22)
10	.48 (1.82)	.68 (2.57)	.83 (3.14)	.96 (3.63)	1.07 (4.05)
12	.57 (2.16)	.81 (3.07)	.99 (3.75)	1.15 (4.35)	1.28 (4.84)

Leakage detection at mechanical joints shall be stopped by tightening the gland (not to exceed required torque) and leaking slip joints shall be cut out and entirely replaced, or, if permission is given by the Owner's Engineer, it may be repaired by a suitable clamp. Any cracked or defective pipes, fittings, valves, or hydrants discovered as a result of this pressure test shall be removed and replaced by the Contractor with sound material and then the test shall be repeated until satisfactory.

The Contractor is warned that pressure testing against existing "end-of-line" or blow-off valves is done at his own risk. Failure of these valves to hold test pressure will not relieve the Contractor of the pressure testing nor will it entitle him to any additional compensation for the extra work performed.

16.28 DISINFECTION

Disinfection: All new water lines shall be thoroughly flushed to remove all foreign material before sterilizing. The Contractor shall sterilize the water mains in accordance with the applicable section of AWWA Specification C-651.
Bacteriological Testing: After disinfecting and final flushing and before the system is placed in service, samples shall be collected and tested by a laboratory, state certified in accordance with Chapter 403, Florida Statutes. Samples shall be collected as follows:

- Connection point to an existing system and the endpoint of the proposed addition;
- Any water lines branching off a main extension;
- Every 1,200 feet on straight run of pipe;
- Each location shall be sampled on two consecutive days with sample points and chlorine residual reading clearly indicated on the report.

If, during construction, trench water has entered the main, or if in the opinion of the Owner's Engineer or job superintendent, excessive quantities of dirt or debris have entered the main, bacteriological samples shall be taken at intervals of approximately 200 feet and shall be identified by location.

Samples shall be taken of water that has stood in the main for at least 16 hours after final flushing has been completed.

Samples for bacteriological analysis shall be collected in sterile bottles treated with sodium thiosulfate as required by "Standard Methods for the Examination of Water and Wastewater." No hose or fire hydrant shall be used in collection of samples. A corporation cock may be installed in the main with a copper tube goose neck assembly. After samples have been collected, the goose neck assembly may be removed and retained for future use.

16.29 MEASUREMENT AND PAYMENT

General: The contract unit price for the various items shall be compensation in full for furnishing all materials, labor, equipment, tools, and incidentals necessary for the installation of the item complete in every detail in accordance with the plans and specifications.

As part of the work of this section, the Contractor may be required to remove and relocate or stockpile for reinstallation upon completion of work certain items including, but not limited to, culverts and mailboxes.

No separate compensation will be provided for these items, compensation should be included in the unit price for item to which it most logically belongs. It shall be the responsibility of the Contractor to identify and be aware of these items by both field inspection and review of the plans.

Concrete: The contract unit price shall be compensation in full for one cubic yard of concrete used for foundations, anchors, encasement for pipe or concrete piers.

Water Pipe: The contract unit price for the various sizes and types of water pipe shall be compensation in full for one linear foot of pipe complete in place. The length of pipe installed will be measured along the centerline of the installed pipe from center of installed pipe or junctions to center of junction or various ends with no deduction in measured length for specials, fittings, or valves.

Cast Iron or Ductile Iron Fitting: The contract unit price for the various sizes and types of fittings shall be compensation in full for furnishing all materials, labor, equipment, tools and incidental necessary to install and complete one fitting with required thrust blocks. All fittings including bends, tees, crosses, slums etc., will be included under this item.

Gate Valves: The contract unit price for the various sizes and types of gate valves shall be compensation in full for furnishing all materials, labor, equipment, tools, including valve stem extension, valve box, concrete pad, and incidentals necessary to install and complete one valve.

Fire Hydrant: The contract unit price shall be compensation in full for furnishing all materials, labor, equipment, tools, and incidentals necessary to install and complete one fire hydrant, auxiliary gate valve with concrete pad and required thrust blocks.

Tapping Sleeve and Valve: The contract unit price for the various types and sizes shall be compensation in full for one valve with valve box, concrete pad, and valve stem extension, if required, and tapping sleeve, size to suit existing water pipe complete in place.

Rust Proof Rods for Anchorage: The contract unit price shall be compensation in full for furnishing all labor, materials, equipment, tools, and incidentals necessary to install one linear foot of anchor rod. The price shall include threading, bolts, and coating of the rod.

Removing and Replacing Paving: The contract unit price for this item will be compensation in full for furnishing all materials, labor, equipment, and incidentals to remove and replace one square yard of paving under which pipe is laid. The term "Pavement" shall be construed to mean either concrete, bituminous, cobblestones, or brick placed as a wearing surface in streets, driveways, or sidewalks; or placed as slope protection for ditches or drains. Shell surfacing, sand-clay surfacing, gravel surfacing, and other such types of surfacing will not be considered paving and will not be paid for as such. In measuring this item for payment, the length removed multiplied by a width of the inside pipe diameter plus 30 inches will be the amount paid for, or were shown as limits of payment for pavement repair on construction plans, regardless of the width removed and replaced. No additional allowance will be made for bell holes or manholes. Where flexible pavement is replaced, no additional allowance will be made for base course or asphalt tack coat.

Encasement Pipe: The contract unit price for furnishing and installing encasement pipe shall be compensation in full for furnishing all material, labor, skids, equipment, and incidentals necessary to install and complete one linear foot of the encasement pipe of various sizes and types in accordance with the plans and specifications. Measurement will be made along the centerline of the installed encasement pipe. The carrier pipe inside encasement pipe will not be included in the contract unit price for encasement pipe.

END OF SECTION 16

SECTION 302110 - SITE CLEARING

PART 1 - GENERAL

RELATED DOCUMENTS:

Drawings and general provisions of Contract, including General and Special Conditions, apply to work of this section.

DESCRIPTION OF WORK:

Extent of site clearing is shown on drawings.

Site clearing work includes, but is not limited to:

Protection of existing trees.

Removal of trees and other vegetation.

Topsoil stripping.

Clearing and grubbing.

Removing above-grade improvements.

Removing below-grade improvements.

JOB CONDITIONS:

Traffic: Conduct site clearing operations to ensure minimum interference with roads, streets, walks, and other adjacent occupied or used facilities. Do not close or obstruct streets, walks or other occupied or used facilities without permission from authorities having jurisdiction.

Protection of Existing Improvements: Provide protection necessary to prevent damage to existing improvements indicated to remain in place.

Protection improvements on adjoining properties and on Owner's property.

Restore damaged improvements to their original condition, as acceptable to parties having jurisdiction.

Protection of Existing Trees and Vegetation: Protect existing trees and other vegetation indicated to remain in place, against unnecessary cutting, breaking or skinning of roots, skinning and bruising of bark, smothering of trees by stockpiling construction materials or excavated materials within drip line, excess foot or vehicular traffic, or parking of vehicles within drip line. Provide temporary guards to protect trees and vegetation to be left standing.

Salvable Improvements: Carefully remove items indicated to be salvaged, and store on Owner's premises where indicated or directed.

PART 2 - PRODUCTS

Not applicable to work of this section.

PART 3 - EXECUTION

SITE CLEARING:

General: Remove trees, shrubs, grass and other vegetation, improvements, or obstructions interfering with installation of new construction. Remove such items elsewhere on the site or premises as specifically indicated. Removal includes digging out stumps and roots.

Carefully and cleanly cut roots and branches of trees indicated to be left standing, where such roots and branches obstruct new construction.

Topsoil: Topsoil is defined as friable clay loam surface soil found in a depth of not less than 4". Satisfactory topsoil is reasonably free of topsoil, clay lumps, stones, and other objects over 2" in diameter, and without weeds, roots, and other objectionable material.

Remove heavy growths of grass from areas before stripping.

Where trees are indicated to be left standing, stop topsoil stripping a sufficient distance to prevent damage to main root system.

Stockpile topsoil in storage piles in areas shown, or where directed. Construct storage piles to freely drain surface water. Cover storage piles if required to prevent wind-blown dust.

Dispose of unsuitable or excess topsoil same as waste material, herein specified.

Clearing and Grubbing: Clear site of trees, shrubs and other vegetation, except for those indicated to be left standing.

Completely remove stumps, roots, and other debris protruding through the ground surface.

Use only hand methods for grubbing inside drip line of trees indicated to be left standing.

Fill depressions caused by clearing and grubbing operations with satisfactory soil material, unless further excavation or earthwork is indicated.

Place fill material in horizontal layers not exceeding 6" loose depth, and thoroughly compact to a density equal to adjacent original ground.

Removal of Improvements: Remove existing above-grade and below-grade improvements necessary to permit construction, and other work as indicated.

DISPOSAL OF WASTE MATERIALS:

Burning on Owner's Property: Burning is not permitted on Owner's property unless Owner's approval is obtained and proper authorities are notified.

Removal from Owner's Property: Remove waste materials and unsuitable materials from Owner's property and dispose of off site in legal manner.

END OF SECTION 02110

SECTION 302830 - CHAIN LINK FENCING AND GATES

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and general provisions of Contract, including General and Special Conditions, apply to work of this section.

1.02 DESCRIPTION OF WORK

A. Extent of chain link fences and gates is indicated on drawings.

1.03 QUALITY ASSURANCE

A. Provide chain link fences and gates as complete units controlled by a single source including necessary erection accessories, fittings, and fastenings.

PART 2 - PRODUCTS

2.01 GENERAL

A. Dimensions indicated for pipe, roll-formed, and H-sections are outside dimensions, exclusive of coatings.

B. Available Manufacturers:

1. Subject to compliance with requirements, manufacturers offering products which may be incorporated in the work include, but are not limited to, the following:

a. Galvanized Steel Fencing and Fabric:

1) Allied Tube and Conduit Corp.

2) American Fence Corp.

3) Anchor Fence, Inc.

4) Storm Fence Company

b. Aluminum Fencing and Fabric:

1) Chain Link Fence Company of Pennsylvania

2) Security Fabricators, Inc.

2.02 STEEL FABRIC

A. Fabric:

1. No. 9 gage (0.148 inch ± 0.005 inches) size steel wires, 2-inch mesh, with top salvage knuckled for fabric 60-inch high and under, and both top and bottom selvages twisted and barbed for fabric over 60-inch high.

2. Furnish one-piece fabric widths for fencing up to 12 feet high.

B. Fabric Finish:

1. Galvanized, ASTM A 392, Class I, with not less than 1.2 ounce zinc per square foot of surface.

2.03 FRAMING AND ACCESSORIES

A. Steel Framework, General:

1. Galvanized steel, ASTM A 120 or A 123, with not less than 1.8 ounce zinc per square foot of surface.

2. Fittings and Accessories:

a. Galvanized, ASTM A 153, with zinc weights per Table I.

B. End, Corner and Pull Posts:

1. Minimum sizes and weights as follows:

a. 3-inch OD steel pipe, 5.79 pounds per linear foot, 2.5-inch by 2.5-inch roll-formed sections, 5.70 pounds per linear foot.

C. Line Posts:

1. Space 10-foot o.c. maximum, unless otherwise indicated, of following minimum sizes and weights.

a. Up to 6-foot fabric height, 2.00-inch OD steel pipe, 3.27 pounds per linear foot.

b. 6- to 8-foot fabric height, 2.5-inch OD steel pipe, 3.65 pounds per linear foot.

c. Over 8-foot fabric height, 2.875-inch OD steel pipe, 5.79 pounds per linear foot.

D. Gate Posts:

1. Furnish posts for supporting single gate leaf, or one leaf of a double gate installation, for nominal gate widths as follows:

Leaf Width	Gate Post	Pounds/Linear Foot
Up to 6 feet	3.5" x 3.5" roll-formed section	4.85
or	2.8750-inch OD pipe	5.79
Over 6 feet to 13 feet	4.000-inch OD pipe	9.11
Over 13 feet to 18 feet	6.625-inch OD pipe	18.97
Over 18 feet	8.625-inch OD pipe	28.55

E. Top Rail:

1. Manufacturer's longest lengths, with expansion type couplings, approximately 6 inches long, for each joint.

2. Provide means for attaching top rail securely to each gate corner, pull and end posts.

3. 1.66-inch OD pipe, 2.27 pounds per square foot.

F. Tension Wire:

1. 7 gage, coated coil spring wire, metal and finish matching fabric. Locate at bottom of fabric.

G. Wire Ties:

1. 9 gage galvanized steel or 9 gage aluminum wire, to match fabric core material.

H. Post Brace Assembly:

1. Manufacturer's standard adjustable brace at end and gate posts and at both sides of corner and pull posts, with horizontal brace located at mid-height of fabric.

2. Use same materials as top rail for brace, and truss to line posts with 0.375-inch diameter rod and adjustable tightener.

I. Post Tops:

1. Provide weathertight closure cap with loop to receive tension wire or toprail; one cap for each post.

J. Stretcher Bars Bands:

1. Space not over 15-inch o.c., to secure stretcher bars to end, corner, pull, and gate posts.

K. Barbed Wire Supporting Arms:

1. Manufacturer's standard barbed wire supporting arms, metal and finish to match fence framework, with provision for anchorage to posts and attaching three rows of barbed wire to each arm.

2. Supporting arms may be either attached to posts or integral with post top weather cap and must be capable of withstanding 250 pounds downward pull at outermost end.

a. Provide following type:

1) Single 45 degrees arm; for three strands barbed wire, one for each post.

L. Barbed Wire:

1. Three strand, 12 ½ gage wire with 14 gage 4-point barbs spaced not more than 5-inch o.c.; metal and finish to match fabric.

2.04 GATES

A. Fabrication:

1. Fabricate perimeter frames of gates from metal and finish to match fence framework.

2. Assemble gate frames by welding or with special fittings and rivets, for rigid connections, providing security against removal or breakage connections.

3. Provide horizontal and vertical members to ensure proper gate operation and attachment of fabric, hardware and accessories.

4. Space frame members maximum of 8 feet apart unless otherwise indicated.

5. Provide same fabric as for fence, unless otherwise indicated.

6. Install fabric with stretcher bars at vertical edges and at top and bottom edges.

7. Attach stretcher bars to gate frame at not more than 15-inch o.c.

8. Install diagonal cross-bracing consisting of 3/8-inch diameter adjustable length truss rods on gates to ensure frame rigidity without sag or twist.

9. Extend end members of gate frames 1foot above to member and prepare to receive three strands of wire where barbed wire is indicated above gates. Provide necessary clips for securing wire to extensions.

B. Swing Gates:

1. Fabricate perimeter frames of minimum 1.90-inch OD pipe.

C. Gate Hardware:

1. Provide hardware and accessories for each gate, galvanized per ASTM A 153, and in accordance with the following:

a. Hinges:

1) Size and material to suit gate size, non-lift-off type, offset to permit 180 degree gate opening.

2) Provide 1-1/2 pair of hinges for each leaf over 6-foot nominal height.

b. Latch:

1) Forked type or plunger-bar type to permit operation from either side of gate, with padlock eye as integral part of latch.

c. Keeper:

d. Provide keeper for vehicle gates, which automatically engages gate leaf and holds it in open position until manually released.

e. Double Gates:

1) Provide gate stops for double gates, consisting of mushroom type flush plate with anchors, set in concrete, and designed to engage center drop rod or plunger bar.

2) Include locking device and padlock eyes as integral part of latch, permitting both gate leaves to be locked with single padlock.

f. Concrete:

1) Provide concrete consisting of Portland cement, ASTM C 150, aggregates ASTM C 33, and clean water.

2) Mix materials to obtain concrete with a minimum 28-day compressive strength of 2,500 pounds per square inch (psi) using at least four sacks of cement per cubic yard, 1-inch maximum size aggregate, maximum 3-inch slump, and 2% to 4% entrained air.

PART 3 - EXECUTION

3.01 INSTALLATION

A. Do not begin installation and erection before final grading is completed, unless otherwise permitted.

B. Excavation:

1. Drill or hand excavate (using post hole digger) holes for posts to diameters and spacing indicated, in firm, undistributed or compacted soil.

2. If not indicated on drawings, excavate holes for each post to minimum diameters as recommended by fence manufacturer, but not less than 4 times largest cross-section of post.

3. Unless otherwise indicated, excavate hole depths approximately 3 inches lower than post bottom, with bottom of posts set not less than 36 inches below finish grade surface.

C. Setting Posts:

1. Center and align posts in holes 3 inches above bottom of excavation.

2. Place concrete around posts and vibrate or tamp for consolidation.

3. Check each post for vertical and top alignment, and hold in position during placement and finishing operations.

4. Unless otherwise indicated, extend concrete footings 2 inches above grade and trowel to a crown to shed water.

D. Top Rails:

1. Run rail continuously through post caps, bending to radius for curved runs.

2. Provide expansion couplings as recommended by fencing manufacturer.

E. Brace Assemblies:

1. Install braces so posts are plumb when diagonal rod is under proper tension.

F. Tension Wire:

1. Install tension wires through post cap loops before stretching fabric and tie to each post cap with not less than 6 gage galvanized wire.

2. Fasten fabric to tension wire using 11 gage galvanized steel hog rings spaced 24-inch o.c.

G. Fabric:

1. Leave approximately 2 inches between finish grade and bottom salvage, unless otherwise indicated.

2. Pull fabric taunt and tie to posts, rails, and tension wires.

3. Install fabric on security side of fence, and anchor to framework so that fabric remains in tension after pulling force is released.

H. Stretcher Bars:

1. Thread through or clamp to fabric 4-inch o.c., and secure to posts with metal bands spaced 15-inch o.c.

I. Barbed Wire:

1. Pull wire taunt and install securely to extension arms and secure to end post or terminal arms in accordance with manufacturer’s instructions.

J. Gates:

1. Install gates plumb, level, and secure for full openings without interference. Install ground-set items in concrete for anchorage.

2. Adjust hardware for smooth operation and lubricate where necessary.

K. Tie Wires:

1. Use U-shaped wire, conforming to diameter of pipe two full turns.

2. Bend ends of wire to minimize hazard to persons or clothing.

3. Tie fabric to line posts, with wire ties spaced 12-inch o.c.

4. Tie fabric to rails and braces, with wire ties spaced 18-inch o.c.

5. Tie fabric to tension wires, with hog rings spaced 24-inch o.c.

L. Fasteners:

1. Install nuts for tension bands and hardware bolts on side of fence opposite fabric side.

2. Peen ends of bolts or score threads to prevent removal of nuts.

M. Electrical Grounds:

1. The fence shall be grounded by a Copperweld rod 10 feet long and a minimum of 5/8-inch diameter, driven vertically until the top of it is approximately 1 foot below the top of ground.

2. A No. 6 solid copper conductor shall be brazed to the rod and to the fence in such a manner that each element of the fence is grounded.

3. Electrical ground shall be installed at intervals not exceeding 500 feet and, where a power line passes over the fence, a ground shall be installed immediately below the point of crossing.

END OF SECTION

SECTION 303310 - CONCRETE WORK

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and general provisions of Contract, including General and Special Conditions, apply to work of this section.

1.02 DESCRIPTION OF WORK

A. Extent of concrete work is shown on Drawings.

1.03 SUBMITTALS

A. Product Data:

1. Submit data proprietary materials and items, including reinforcement and forming accessories, admixtures, patching compounds, waterstops, joint systems, curing compounds, dry-shake finish materials, and others as requested by ENGINEER.

B. Shop Drawings, Reinforcement:

1. Submit original shop drawings for fabrication, bending, and placement of concrete reinforcement.

2. Comply with American Concrete Institute (ACI) 315 “Manual of Standard Practice for Detailing Reinforced Concrete Structures” showing bar schedules, stirrup spacing, diagrams of bent bars, and arrangement of concrete reinforcement.

3. Include special reinforcement required for openings through concrete structures.

C. The ENGINEER’s review is for general engineering applications and features only. Design of formwork for structural stability and efficiency is the CONTRACTOR’s responsibility.

D. Laboratory Test Reports:

1. Submit laboratory test reports for concrete materials and mix design test.

1.04 QUALITY ASSURANCE

A. Codes and Standards:

1. Comply with provisions of following codes, specifications, and standards, except where more stringent requirements are shown or specified:

a) ACI 301 “Specifications for Structural Concrete for Buildings.”

b) ACI 318 “Building Code Requirements for Reinforced Concrete.”

c) Concrete Reinforcing Steel Institute (CRSI) “Manual of Standard Practice.”

B. Concrete Testing Services:

1. A testing laboratory shall be engaged that is acceptable to the ENGINEER to perform material evaluation tests and to design concrete mixes.

2. Materials and installed work may require testing and retesting at anytime during progress of work.

3. Tests, including retesting of rejected materials for installed work, shall be done at the CONTRACTOR's expense.

1.05 PROJECT CONDITIONS

A. Protect Footings Against Freezing:

1. Cover completed work at footing level with sufficient temporary or permanent cover as required to protect footings and adjacent subgrade against the possibility of freezing.

2. Maintain cover for time period as necessary.

B. Protect adjacent finish materials against spatter during concrete placement.

PART 2 - PRODUCTS

2.01 FORM MATERIALS

A. Forms for Exposed Finish Concrete:

1. Plywood, metal, metal-framed plywood faced, or other acceptable panel-type materials, to provide continuous, straight, smooth, exposed surfaces.

2. Furnish in largest practicable sizes to minimize number of joints.

B. Use plywood complying with U. S. Product Standard PS-1 "B-B (Concrete Form) Plywood," Class I, Exterior Grade or better, mill-oiled and edge-sealed, with each piece bearing legible inspection trademark.

C. Forms for Unexposed Finish Concrete:

1. Plywood, lumber, metal, or other acceptable material.

2. Provide lumber dressed on at least two edges and one side for tight fit.

D. Form Coatings:

1. Provide commercial formulation form-coating compounds that will not bond with, stain, nor adversely affect concrete surfaces, and will not impair subsequent treatments of concrete surfaces.

E. Form Ties:

1. Factory-fabricated, adjustable-length, removable or snap-off metal form ties, designed to prevent form deflection and to prevent spalling concrete upon removal.

2. Provide units which will leave no metal closer than 1 ½ inches to surface.

3. Provide ties which, when removed, will leave holes not larger than 1 inch in diameter in concrete surface.

2.02 REINFORCING MATERIALS

A. Reinforcing Bars:

1. American Society of Testing and Materials (ASTM) A 615

2. Grade 60.

3. Deformed.

B. Steel Wire:

1. ASTM A 82

2. Plain.

3. Cold-drawn steel.

C. Welded Wire Fabric:

1. ASTM A 185.

2. Welded steel wire fabric.

D. Welded Deformed Steel Wire Fabric:

1. ASTM A 497.

E. Supports for Reinforcement:

1. Use bolsters, chairs, spacers, and other devices for spacing, supporting, and fastening reinforcing bars and welded wire fabric in place.

2. Use wire bar type supports complying with CRSI specifications.

F. For slabs-on-grade, use supports with sand plates or horizontal runners where base material will not support chair legs.

2.03 CONCRETE MATERIALS

A. Portland Concrete:

1. ASTM C 150, Type I.

2. Use one brand of cement throughout project, unless otherwise acceptable to the ENGINEER.

B. Normal Weight Aggregates:

1. ASTM C 33, and as herein specified.

2. Provide aggregates from a single source for exposed concrete.

3. For exterior exposed surfaces, do not use fine or coarse aggregates containing spalling-causing deleterious substances.

C. Water:

1. Drinkable.

2.04 RELATED MATERIALS

A. Polyvinyl Chloride (PVC) Waterstops:

1. Corps of Engineers CRD-C 572.

2. Manufacturer: Subject to compliance with requirements, provide products of one of the following or equal:

a. AFCO Products.

b. The Burke Co.

c. Edoco Technical Products.

d. Greenstreet Plastic Products.

e. Harbour Town Products.

f. W. R. Meadows.

g. Progress Unlimited.

h. Schleigel Corp.

i. Vinylex Corp.

B. Granular Base:

1. Use evenly graded mixture of fine and coarse aggregates to provide, when compacted, a smooth and even surface below slabs on grade.

C. Vapor Retarder:

1. Provide vapor retarder cover over prepared base material where indicated below slabs on grade.

2. Use only materials which are resistant to decay when tested in accordance with ASTM E 154, as follows:

a. Polyethylene sheet not less than 8 mils thick.

b. Non-Shrink Grout: CRD-C 621, factory pre-mixed grout.

3. Products: Subject to compliance with requirements, provide one of the following or equal:

a. Metallic:

1) "Vibrofoil," A. C. Horn, Inc.

2) "Metallic Spec. Grout," The Burke Co.

3) "Embeco 636," Master Builders.

4) "Ferrolith GDS," Sonneborn-Rexnord.

5) "Hi-Mod Grout," Euclid Chemical Co.

6) "Kemox G," Sika Chemical Co.

7) "Ferrogrout," L & M Const. Chemical Co.

8) "Supreme Plus," Gifford-Hill/American Admixtures.

b. Non-Metallic:

1) "Set Grout," Master Builders.

2) "Sonogrout," Sonneborn-Rexnord.

3) "Euco-NS," Euclid Chemical Co.

4) "Supreme," Gifford-Hill/American Admixtures.

5) "Crystex," L &M Const. Chemical Co.

6) "Sure-Grip Grout," Dayton Superior Corp.

7) "Horngrout," A. C. Horn, Inc.

8) "Five Star Grout," U. S. Grout Corp.

D. Liquid Membrane-Forming Curing Compound:

1. Liquid type membrane-forming curing compound complying with ASTM C 309, Type I, Class A.

2. Moisture loss not more than 0.055 grams per square centimeter (gr./sq. cm.) when applied at 200 square feet per gallon (sq. ft./gal).

3. Products: Subject to compliance with requirements, provide one of the following or equal:

a. "Masterseal," Master Builders.

b. "A-H 3 Way Sealer," Anti-Hydro Waterproofing Co.

c. "Ecocure," Euclid Chemical Co.

d. "Clear Seal," A. C. Horn, Inc.

e. "Sealco 309," Gifford-Hill/American Admixtures.

f. "J-20 Acrylic Cure," Dayton Superior.

g. "Spartan-Cote," The Burke Co.

h. "Sealkure," Toch Div. – Carboline.

i. "Kure-N-Seal," Sonneborn-Rexnord.

j. "Polyclear," Upco Chemical/USM Corp.

k. "L & M Cure," L & M Construction Chemicals.

l. "Klearseal," Setcon Industries.

m. "LR-152," Protex Industries.

n. "Hardtop," Gifford-Hill.

2.05 PROPORTIONING AND DESIGN OF MIXES

A. Prepare design mixes for each type and strength of concrete by either laboratory trial batch or field experience methods as specified in ACI 301. If a trial batch method is used, use an independent testing facility acceptable to the ENGINEER for preparing and reporting proposed mix designs. The testing facility shall not be the same as used for field quality control testing.

B. Submit written reports to Structural Engineer of each proposed mix for each class of concrete at least 15 days prior to start of work. Do not begin concrete production until mixes have been reviewed by the ENGINEER.

C. Design mixes to provide normal weight concrete with the following properties, as indicated on drawings and schedules:

1. 4,000 pounds per square inch (psi) 28-day compressive strength; W/C ratio, 0.44 maximum (non-air-entrained).

2. 3,000 psi 28-day compressive strength; W/C ratio, 0.58 maximum (non-air-entrained).

3. 2,500 psi 28-day compressive strength; W/C ratio, 0.67 maximum (non-air-entrained).

D. Lightweight Concrete:

1. Proportion mix as herein specified.

2. Design mix to produce strength and modulus of elasticity as noted on Drawings, with a split-cylinder strength factor (Fct) of not less than 5.5 for 3,000 psi concrete and a dry weight of not less than 95 pounds (lbs) or more than 110 lbs. after 28 days.

3. Limit shrinkage to 0.03 percent at 28 days.

E. Adjustment to Concrete Mixes:

1. Mix design adjustments may be requested by the CONTRACTOR when characteristics of materials, job conditions, weather, test results, or other

circumstances warrant; at no additional cost to the OWNER and as accepted by the ENGINEER.

2. Submit laboratory test data for revised mix design and strength results to the ENGINEER for acceptance before using in work.

F. Use air-entraining admixture in exterior exposed concrete, unless otherwise indicated. Add air-entraining admixture at Manufacturer's prescribed rate to result in concrete at point of placement having total air content with a tolerance of plus-or-minus 1½ percent within the following limits:

G. Slump Limits: Proportion and design mixes to result in concrete slump at point of placement as follows:

1. Ramps, slabs, and sloping surfaces: Not more than 3 inches.

2. Reinforced foundation systems: Not less than 1 inch and not more than 3 inches.

3. Concrete containing HRWR admixture (super-plasticizer): Not more than 8 inches after addition of HRWR to site-verified 2 to 3 inches slump concrete.

4. Other concrete: Not less than 1 inch and not more than 4 inches.

2.06 CONCRETE MIXING

A. Ready-Mix Concrete: Comply with requirements of ASTM C 94, and as herein specified.

B. During hot weather, or under conditions contributing to rapid setting of concrete, a shorter mixing time than specified in ASTM C 94 may be required.

PART 3 - EXECUTION

3.01 GENERAL

A. Coordinate the installation of joint materials and vapor retarders with placement of forms and reinforcing steel.

3.02 FORM

A. Design, erect, support, brace, and maintain formwork to support vertical and lateral, static, and dynamic loads that might be applied until such loads can be supported by concrete structure.

B. Construct formwork so concrete members and structures are of correct size, shape, alignment, elevation, and position.

C. Maintain formwork construction tolerances complying with ACI 347.

D. Design formwork to be readily removable without impact, shock, or damage to cast-in-place concrete surfaces and adjacent materials.

E. Construct forms to sizes, shapes, lines, and dimensions shown, and to obtain accurate alignment, location, grades, level, and plumb work in finished structures.

F. Provide for openings, offsets, sinkages, keyways, recesses, moldings, rustications, reglets, chamfers, blocking, screeds, bulkheads, anchorages and inserts, and other features required for this Work.

G. Use selected materials to obtain required finishes. Solidly butt joints and provide back-up at joints to prevent leakage of cement paste.

H. Fabricate forms for easy removal without hammering or prying against concrete surfaces.

I. Provide crush plates or wrecking plates where stripping may damage cast concrete surfaces.

J. Provide top forms for inclined surfaces where slope is too steep to place concrete with bottom forms only.

K. Provide Kerf wood inserts for forming keyways, reglets, recesses, and the like, to prevent swelling and for easy removal.

L. Provide temporary openings where interior area of formwork is inaccessible for cleanout, for inspection before concrete placement, and for placement of concrete.

1. Securely brace temporary openings and set tightly to forms to prevent loss of concrete mortar.

2. Locate temporary openings on forms at inconspicuous locations.

M. Chamfer exposed corners and edges as indicated, using wood, metal, PVC, or rubber chamfer strips fabricated to produce uniform smooth lines and tight edge joints.

N. Provisions for Other Trades:

1. Provide openings in concrete formwork to accommodate work of other trades.

2. Determine size and location of openings, recesses, and chases from trades providing such items.

3. Accurately place and securely support items built into forms.

4. Other trades shall provide location and size of openings. The forms for such openings shall be constructed and set in place under this section.

O. Cleaning and Tightening:

1. Thoroughly clean forms and adjacent surfaces to receive concrete.

2. Remove chips, wood, sawdust, dirt, or other debris just before concrete is placed.

3. Retighten forms and bracing after concrete placement is required to eliminate mortar leaks and maintain proper alignment.

3.03 VAPOR RETARDER INSTALLATION

A. Place vapor retarder sheeting with longest dimension parallel with direction of pour following the completion of leveling and tamping of granular base for slabs on grade.

B. Lap joints 6 inches and seal with appropriate tape.

3.04 PLACING REINFORCEMENT

A. Comply with CRSI's recommended practice for "Placing Reinforcing Bars," for details and methods of reinforcement placement and supports, and as herein specified.

B. Avoid cutting or puncturing vapor retarder during reinforcement placement and concreting operations.

C. Clean reinforcement of loose rust and mill scale, earth, ice, and other materials which reduce or destroy bond with concrete.

D. Accurately position, support, and secure reinforcement against displacement by formwork, construction, or concrete placement operations.

E. Locate and support reinforcing by metal chairs, runners, bolsters, spacers, and hangers, as required.

F. Place reinforcement to obtain at least minimum coverages for concrete protection.

1. Arrange, space, and securely tie bars and bar supports to hold reinforcement in position during concrete placement operations.

2. Set wire ties so ends are directed into concrete, not toward exposed concrete surfaces.

G. Install welded wire fabric in as long lengths as practicable.

1. Lap adjoining pieces at least one full mesh and lace splices with wire.

2. Offset end laps in adjacent widths to prevent continuous laps in either direction.

3.05 JOINTS

A. Construction Joints:

1. Locate and install construction joints as indicated or, if not indicated, locate so as not to impair strength and appearance of the structure, as acceptable to the ENGINEER.

2. Place construction joints perpendicular to main reinforcement.

3. Continue reinforcement across construction joints, except as otherwise indicated.

B. Waterstops:

1. Provide waterstops in construction joints as indicated.

2. Install waterstops to form continuous diaphragm in each joint.

3. Make provisions to support and protect exposed waterstops during progress of work.

4. Fabricate field joints in waterstops in accordance with Manufacturer’s printed instructions.

C. Isolation Joints in Slabs-on-Ground:

1. Construct isolation joints in slabs-on-ground at points of contact between slabs-on-ground and vertical surfaces, such as column pedestals, foundation walls, grade beams, and elsewhere as indicated.

3.06 INSTALLATION OF EMBEDDED ITEMS

A. General:

1. Set and build into work anchorage devices and other embedded items required for other work that is attached to, or supported by, cast-in-place concrete.

2. Use setting drawings, diagrams, instructions, and directions provided by suppliers of items to be attached thereto.

3.07 PREPARATION OF FORM SURFACES

A. Clean re-used forms of concrete matrix residue, repair and patch as required returning forms to acceptable surface condition.

B. Coat contact surfaces of forms with a form-coating compound before reinforcement is placed.

C. Thin form-coating compounds only with thinning agent of type, amount, and under conditions of form-coating compound Manufacturer's directions.

D. Do not allow excess form-coating material to accumulate in forms or to come into contact with in-place concrete surfaces against which fresh concrete will be placed.

E. Apply in compliance with Manufacturer's instructions.

3.08 CONCRETE PLACEMENT

A. Pre-Placement Inspection:

1. Before placing concrete, inspect and complete formwork installation, reinforcing steel, and items to be embedded or cast-in.

2. Notify other crafts to permit installation of their work; cooperate with other trades in setting such work.

3. Moisten wood forms immediately before placing concrete where form coatings are not used.

4. Apply temporary protective covering to lower 2 feet of finished walls adjacent to poured floor slabs and similar conditions, and guard against spattering during placement.

B. General:

1. Comply with ACI 304 "Recommended Practice for Measuring, Mixing, Transporting, and Placing Concrete," and as herein specified.

2. Deposit concrete continuously or in layers of such thickness that no concrete will be placed on concrete which has sufficiently hardened to cause the formation of seams or planes of weakness. If a section cannot be placed continuously, provide construction joints as herein specified. Deposit concrete as nearly as practicable to its final location to avoid segregation.

3. Placing Concrete in Forms:

a Deposit concrete in forms in horizontal layers not deeper than 24 inches and in a manner to avoid inclined construction joints.

b Where placement consists of several layers, place each layer while the preceding layer is still plastic to avoid cold joints.

c Consolidation of Concrete:

1) Consolidate placed concrete by mechanical vibrating equipment supplemented by hand-spading, rodding, or tamping.

2) Use equipment and procedures for consolidation of concrete in accordance with ACI 309.

3) Do not use vibrators to transport concrete inside forms.

4) Insert and withdraw vibrators vertically at uniformly spaced locations not farther than visible effectiveness of machine.

5) Place vibrators to rapidly penetrate placed layer and at least 6 inches into preceding layer.

6) Do not insert vibrators into lower layers of concrete that have begun to set. At each insertion, limit duration of vibration to time necessary to consolidate concrete and complete embedment of reinforcement and other embedded items without causing segregation of mix.

4. Placing Concrete Slabs:

a Deposit and consolidate concrete slabs in a continuous operation, within limits of construction joints, until the placing of a panel or section is completed.

b Consolidate concrete during placing operations so that concrete is thoroughly worked around reinforcement and other embedded items and into corners.

c Bring slab surfaces to correct level with straightedge and strike off. Use bull floats or darbies to smooth surface; free of humps or hollows.

d Do not disturb slab surfaces prior to commencement of finishing operations.

e Maintain reinforcing in proper position during concrete placement operations.

5. Cold Weather Placing:

a Protect concrete work from physical damage or reduced strength which could be caused by frost, freezing actions, or low temperatures, in compliance with ACI 306 and as herein specified.

b When air temperature has fallen to or is expected to fall below 40 degrees Fahrenheit (F)/4 degrees Celcius (C), uniformly heat water and aggregates before mixing to obtain a concrete mixture temperature of not less than 50 degrees F (10 degrees C), and not more than 80 Degrees F (27 degrees C) at point of placement.

c Do not use frozen materials or materials containing ice or snow.

d Do not place concrete on frozen subgrade or on subgrade containing frozen materials.

e Do not use calcium chloride, salt, and other materials containing antifreeze agents or chemical accelerators, unless otherwise accepted in mix designs.

6. Hot Weather Placing:

a When hot weather conditions exist that would seriously impair quality and strength of concrete, place concrete in compliance with ACI 305 and as herein specified.

b Cool ingredients before mixing to maintain concrete temperature at time of placement below 90 degrees F (32 degrees C).

c Mixing water may be chilled or chopped ice may be used to control temperature provided water equivalent of ice is calculated to total amount of mixing water.

d Use of liquid nitrogen to cool concrete is the CONTRACTOR's option.

e Cover reinforcing steel with water-soaked burlap if it becomes too hot, so that the temperature of the steel does not exceed the ambient air temperature immediately before embedment in concrete.

f Fog spray forms, reinforcing steel, and subgrade just before concrete is placed.

g Use water-reducing retarding admixture (Type D) when required by high temperatures, low humidity, or other adverse placing conditions.

3.09 FINISH OF FORMED SURFACES

A. Rough Form Finish:

1. For formed concrete surfaces not exposed-to-view in the finish work or by other construction, unless otherwise indicated.

2. This is the concrete surface having texture imparted by form facing material used, with tie holes and defective areas repaired and patched, and fins and other projections exceeding 1/4 inch in height rubbed down or chipped off.

B. Smooth Form Finish:

1. For formed concrete surfaces exposed-to-view, or that are to be covered with a coating material directly applied to the concrete, or a covering material directly applied to the concrete, such as waterproofing, dampproofing, veneer plaster, painting, or other similar system.

2. This is as-cast concrete surface obtained with selected form facing material, arranged orderly and symmetrically with a minimum of seams.

3. Repair and patch defective areas with fins or other projections completely removed and smoothed.

C. Grout Cleaned Finish:

1. Provide grout cleaned finish to scheduled concrete surfaces which have received smooth form finish treatment.

2. Combine one part Portland cement to 1½ parts fine sand by volume, and mix with water to consistency of thick paint.

3. Use proprietary additives at the CONTRACTOR's option.

4. Blend standard Portland cement and white Portland cement (amounts determined by trial patches) so that final color of dry grout will match adjacent surfaces.

5. Thoroughly wet concrete surfaces and apply grout to coat surfaces and fill small holes.

6. Remove excess grout by scraping and rubbing with clean burlap.

7. Keep damp by fog spray for at least 36 hours after rubbing.

D. Related Unformed Surfaces:

1. Strike-off smooth tops of walls, horizontal offsets, and similar unformed surfaces occurring adjacent to formed surfaces and finish with a texture matching adjacent formed surfaces.

2. Continue final surface treatment of formed surfaces uniformly across adjacent unformed surfaces, unless otherwise indicated.

3.10 MONOLITHIC SLAB FINISHES

A. ASTM E 1155, "Standard Test Method for Determining Floor Flatness and Levelness Using the "F Number System (inch-pound-units)," shall be used for these finishes as follows:

1. Scratch Finish:

a. Apply scratch finish to monolithic slab surfaces that are to receive concrete floor topping or mortar setting beds for tile, Portland cement terrazzo, and other bonded applied cementitious finish flooring material, and as otherwise indicated.

b. After placing slabs, plane surface to tolerances for floor flatness (FF) of 15 and floor levelness (FL) of 13.

c. Slope surfaces uniformly to drain where required.

d. After leveling, roughen surface before final set, with stiff brushes, brooms, or rakes.

2. Float Finish:

a. Apply float finish to monolithic slab surface to receive trowel finish and other finishes as hereinafter specified, and slab surfaces which are to be covered with membrane or elastic waterproofing membrane or elastic roofing, or sand-bed terrazzo, and as otherwise indicated.

b. After screeding, consolidating, and leveling concrete slabs, do not work surface until ready for floating.

c. Begin floating when surface water has disappeared or when concrete has sufficiently stiffened to permit operation of power-driven floats, or both.

d. Consolidate surface with power-driven floats or by hand-floating if area is small or inaccessible to power units.

e. Check and level surface plane to tolerances of FF 18 - FL 15.

f. Cut down high spots and fill low spots.

g. Uniformly slope surfaces to drains.

h. Immediately after leveling, refloat surface to a uniform, smooth, granular texture.

3. Trowel Finish:

a. Apply trowel finish to monolithic slab surfaces to be exposed-to-view, and slab surfaces to be covered with resilient flooring, carpet, ceramic or quarry tile, paint, or other thin film finish coating system.

b. After floating, begin first trowel finish operation using a power-driven trowel.

c. Begin final troweling when surface produces a ringing sound as trowel is moved over surface.

d. Consolidate concrete surface by final hand-troweling operation, free of trowel marks, uniform in texture and appearance, and with surface leveled to tolerances of FF 20 - FL 17.

e. Grind smooth surface defects which would telegraph through applied floor covering system.

4. Trowel and Fine Broom Finish:

a. Where ceramic or quarry tile is to be installed with thin-set mortar, apply trowel finish as specified, then immediately follow with slightly scarifying surface by fine brooming.

5. Non-Slip Broom Finish:

a. Apply non-slip broom finish to exterior concrete platforms, steps, and ramps, and elsewhere as indicated.

b. Immediately after float finishing, slightly roughen concrete surface by brooming with fiber bristle broom perpendicular to main traffic route.

c. Coordinate required final finish with the ENGINEER before application.

3.11 CONCRETE CURING AND PROTECTION

A. General:

1. Protect freshly placed concrete from premature drying and excessive cold or hot temperatures.

2. Start initial curing as soon as free water has disappeared from concrete surface after placing and finishing.

3. Continuously keep concrete moist for not less than 7 days, weather permitting.

4. Begin final curing procedures immediately following initial curing and before concrete has dried.

5. Continue final curing for at least 7 days in accordance with ACI 301 procedures.

6. Avoid rapid drying at end of final curing period.

B. Curing Methods:

1. Perform curing of concrete by curing and sealing compound, by moist curing, by moisture-retaining cover curing, and by combinations thereof, as herein specified.

2. Provide moisture curing by the following methods:

   a. Keep concrete surface continuously wet by covering with water.

   b. Continuous water-fog spray.

   c. Covering concrete surface with specified absorptive cover, thoroughly saturating cover with water and continuously keeping wet.

   d. Place absorptive cover to provide coverage of concrete surfaces and edges, with 4-inch lap over adjacent absorptive covers.

3. Provide moisture-cover curing as follows:

   a. Cover concrete surfaces with moisture-retaining cover for curing concrete, placed in widest practicable width with sides and ends lapped at least 3 inches and sealed by waterproof tape of adhesive.

   b. Immediately repair any holes or tears during curing period using cover material and waterproof tape.

4. Provide curing slabs and sealing compounds to exposed interior slabs and to exterior slabs, walks, and curbs, as follows:

   a. Apply specified curing and sealing compound to concrete slabs as soon as final finishing operations are complete (within 2 hours).

   b. Uniformly apply in continuous operation by power-spray or roller in accordance with Manufacturer’s directions.

   c. Recoat areas subjected to heavy rainfall within 3 hours after initial application.

   d. Maintain continuity of coating and repair damage during curing period.

5. Do not use membrane curing compounds on surfaces that are to be covered with coating material applied directly to concrete, liquid floor hardener, waterproofing,

dampproofing, membrane roofing, flooring (such as ceramic or quarry tile and glue-down carpet), painting, and other coatings and finish materials, unless otherwise acceptable to the ENGINEER.

6. Curing Formed Surfaces:

   a. Cure formed concrete surfaces, including undersides of beams, supported slabs, and other similar surfaces by moist curing with forms in place for full curing period or until forms are removed.

   b. If forms are removed, continue curing by methods specified above, as applicable.

7. Curing Unformed Surfaces:

   a. Cure unformed surfaces, such as slabs, floor topping, and other flat surfaces by application of appropriate curing method.

   b. Final cure concrete surfaces to receive liquid floor hardener or finish flooring by use of moisture-retaining cover, unless otherwise directed.

8. Sealer and Dustproofer:

   a. Apply a second coat of specified curing and sealing compound only to surfaces given a first coat.

3.12 SHORES AND SUPPORTS

A. Remove shoring from ground to roof for structures four stories or less, unless otherwise permitted.

B. Remove shores and re-shore in a planned sequence to avoid damage to partially cured concrete.

C. Locate and provide adequate re-shoring to safely support work without excessive stress or deflection.

D. Keep shores in place a minimum of 15 days after placing upper tier, and longer if required, until concrete has attained its required 28-day strength and heavy loads due to construction operations have been removed.

3.13 REMOVAL OF FORMS

A. Formwork not supporting weight of concrete, such as sides of beams, walls, columns, and similar parts of the work, may be removed after cumulatively curing at no less than 50 degrees F (10 degrees C) for 24 hours after placing concrete, provided concrete is sufficiently hard to not be damaged by form removal operations, and provided curing and protection operations are maintained.

B. Form facing material may be removed 4 days after placement, only if shores and other vertical supports have been arranged to permit removal of form facing material without loosening or disturbing shores and supports.

3.14 RE-USE OF FORMS

A. Clean and repair surfaces of forms to be re-used in work. Split, frayed, delaminated, or otherwise damaged form facing material will not be acceptable for exposed surfaces.

B. Apply new form coating compound as specified for new formwork.

C. Thoroughly clean surfaces, remove fins and laitance, and tighten forms to close joints when forms are extended for successive concrete placement.

D. Align and secure joint to avoid offsets. Do not use “patched” forms for exposed concrete surfaces, except as acceptable to the ENGINEER.

3.15 MISCELLANEOUS CONCRETE ITEMS

A. Filling-In:

1. Fill-in holes and openings left in concrete structures for passage of work by other trades, unless otherwise shown or directed, after work of other trades is in place.

2. Mix, place, and cure concrete as herein specified, to blend with in-place construction.

3. Provide other miscellaneous concrete filling shown or required to complete work.

B. Curbs:

1. Provide monolithic finish to interior curbs by stripping forms while concrete is still green and steel troweling surfaces to a hard, dense finish with corners, intersections, and terminations slightly rounded.

C. Equipment Bases and Foundations:

1. Provide machine and equipment bases and foundations, as shown on Drawings.

2. Set anchor bolts for machines and equipment to template at correct elevations, complying with certified diagrams or templates of Manufacturer furnishing machines and equipment.

3. Grout base plates and foundations as indicated, using specified non-shrink grout.

4. Use non-metallic grout for exposed conditions, unless otherwise indicated.

D. Reinforced Masonry:

1. Provide concrete grout for reinforced masonry lintels and bond beams where indicated on Drawings and as scheduled, including filling of concrete modular unit cavities where called for on plans.

2. Maintain accurate location of reinforcing steel during concrete placement.

3.16 CONCRETE SURFACE REPAIRS

A. Patching Defective Areas:

1. Repair and patch defective areas with cement mortar immediately after removal of forms, when acceptable to the ENGINEER.

2. Cut out honeycomb, rock pockets, voids over 1/4 inch in any dimension, and holes left by tie rods and bolts, down to solid concrete but, in no case to a depth of less than 1 inch.

3. Make edges of cuts perpendicular to the concrete surface.

4. Thoroughly clean, dampen with water, and brush-coat the area to be patched with specified bonding agent.

5. Place patching mortar after bonding compound has dried.

B. Repair of Formed Surfaces:

1. Remove and replace concrete having defective surfaces if defects cannot be repaired to the satisfaction of the ENGINEER. Surface defects, as such, include:

a. Color and texture irregularities, cracks, spalls, air bubbles, honeycomb, rock pockets.

b. Fins and other projections on surface.

c. Stains and other discolorations that cannot be removed by cleaning.

2. Flush out form tie holes, fill with dry pack mortar, or precast cement cone plugs secured in place with bonding agent.

3. Repair concealed formed surfaces, where possible, that contain defects that affect the durability of concrete. If defects cannot be repaired, remove and replace concrete.

C. Repair of Unformed Surfaces:

1. Test unformed surfaces, such as monolithic slabs, for smoothness and verify surface plane to tolerances specified for each surface and finish.

2. Correct low and high areas as herein specified.

3. Test unformed surfaces sloped to drain for trueness of slope, in addition to smoothness using a template having required slope.

D. Repair finished unformed surfaces that contain defects which affect durability of concrete. Surface defects, as such, include crazing cracks in excess of 0.01 inch wide or which penetrate to reinforcement or completely through non-reinforced sections regardless of width, spalling, pop-outs, honeycomb, rock pockets, and other objectionable conditions.

1. Correct high areas in unformed surfaces by grinding, after concrete has cured at least 14 days.

2. Correct low areas in unformed surfaces during or immediately after completion of surface finishing operations by cutting out low areas and replacing with fresh concrete.

3. Finish repaired areas to blend into adjacent concrete.

4. Proprietary patching compounds may be used when acceptable to the ENGINEER.

E. Repair Defective Areas:

1. Cut out and replace with fresh concrete except random cracks and single holes not exceeding 1 inch in diameter.

2. Remove defective areas to sound concrete with clean, square cuts and expose reinforcing steel with at least ¾-inch clearance all around.

3. Dampen concrete surfaces in contact with patching concrete and apply bonding compound.

4. Mix patching concrete of same materials to provide concrete of same type or class as original concrete.

5. Place, compact, and finish to blend with adjacent finished concrete.

6. Cure in same manner as adjacent concrete.

F. Perform structural repairs with prior approval of Structural Engineer for method and procedure, using specified epoxy adhesive and mortar.

G. Use repair methods not specified above, subject to acceptance of the ENGINEER.

3.17 QUALITY CONTROL TESTING DURING CONSTRUCTION

A. The OWNER may employ a testing laboratory to perform tests and to submit test reports.

B. Sampling and testing for quality control during placement of concrete may include the following, as directed by the ENGINEER.

1. Sampling Fresh Concrete:

a. ASTM C 172, except modified for slump to comply with ASTM C 94.

2. Slump:

a. ASTM C 143, one test at point of discharge for each day's pour of each type of concrete and additional tests when concrete consistency seems to have changed.

3. Concrete Temperature:

a. 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 are made.

4. Compression Test Specimen:

a. ASTM C 31, one set of four standard cylinders for each compressive strength test, unless otherwise directed.

b. Cylinders for laboratory cured test specimens shall be molded and stored except when field-cure test specimens are required.

5. Compressive Strength Tests:

a. ASTM C 39, one set for each day's pour exceeding 5 cubic yards plus additional sets for each 50 cubic yards over and above the first 25 cubic yards of each concrete class placed in any 1 day:

1) One specimen tested at 7 days.
2) Two specimens tested at 28 days.
3) One specimen retained in reserve for later testing if required.

b. When frequency of testing will provide less than five strength tests for a given class of concrete, conduct testing from at least five randomly selected batches or form each batch if fewer than five are used.

C. Test results will be reported in writing to Structural Engineer and the CONTRACTOR within 24 hours after tests.

D. Reports of compressive strength tests shall contain:

1. The project identification name and number.
2. Date of concrete placement.
3. Name of concrete testing service.
4. Concrete type and class.
5. Location of concrete batch in structure.
6. Design compressive strength at 28 days.
7. Concrete mix proportions and materials.
8. Compressive breaking strength.
9. Type of break for both 7- and 28-day tests.

E. Nondestructive Testing:

1. Impact hammer, sonoscope, or other nondestructive device may be permitted but shall not be used as the sole basis for acceptance or rejection.

F. Additional Tests:

1. 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 the ENGINEER.

2. Testing service may conduct tests to determine adequacy of concrete by cored cylinders complying with ASTM C 42, or by other methods as directed.

3. The CONTRACTOR shall pay for such tests when unacceptable concrete is verified.

END OF SECTION 03310

SECTION 312200 - EARTHWORK

PART 1 - GENERAL

RELATED DOCUMENTS:

Drawings and general provisions of Contract, including General and Special Conditions, apply to work of this section.

DESCRIPTION OF WORK:

Definition: "Excavation" consists of removal of material encountered to subgrade elevations indicated and subsequent disposal of materials removed.

QUALITY ASSURANCE:

Codes and Standards: Perform excavation work in compliance with applicable requirements of governing authorities having jurisdiction.

Testing and Inspection Service: Employ, at Contractor's expense, a testing laboratory subject to approval by the Engineer to perform soil testing and inspection service for quality control during earthwork operations.

SUBMITTALS:

Test Reports-Excavating: Submit following reports directly to Engineer from the testing services; with copy to Contractor:

Test reports on fill material. (Modified Proctor Tests)

Field density test reports. (Modified Proctor Tests)

Report of actual unconfined compressive strength and/or results of bearing tests of each strata tested.

JOB CONDITIONS:

Existing Utilities: Locate existing underground utilities in areas of work. If utilities are to remain in place, provide adequate means of support and protection during earthwork operations.
Should uncharted, or incorrectly charted, piping or other utilities be encountered during excavation, consult utility owner immediately for directions. Cooperate with Owner, and utility companies in keeping respective services and facilities in operation. Contractor shall bear all costs of repairing damaged utilities to the satisfaction of utility owner.

Do not interrupt existing utilities serving facilities occupied and used by Owner or others, during occupied hours, except when permitted in writing by Engineer and then only after acceptable temporary utility services have been provided.

Provide minimum of 48-hour notice to engineer, and receive notice to proceed before interrupting any utility.

Demolish and completely remove from site existing underground utilities indicated to be removed. Coordinate with utility companies for shut-off of services if lines are active.

Use of explosives: The use of explosives is not permitted.

Protection of Persons and Property: Barricade open excavations occurring as part of this work and post with warning lights.

Operate warning lights as recommended by authorities having jurisdiction.

Protect structures, utilities, sidewalks, pavements, and other facilities from damages caused by settlement, lateral movement, undermining, washout, and other hazards created by earthwork operations.

Perform excavation within drip-line of large trees to remain by hand, and protect the root system from damage or dryout in the manner prescribed in sections under "Sitework".

PART 2 - PRODUCTS

SOILS MATERIALS:

Subbase Material: Naturally or artificially graded mixture of natural or crushed gravel, crushed stone, crushed slag, natural or crushed sand.

Backfill and Fill Materials: Satisfactory soil materials free of clay, rock or gravel larger than 2" in any dimension, debris, waste, frozen materials, vegetable and other deleterious matter. The fill material should be sand containing little fines. Prior to placing the fill material, the existing material shall be stripped of all soils containing a significant percentage of organics and all loose soils which cannot be readily compacted. If existing materials do not meet these requirements, it may be necessary to backfill with select materials other than those on the job site.

PART 3 - EXECUTION

EXCAVATION:

Excavation is Unclassified, and includes excavation to subgrade elevations indicated, regardless of character of materials and obstructions encountered.

Unauthorized excavation consists of removal of materials beyond indicated subgrade elevations or dimensions without specific direction of Engineer. Unauthorized excavation, as well as remedial work directed by Engineer, shall be at Contractor's expense.

Under footings, foundation bases, or retaining walls, fill unauthorized excavation by extending indicated bottom of elevation of footing or base to excavation bottom, without altering required top elevation. Lean concrete fill may be used to bring elevations to proper position, when acceptable to Engineer.

Elsewhere, backfill and compact unauthorized excavations as specified for authorized excavations of same classifications, unless otherwise directed by engineer.

Additional Excavation: When excavation has reached required subgrade elevations, notify Engineer who will make an inspection of conditions.

If unsuitable bearing materials are encountered at required subgrade elevations, notify Engineer who will make an inspection of conditions.

If unsuitable bearing materials are encountered at required subgrade elevations, carry excavations deeper and replace excavated material as directed by the Engineer.

Removal of unsuitable material and its replacement as directed will be paid on basis of contract conditions relative to changes in work.

Stability of Excavations: Slope sides of excavations to comply with local codes and ordinances having jurisdiction. Shore and brace where sloping is not possible because of space restrictions or stability of material excavated.

Maintain sides and slopes of excavations in safe condition until completion of backfilling.

Shoring and Bracing: Provide materials for shoring and bracing, such as sheet piling, uprights, stringers and cross-braces, in good serviceable condition.

Establish requirements for trench shoring and bracing to comply with local codes and authorities having jurisdiction.
Maintain shoring and bracing in excavations regardless of time period excavations will be open. Carry down shoring and bracing as excavation progresses.

Dewatering: Prevent surface water and subsurface or ground water from flowing into excavations and from flooding project site and surrounding area. The cost of all dewatering operations including well pointing shall be the responsibility of the Contractor.

Do not allow water to accumulate in excavations. Remove water to prevent softening of foundation bottoms, undercutting footings, and soil changes detrimental to stability of subgrades and foundations. Provide and maintain pumps, well points, sumps, suction and discharge lines, and other dewatering system components necessary to convey water away from excavations.

Establish and maintain temporary drainage ditches and other diversions outside excavation limits to convey rain water and water removed from excavations to collecting or run-off areas. Do not use trench excavations as temporary drainage ditches.

Material Storage: Stockpile satisfactory excavated materials where directed, until required for backfill or fill. Place, grade, and shape stockpiles for proper drainage.

Locate and retain soil materials away from edge of excavations. Do not store within drip line of trees indicated to remain.

Dispose of excess soil material and waste materials as herein specified.

Excavation for Structures: Conform to elevations and dimensions shown within a tolerance of plus or minus 0.10', and extending a sufficient distance from footings and foundations to permit placing and removal of concrete formwork, installation of service, other construction, and for inspection.

In excavating for footings and foundations, take care not to disturb bottom of excavation. Excavate by hand to final grade just before concrete reinforcement is places. Trim bottoms to required lines and grades to leave solid base to receive other work.

Excavation for Trenches: Dig trenches to the uniform width required for particular item to be installed, sufficiently wide to provide ample working room. Provide 6" to 9" clearance on both sides of pipe or conduit and a maximum of 30" total width.

Excavate trenches to depth indicated or required. Carry depth of trenches for piping to establish indicated flow lines and invert elevations. Beyond building perimeter, keep bottoms of trenches sufficiently below finish grade to avoid freeze-ups.

Where rock is encountered, carry excavation 6" below required elevation and backfill with a 6" layer of crushed stone or gravel prior to installation of pipe.

For pipes or conduit 5" or less in nominal size and for flat-bottomed multiple-duct conduit units, do not excavate beyond indicated depths. Hand excavate bottom cuts to accurate elevations and support pipe or conduit on undisturbed soil.

For pipes or conduit 6" or larger in nominal size, tanks and other mechanical/electrical work indicated to receive subbase, excavate to subbase depth indicated, or, if not otherwise indicated, to 6" below bottom of work to be supported.

Except as otherwise indicated, excavate for waterbearing piping so top of piping is not less that 3'-0" below finished pavement grade, but no less that 2'-6" below finish grade.

Grade bottoms of trenches as indicated, notching under pipe bells to provide solid bearing for entire body of pipe.

Backfill trenches with concrete where trench excavations pass within 18" of column or wall footings and which are carried below bottom of such footings, or which pass under wall footings. Place concrete to level of bottom of adjacent footing.

Use care in backfilling to avoid damage or displacement of pipe systems.

COMPACTION:

General: Control soil compaction during construction, providing minimum percentage of density specified for each area classification indicated below.

All compaction requirements for this section are specified on the construction plans.

Moisture Control: Where subgrade of layer of soil material must be moisture conditioned before compaction, uniformly apply water to surface of subgrade, or layer of soil material, to prevent free water appearing on surface during subsequent to compaction operations.

Remove and replace, or scarify and air dry, soil material that is too wet to permit compaction to specified density.

Soil material that has been removed because it is too wet to permit compaction may be stockpiled or spread and allowed to dry. Assist drying by dicing, harrowing or pulverizing, until moisture content is reduced to a satisfactory value.

BACKFILL AND FILL:

General: Place acceptable soil material in layers to required subgrade elevations, for each area classification listed below:

In excavations, use satisfactory excavated or borrow material.

Under grassed areas, use satisfactory excavated or borrow material.

Under walks and pavements, use subbase material, or satisfactory excavated or borrow material, or combination of both.

Under piping and conduit, use subbase material where subbase is indicated under piping or conduit; shape to fit bottom 90 degrees of cylinder.

Backfill excavation as promptly as work permits, but not until completion of the following;

Acceptance of construction below finish grade.

Inspection, testing, approval, and recording locations of underground utilities.

Removal of concrete formwork.

Removal of shoring and bracing, and backfilling of voids with satisfactory materials. Cut off temporary sheet piling driven below bottom of structures and remove in manner to prevent settlement of the structure or utilities, or leave in place if required.

Removal of trash and debris.

Permanent or temporary horizontal bracing is in place on horizontally supported walls.

Ground Surface Preparation: Remove vegetation, debris, unsatisfactory soil materials, obstructions, and deleterious materials from ground surface prior to placement of fills. Plow, strip, or break-up sloped surfaces steeper than 1 vertical to 4 horizontal so that fill material will bond with existing surface.

When existing ground surface has a density less than that specified under "Compaction" for particular area classification, break-up ground surface, pulverize, moisture-condition to optimum moisture content, and compact to required depth and percentage of maximum density.

Placement and Compaction: The lower portion of backfill, to a compacted level of one foot above the top of the pipe, shall be hand placed in layers of lifts not to exceed six inches of compacted depth and each layer compacted individually by means of hand tampers. Above that level, place lifts in layers not to exceed twelve inches of compacted depth and machine filling and tamping may be used.

Before compaction, moisten or aerate each layer as necessary to provide optimum moisture content. Compact each lift to required percentage of minimum soil density for each area classification as designated herein. Do not place backfill or fill material on surfaces that are muddy, frozen, or contain frost or ice.

Place backfill and fill materials evenly adjacent to structures, piping or conduit to required elevations. Take care to prevent wedging action of backfill against structures or displacement of piping or conduit by carrying material uniformly around structure, piping or conduit to approximately same elevation in each lift.

GRADING:

General: Uniformly grade areas within limits of grading under this section, including adjacent transition areas. Smooth finished surfaces within specified tolerances, compact with uniform levels or slopes between points where elevations are indicated, or between such points and existing grades.

Grading Outside Building Lines: Grade areas adjacent to building lines to drain away from structures and to prevent ponding.

Finish surfaces free from irregular surface changes, and as follows:

Lawn or Unpaved Ares: Finish areas to receive topsoil to within not more than 0.10' above or below required subgrade elevations.

Walks: Shape surface of areas under walks to line, grade and cross-section, with finish surface not more that 0.10' above or below required subgrade elevation.

Pavements: Shape surface of ares under pavement to line, grade and cross-section, with finish surface not more than 1/2" above or below requires subgrade elevations.

Grading Surface of Fill Under Building Slabs: Grade smooth and even, free from voids, compacted as specified, and to required elevation.

Provide final grades within a tolerance of 1/2" when tested with a 10' straightedge.

Compaction: After grading, compact subgrade surfaces to the depth and indicated percentage for each area classification.

FIELD QUALITY CONTROL:

Quality Control Testing During Construction: Provide testing service by a qualified soil testing firm, subject to Engineer's approval, to inspect and approve subgrades and fill layers before further construction work is performed.

Paved Areas: Make at least one field density test of subgrade for every 2000 square feet of paved area but in no case less than 3 tests, nor less than 1 per driveway or crossing. In each compacted fill layer, make one field density test for every 2,000 square feet of paved area but in no case less than 3 tests, nor less than 1 per driveway or crossing.

Non-Paved Areas: Perform at least 1 field density test per 3,000 square feet of fill per every vertical foot of height, and perform at least 1 field density test per 1,000 feet of pipe installed per every 2 feet of vertical trench depth.

If in opinion of Engineer, based on testing service reports and inspection, subgrade or fills which have been placed below are specified density, provide additional compaction and testing at no additional expense.

MAINTENANCE:

Protection of Graded Areas: Protect newly graded areas from traffic and erosion. Keep free of trash and debris.

Repair and re-establish grades in settled, eroded, and rutted areas to specified tolerances.

Reconditioning Compacted Areas: Where completed compacted areas are disturbed by subsequent construction operations or adverse weather, scarify surface, re-shape, and compact to required density prior to further construction.

Grassed Areas: See Section 02210, "Grassing" for requirements of grassed areas.

DISPOSAL OF EXCESS AND WASTE MATERIALS:

Disposal of all spoil material resulting from construction shall be the responsibility of the Contractor.

END OF SECTION 312200

SECTION 312222 - TRENCHING, BACKFILLING AND COMPACTING

PART 1 - GENERAL

1.1 DESCRIPTION OF WORK

A. The extent of trenching, backfilling and compacting is shown on the drawings.

B. This section includes furnishing equipment, labor and materials, and performing all operations necessary and incidental to perform the required work.

PART 2 - PRODUCTS

NOT USED

PART 3 - EXECUTION

3.1 CLEARING THE SITE

A. The site of the work shall be cleared of all trees, shrubs, paving and objectionable material which interfere with the prosecution of the proposed work. Trees and shrubs which will not interfere with construction shall be protected from damage. Clearing shall be considered as an incidental item of excavation.

3.2 EXCAVATION

A. General: Perform excavation described of whatever substance encountered to the dimensions and depths specified or shown on the drawings. Undercutting will not be permitted, except when ordered by the Engineer. Material suitable for backfill shall be stockpiled near the site. Rock or other material undesirable for backfill shall be spoiled outside the area in a neat manner, as directed by the Engineer. Where it is necessary to cut roots projecting into an excavation or where it is necessary to trim branches for equipment clearance, all severed root ends or cuts to branches over 1/2-inch diameter shall be treated with an asphalt base pruning paint. Backfill over exposed roots as soon as possible.

B. Rock: Where encountered in the trench bed, rock shall be excavated to a depth of 1/4 of the pipe diameter below the bottom of the pipe but in no case less than 4-inches. All undercut trench excavation shall be backfilled and tamped with materials as specified in the following paragraphs under Unstable Subgrade.

C. Unstable Subgrade:

1. In the event that unsuitable material is encountered at or below the excavation depth specified or shown on the drawings, the Engineer shall be notified. Such material shall be removed and replaced with suitable material. Methods and materials used for replacement shall be one of the following as directed by the Engineer in writing.
   a. Suitable earth or sand, compacted in the trench. Materials shall be furnished as a part of the Bid Proposal item covering excavation and backfill.
   b. Gravel or crushed limerock, compacted in the trench and paid for under the appropriate item.
   c. Existing materials, stabilized after removal and then replaced and compacted in the trench at no additional cost to the Owner.

2. The Engineer shall determine the methods and materials to be used, based upon the condition of the excavation, the pipe structure to be supported, and the availability and character of stabilizing materials.

D. Trenches:

1. Keep pipe laying operation as close to the excavation operation as possible during the prosecution of the work. The Engineer reserves the right to stop the excavation at any time when, in his opinion, the excavation is opened too far in advance of the pipe laying.

2. Pipe trenches shall be excavated to a depth that will insure a minimum of 36-inches of cover for ductile iron and PVC pipe and 54-inches of cover for polyethylene pipe, except service laterals. Trenches shall be only of sufficient width to provide a free working space on each side of the pipe. To prevent excess pressure on the pipe, the maximum width of trench at the top of the pipe and at the bottom of the trench shall not be greater than 2-feet more than the greatest exterior diameter of the pipe. If this maximum width is exceeded, it shall be the Contractor's responsibility to provide, at no additional cost to the Owner, such additional bedding or select backfill materials as the Engineer may require. The excavation below the spring line shall be made to conform as near as possible to the shape of the lower third of the pipe. To protect the pipe lines from unusual stresses, all work shall be done in open trenches. Excavation shall be made for bells of all pipes and of sufficient depth to permit access to the joint for construction and inspections. In no case will the bells be used to support the body of the pipe.

3. In order to avoid existing utilities, at times it may be necessary for the pipe to be laid deeper than the minimum cover specified in the preceding paragraph. At such time the Contractor will not be allowed extra compensation for additional excavation involved.

4. In case excavation has been made deeper than necessary, a layer of concrete, fine gravel or other material satisfactory to the Engineer shall be placed, at no extra cost, to secure a firm foundation for the lower third of each pipe. Where possible, excavated material shall be placed so as not to interfere with public travel. Bridging shall be provided to afford necessary access to public or private premises. Bridging shall be considered as part of the excavation operation and shall be supplied at no additional cost to the Owner.

E. Structural: (For inlets, manholes, valve pits and similar structures)

1. Remove sufficient material to allow proper space for erecting and removing forms. The elevations of the bottoms of footings, if shown on the drawings, shall be considered as approximate only, and the Engineer may order, in writing, such changes in dimensions or elevations of footings as may be deemed necessary to secure a satisfactory foundation. Excavation for structures shall be sufficient to leave at least 12-inches in the clear between their outer surfaces and the embankment of timber that may be used to protect them. Backfill of earth under structures will not be permitted. Excess excavation for structures shall be filled with thoroughly compacted sand, gravel, or concrete at the expense of the Contractor.

2. After excavation for a structure is completed, the Contractor shall notify the Engineer to that effect. No concrete or reinforcing steel shall be placed until the Engineer has approved the depth of the excavation and the character of the foundation material.

F. Sheeting and Shoring:

1. The Contractor shall provide all trench and structural bracing, sheeting or shoring necessary to construct and protect the excavation, existing utilities, structures and private property of all types and as required for the safety of the employees. Sheeting shall be removed or cut off by the Contractor during backfilling operations as directed by the Engineer. Sheeting which is left in place by order of the Engineer will be paid for under the item, Lumber left in Place. Removal of shoring for structures shall be done in such a manner as not to disturb or mar finished masonry or concrete surfaces.

3.3 DRAINAGE

A. Grading shall be controlled in the vicinity of excavations so that the surface of the ground will be properly sloped to prevent water from running into trenches or other excavated areas. Any water which accumulates in the excavations shall be removed promptly by well point or by other means satisfactory to the Engineer in such a manner as to not create a nuisance to adjacent property or public thoroughfare. Trenches shall be kept dry while pipe is being laid. Bridging of dewatering pipe shall be provided where necessary. Pumps and engines for well point systems shall be operated with mufflers, and at a minimum noise level suitable to a residential area. The Contractor will not be allowed to discharge water into the Owner's storm drainage system without the written approval of the Engineer. Approval will be subject to the condition that the storm sewer be returned to its original condition.

B. The Contractor is responsible for carrying the water to the nearest ditch or body of water and for obtaining the necessary permission to use same. The Contractor shall be financially responsible for any nuisance created due to carrying off water from his drainage system.

3.4 BACKFILL

A. Trenches:

1. Trenches shall be backfilled immediately after the pipe is laid unless other protection for the pipeline is provided. Clean earth, sand, crushed limerock or other material approved by the Engineer shall be used for backfill. Backfill material shall be selected, deposited and compacted (simultaneously on both sides of the pipe) so as to eliminate the possibility of lateral displacement of the pipe. Backfill material shall solidly tamped around the pipes in layers to a level at least 1-foot above the top of the pipe. Each layer shall be compacted to a maximum thickness of 6-inches.

2. In unpaved areas, the remainder of the backfill shall be deposited and then compacted by puddling, water flooding or mechanical tampers. Mechanical tamping of layers in unpaved areas shall be to a maximum thickness of 12-inches. In areas to be paved or repaved, the entire depth of backfill shall be deposited in layers and compacted by hand or mechanical tampers to a maximum thickness of 6-inches. Compaction shall be carried out to achieve a density of at least 98% of the maximum density as determined by AASHTO, Method T-180. Under areas to be paved, puddling may be used for backfill consolidation after tamping to 1-foot over the pipe, as specified, provided the method is first approved by the Engineer and the density requirements are met.

3. In areas to be paved, density tests for determination of the specified compaction shall be made by a testing laboratory and spaced one in every 300-feet of trench cut. It is the intent of this specification to secure a condition where no further settlement of trenches will occur. When backfilling is completed, the roadway base for pavement replacement may be placed immediately. It will be the responsibility of the Contractor to restore the surface to the original grade

wherever settlement occurs.

B. Wet Trenches (Contractor's Option):

1. Backfill for the pipe bed in wet trenches shall be crushed, graded limerock, compacted in the trench. After the pipe is laid, a graded limerock backfill shall be placed and worked in around the haunches to a point 6-inches above the pipe. The width of the limerock material around the pipe shall not be less than the outside diameter of the pipe plus 6-inches on each side of the pipe. Material shall be carefully distributed along the pipe so as to provide full and uniform support under and around the pipe. Six inches above the top of the pipe and up to the water level, material from the excavations with no rock or earth exceeding 4-inches in any one dimension shall then be lifted to the trench and released at the water level. Material shall be uniformly distributed for the full width of the trench. Backfill and compaction above the eater level in the trench shall be as specified above. All costs for graded limerock placed in wet trenches shall be included in the cost of stage excavation and backfill for the various sizes of pipe.

C. Bedding and Backfill - Flexible Sewer Pipe:

1. For polyvinyl chloride pipe, the bedding and backfill materials shall be such as to limit the vertical ring deflection to 5% of the inside pipe diameter. A deflection greater than 5% of the inside diameter shall be cause for rejection of the pipe.

2. Class IV or Class V materials as defined in ASTM D2321-74 shall not be used for bedding, haunching or initial backfill for flexible pipes.

3. For polyvinyl chloride plastic pipe, bedding shall be in accordance with ASTM D2321-74, using Class I, II or III materials, except under wet conditions. In any area where the pipe will be installed below existing or future groundwater levels or where the trench could be subject to inundation, Class I material shall be placed to the springline of the pipe.

4. A minimum of effort is needed to compact the material. However, in the initial stage of placing this type of material, take care to ensure that sufficient material has been worked under the haunch of the pipe to provide adequate side support. Take precautions to prevent movement of the pipe during placing of the material under the pipe haunch. Except for the protection of the pipe from large particles of backfill material, little care need be taken and no compaction is necessary in placing backfill material in the balance of the initial backfill area above the pipe. Where unstable trench wall exist because of migratory materials, such as water-bearing silts or fine sand, take care to prevent the loss of side support through the migratory action.

5. All bedding requirements for flexible pipe specified in the preceding paragraphs shall be included in the price bid for the applicable pipe material and no additional compensation for bedding material will be allowed.

D. Structural:

1. After completion of foundation footings and walls and other construction below the elevation of the final grades, and prior to backfilling, forms shall be removed and the excavation shall be cleared of all trash and debris. Material for backfilling shall consist of the excavation, borrow sand or other approved materials, and shall be free of trash, lumber or other debris. Backfill shall be placed in horizontal layers not in excess of 9-inches in thickness, and have a moisture content such that a density may be obtained to prevent excessive settlement or shrinkage. Each layer shall be compacted by hand or approved machine tampers with extreme care being exerted not to damage pipe or structures. Backfill shall be

placed and compacted evenly against the exposed surfaces to prevent undue stress on any surface.

3.5 RESTORATION OF SURFACE IMPROVEMENTS

A. Roadways, including shoulders, alleys and driveways of shell, limerock, stabilized soil or gravel, grass plots, sod, shrubbery, ornamental trees, signs, fences, or other surface improvements on public or private property which have been damaged or removed in excavation, shall be restored to conditions equal to or better than conditions existing prior to beginning work. Restoration of shoulders shall consist of seeding and mulching or stabilizing with limerock as selected by the Engineer. The cost of doing this work shall be included in the cost of the various applicable items. Photographs as specified in Section 01380 - General Quality Control will be used as an aid in determining conditions prior to construction.

B. Materials for unpaved roadways, road shoulders, alleys, or driveways, shall be compacted as described in the plans. The cost of this work and furnishing new materials shall be included in the cost of the applicable items of work as no separate payment will be made, unless a separate bid item is provided.

3.6 FINE GRADING

A. Finished areas around structures shall be graded smooth and hand raked and shall meet the elevations and contours shown on the drawings. Lumber, earth clods, rocks and other undesirable materials shall be removed from the site.

3.7 DISPOSAL OF MATERIALS

A. Such portions of the excavated materials as needed and as suitable, shall be used for backfilling and grading about the completed work to the elevations as shown of the drawings or as directed. Excavated material in excess of the quantity required for this purpose shall be disposed of by the Contractor in those areas designated by the Owner and as shown on the drawings. The Contractor shall leave the earth over the trenches or other excavations in a neat and uniform condition acceptable to the Owner.

3.8 PAVEMENT REPLACEMENT

A. Asphalt pavement shall be removed by saw cutting on a straight line with edges as vertical as possible. Concrete pavement or asphalt surfaced concrete shall be removed by cutting with a concrete saw in as straight a line and vertically as possible. Materials to replace State Highway paving shall conform to the specifications required by the Florida Department of Transportation Specifications for Type S-I asphaltic concrete surface course, or as specifically shown in the plans.

B. Prior to replacing concrete or asphalt pavement replacement, a limerock base shall be laid. The base for concrete pavement shall be 6-inches of compacted thickness, and that for asphalt pavement shall be 8-inches of compacted thickness. The base course for each shall be compacted to a minimum of 98% of the maximum density as determined by AASHTO, Method T-180. The Owner will have tests made by an independent testing laboratory to verify compaction results. One test will be made for each block of continuous trench cut.

C. Non-asphalt pavement replacement shall be replaced of like material and thickness. Asphalt or built-up asphalt pavement shall be replaced with like material or concrete as directed by the Engineer. Where asphalt or built-up asphalt pavement is replaced by concrete, the concrete shall have a minimum of 6-inches in thickness and be reinforced with 6 by 6 no. 6 gage welded wire fabric. Concrete for paving shall be 3,000 psi design strength. Where the pavement replacement is of like material, it shall be replaced in thickness equal to or better than that existing at the time of removal.

D. Unless the base is sealed or other temporary paving applied over areas to be repaved, pavement shall be replaced not later than 3-weeks after completion of backfill.

3.9 TESTS

A. The Contractor shall furnish facilities for making all density tests and make such restorations as may be necessary due to test operations. All density tests on backfill or base replacement will be made by a commercial testing laboratory employed by the Contractor and at such locations as may be recommended by the Engineer. If the densities as determined by the specified tests fall below the required minimums, the Contractor shall pay for all retests.

3.10 SIDEWALK, CURB AND GUTTER REMOVAL AND REPLACEMENT

A. Sidewalk, curb and gutter removal and replacement required in the construction of this work shall be done by the Contractor. Reasonable care shall be exercised in removing sidewalk and curb and gutter, and the Contractor shall either stockpile or dispose of this material as directed by the Engineer. Brick, concrete or built-up asphalt sidewalk replacement and curb and gutter replacement shall be replaced of like material in a manner and condition equal to or better than that existing at the time of removal. Materials and methods of replacing State Highway sidewalks or curbs shall conform to the Department of Transportation specifications.

END OF SECTION 02222

SECTION 322500 - PAVING QUALITY CONTROL SYSTEM

PART 1 - GENERAL

1.01 GENERAL REQUIREMENTS

A. The CONTRACTOR shall furnish and maintain a quality control system that will provide reasonable assurance that all materials and products submitted to the ENGINEER for acceptance conform to the contract requirements whether manufactured or processed by the CONTRACTOR or procured from suppliers or subcontractors.

B. The CONTRACTOR shall perform or have performed the inspection and tests required to substantiate product conformance to contract requirements and shall also perform or have performed all inspections and tests otherwise required by the contract.

C. The CONTRACTOR shall have a Quality Control Technician, who has been certified by FDOT as a Certified Asphalt Plant Technician; available at the asphalt plant at all times the CONTRACTOR is producing asphalt mix for the contract.

D. The CONTRACTOR's quality control procedures, inspection, and tests shall be documented and that information is available for review by the ENGINEER throughout the life of the contract.

E. The CONTRACTOR's person in responsible charge of the paving operations shall also be certified by the FDOT as an Asphalt Paving Technician and shall possess a valid certificate of qualification, and be present during all paving operations.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.01 ENGINEER'S INSPECTION:

A. The ENGINEER reserves the right to inspect materials not manufactured within the CONTRACTOR's facility.

B. The ENGINEER inspection shall not constitute acceptance nor shall it in any way replace the CONTRACTOR's inspection or otherwise relieve the CONTRACTOR of his responsibility to furnish an acceptable material or product.

C. When inspection of the subcontractor's or supplier's product is performed by the ENGINEER, such inspection shall not be used by the CONTRACTOR as evidence of effective inspection of such subcontractor's or supplier's product.

END OF SECTION 02500

SECTION 322505 - PAVING CONSTRUCTION DETAILS AND MATERIALS

PART 1 - GENERAL

Unless otherwise stated in the project plans or specifications, the Contractor will be required to follow all general requirements and covenants, construction methods and materials, to meet the specifications set forth in the Florida Department of Transportation Standard Specifications for Road and Bridge Construction, latest edition, and any new or amended sections in effect prior to the date of bid opening. Testing procedures shall be as specified in Section 02520 of these specifications. Results of testing shall be as set forth by the Florida Department of Transportation for road construction.

There will be no asphalt or fuel escalators allowed under this contract.

END OF SECTION 02505

SECTION 322510 - GENERAL CONSTRUCTION REQUIREMENTS FOR ASPHALT PAVEMENT

PART 1 - GENERAL

1.01 DESCRIPTION:

A. This Section specifies the general construction requirements for all plant-mixed hot bituminous pavements.

1.02 LIMITATIONS OF OPERATIONS:

A. Weather Limitations:

1. Plant Operations shall not begin unless all weather conditions are suitable for the laying operations.

1.03 LIMITATIONS OF LAYING OPERATIONS:

A. General:

1. The mixture shall be spread only when the surface, upon which it is to be laid has been previously prepared, is intact, firm and properly cured, and is dry.

2. Unless otherwise approved by the Engineer, no mixture shall be spread that cannot be finished and compacted during daylight hours.

B. Temperature:

1. The mixture shall be spread only when the air temperature (the temperature in the shade away from artificial heat) is 40E F and above for layers greater than one inch (100 pounds per square yard) in thickness and 45E F and above for layers one inch (100 pounds per square yard) or less in thickness.

2. No mixture shall be placed when there is evidence that the base is frozen.

C. Wind:

1. The mixture shall not be spread when the wind is blowing to such an extent that proper and adequate compaction cannot be maintained or when sand, dust, etc. are being deposited on the surface being paved, to the extent that the bond between layers will be diminished.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.01 PREPARATION OF ASPHALT CEMENT:

A. The asphalt cement shall be delivered to the asphalt plant at a temperature not to exceed 350EF and shall be maintained within a range of 230EF to 350EF in advance of mixing operations.

B. Heating within these limits shall be constant and wide fluctuations of temperature during a day's production will not be permitted.

3.02 PREPARATION OF AGGREGATES:

A. Stockpiles:

1. Each aggregate component shall be placed in an individual stockpile, which shall be separated from the adjacent stockpiles, either by space or by system of bulkheads.

2. The intermingling of different materials in stockpiles shall be prevented at all times. Each stockpile, including RAP, shall be identified as shown on the Mix Designs.

3.03 PREVENTION OF SEGREGATION:

A. In the event that the method used for stockpiling coarse aggregate results in segregation of the aggregate, the Engineer will require that the stockpiles be built up in layers not higher than four feet, with each layer completely in place before the next is started.

B. Stockpiles shall not be formed by depositing material in one place or by coning.

3.04 BLENDING OF AGGREGATES:

A. Blending or proportioning from railroad cars will not be permitted.

B. All aggregates shall be stockpiled prior to blending or placing in the cold hoppers.

C. All aggregates to be blended or proportioned shall be placed in separate bins at the cold hopper and proportioned by means of securely positioned calibrated gates or other approved devices.

3.05 COLD BINS:

A. Adequacy of Bins:

1. The separate bin compartments of the cold aggregate feeder shall be so constructed as to prevent any spilling or leakage of aggregate from one bin to another.

2. Each bin compartment shall be of such capacity and design as to permit a uniform flow of aggregates.

3. All bin compartments shall be mounted over a feeder of uniform speed, which shall deliver the specified proportions of the separate aggregates to the drier at all times.

4. If necessary, the bins shall be equipped with vibrators to insure a uniform flow of the aggregates at all times.

3.06 GATES:

A. Each bin compartment shall be provided with a gate that is adjustable in a vertical direction.

B. The gate shall be so designed that it can be held securely at any specified vertical opening.

C. The gates shall be equipped with a measuring device for measuring the vertical opening of the gates from a horizontal plane level with the bottom of the feeder.

3.07 MINERAL FILLER:

A. If mineral filler is required in the mix, it shall be fed or weighed-in separately from the other aggregates.

3.08 HEATING AND DRYING:

A. The aggregates shall be heated and dried before screening.

B. The temperature of the aggregates shall be heated and dried before screening.

C. The temperature of the aggregates shall be co controlled that the temperature of the completed mixture at the plant will fall within the permissible range allowed by these specifications.

3.09 SCREENING UNIT:

A. OVERSIZE AGGREGATE:

1. Any oversized pieces of aggregate shall be removed by the use of a scalping screen.

2. This oversized material shall not be returned to the stockpile for reuse unless it has been crushed and reprocessed into sizes that will pass the scalping screen.

B. SCREENING:

1. Unless otherwise permitted by the Engineer, the quantity of aggregates being discharged onto the screens shall not be in excess of the capacity of the screens to actually separate the aggregates into the required sizes.

2. A minimum of ten percent plus-ten material will be permitted in the minus-ten bin.

3. The maximum amount of minus-ten material allowed in the plus-ten bins will be determined by the Engineer, in accordance with its effect on the uniformity of the mix.

C. MIXING DIFFERENT MATERIALS:

1. Unless written permission is obtained, coarse aggregates of different types shall not be mixed; nor shall coarse aggregates of different types be used alternately in sections less than on mile in length.

3.10 PREPARATION OF THE MIXTURE

A. BATCH MIXING:

1. Aggregates:

a) The dried aggregates and mineral filler (if required), prepared in the manner previously described, and combined in batches to meet the job mix formula by weighing each separate bin size, shall be conveyed to the empty mixer.

2. Bitumen:

   a) The hot asphalt cement, accurately measured, shall be introduced into the mixer simultaneously with, or after, the hot aggregates.

   b) Mixing shall continue until the mixture is thoroughly uniform, with all particles fully coated.

3. Mixing time:

   a) The mixing time shall begin when the measuring devices for both the asphalt and the aggregates indicate that all the material is in the mixer, and shall continue until the material begins to leave the mixing unit.

   b) The mixing time will vary in relation to the nature of the aggregates and the capacity of the mixer shall be as designated by the Engineer but in no case shall it be less than 35 seconds.

B. CONTINUOUS MIXING:

1. The dried aggregates and mineral filler (if required), prepared as specified and proportioned to meet the job mix formula by volumetric measurements, shall be introduced into the mixer in synchronization with the accurate feeding of the hop asphalt cement.

2. The rate of flow of material to the pug mill shall be such that the maintained depth of the mix will not exceed the tips of the paddles when in the upright position.

3. Mixing shall be sufficient to produce a thoroughly and uniformly coated mixture.

C. MIXING TEMPERATURE:

1. The ingredients of the mix shall be heated and combined in such a manner as to produce a mixture, which shall be at a temperature, when discharged from the pug mill or surge bin, within the range of 230°F to 310°F and within the tolerance shown in Table 1.

Table 1

Temperature Tolerance From Job Mix Formula

Any Single Measurement	25°F
Average of Any Five Consecutive Measurements	15°F

2. Any load or portion of a load of asphalt mix at the plant or on the road with mix temperature exceeding 335°F shall be rejected for use on the project.

3. Temperature of the completed mixture shall be determined by a quick-reading thermometer through a hole in the side of the loaded truck immediately after loading. The hole shall be located within the middle third of the length of the body, and at a distance of from six to ten inches above the surface supporting the mixture. If a truck body already has a hole located in the general vicinity of the above-specified location, this will be acceptable. At the Engineer's discretion, the temperature of the load may be taken over the top of the truck in lieu of using the hole in the side of the truck.

4. The mix temperature will be taken at the plant on the first five loads each day and on an average of once every five loads thereafter. If the temperature fails to fall within the specified tolerance range, the Contractor will be required to take corrective action.

3.11 MAXIMUM PERIOD OF STORAGE:

A. The maximum time that any mix may be kept in a hot storage or surge bin is 72 hours.

3.12 CONTRACTOR'S RESPONSIBILITY FOR MIXTURE REQUIREMENTS:

A. The responsibility for producing a homogeneous mixture, free from moisture and with no segregated materials, and meeting all requirements of the specifications for the mixture, including compliance with the design limits, shall lie entirely with the Contractor.

B. These requirements shall apply also to all mixes produced by the drum mixer process and all mixes processed through a hot storage or surge bin, both before and after storage.

3.13 TRANSPORTATION OF THE MIXTURE

A. The mixture shall be transported in tight vehicles previously cleaned of all foreign material.

B. The inside surface of the truck bodies after cleaning shall be thinly coated with soapy water or an approved emulsion containing not over five percent oil.

C. The coasting shall be applied prior to the first loading each day and repeated as necessary throughout the day's operations.

D. After the truck bodies are coated before any mixture is placed therein, they shall be raised to drain out all excess liquids.

E. Each load shall be covered during cool and cloudy weather and at any time there is a probability of rain.

3.14 PREPARATION OF APPLICATION SURFACES

A. CLEANING:

1. Prior to the laying of the mixture, the surface of the base or pavement to be covered shall be cleaned of all loose and deleterious material by the use of power brooms or blowers, supplemented by hand brooming where necessary.

B. PATCHING AND LEVELING COURSES:

1. Where a surface course is constructed on an existing pavement of old base which is irregular, and wherever so indicated in the plans, the existing surface shall be brought to proper grade and cross section by the application of patching or leveling courses.

C. APPLICATION OVER SURFACE TREATMENT:

1. Where a surface course is to be placed over a newly constructed surface treatment, all loose material shall be swept from the paving area and disposed of by the contractor.

D. COATING SURFACES OF CONTACTING STRUCTURES:

1. All structures which will be in actual contact with the asphalt mixture, with the exception of the vertical faces of existing pavements and curbs or curb and gutter, shall be painted with a uniform coating of asphalt cement to provide a closely bonded, watertight joint.

3.15 TACK COAT

A. TACK COAT REQUIRED:

1. A tack coat will be required on existing pavements that are to be overlaid with an asphalt mix and between successive layers of all asphalt mixes.

B. TACK COAT AT ENGINEER'S OPTION:

1. A tack coat will be required on the following surfaces only when so directed by the Engineer:

2. Freshly primed bases

3. Surface Treatment

3.16 PLACING MIXTURE

A. Requirements Applicable To All Types:

1. Alignment of Edges:

a) All asphaltic concrete mixtures other than adjacent to curb and gutter or other true edges, shall be laid by the string line method, to assure the obtaining of an accurate, uniform alignment of the pavement edge.

2. Temperature of Spreading:

a) The temperature of the mix at the time of spreading shall be within "25E F of the established mix temperature selected by the Contractor.

b) The minimum frequency for taking mix temperatures on the road will be an average of one per five trucks. If the temperature fails to fall within the specified tolerance range, corrective action by the contractor will be required.

3. Rain and Surface Conditions:

a) Transportation of asphalt mixtures shall immediately cease from the plant when rain begins at the roadway.

b) Asphalt mixtures shall not be placed while rain is falling, or when there is water on the surface to be covered.

c) As an exception, mixture caught in transit may be placed at the Contractor's risk if the only option is to waste this mixture, and provided the surface has been tacked (as required) prior to the rain and the surface broomed in front of the spreading operation.

d) Such mixture will be evaluated separately and if it should prove unsatisfactory in any way, in the opinion of the Engineer, it shall be removed and replaced with satisfactory mixture at the Contractor's expense.

4. Speed of Spreading:

    a) The forward speed of the asphalt spreader shall be as established by the Engineer.

5. Number of Crews Required:

    a) For each paving machine being operated, the Contractor will be required to use a separate crew; each crew operating as a full unit.

6. Checking Depth of Layer:

    a) The depth of each layer shall be checked at frequent intervals, not to exceed 25 feet.

    b) Any deviation from the required thickness, in excess of the allowable tolerance, shall be immediately corrected.

7. Hand Spreading:

    a) In limited areas where the use of the spreader is impossible or impracticable, the mixture may be spread and finished by hand.

8. Straight-edging and Back-patching:

    a) Straight-edging and back-patching shall be done after initial compaction has been obtained and while the material is still hot.

3.17 REQUIREMENTS APPLICABLE TO COURSES OTHER THAN LEVELING:

A. Spreading and Finishing:

1. Upon arrival, the mixture shall be dumped in the approved mechanical spreader and immediately spread and struck-off to the full width required and to such loose depth for each course that, when the work is completed, the required weight of mixture per square yard, or the specified thickness, will be secured.

2. An excess amount of mixture shall be carried ahead of the screed at all times.

3. Hand raking shall be done behind the machine as required.

B. Thickness of Layers:

1. Unless otherwise noted in the plans each course shall be constructed in layers of the thickness shown on FDOT Standard Index No. 513.

2. Type S-III Asphaltic Concrete shall be constructed in layers of thickness of not less than: inch nor greater than 13 inches.

C. Laying Width:

1. If necessary due to the traffic requirements, the mixture shall be laid in strips in such a manner as to provide for the passage of traffic.

2. Where the road is closed to traffic, the mixture may be laid to the full width, by machines traveling in echelon.

D. Correcting Defects:

1. Before any rolling is started the surface shall be checked, any irregularities adjusted, and all drippings, fat sandy accumulations from the screed, and fat spots from any source shall be removed and replaced with satisfactory material.

2. No skin patching shall be done.

3. When a depression is to be corrected while the mixture is hot, the surface shall be well scarified before the addition of fresh mixture.

3.18 REQUIREMENTS APPLICABLE ONLY TO LEVELING COURSES:

A. Patching Depressions:

1. Before any leveling course is spread, all depressions in the existing surface more than one inch deep shall be filled by spot patching with leveling course mixture and then thoroughly compacted.

B. Spreading Leveling Courses:

1. All courses of leveling shall be placed by the use of two motor graders - one of which is equipped with a spreader box - unless otherwise shown in the plans.

2. Other types of leveling devices may be used after the Engineer has approved them.

C. Rate of Application:

1. When the total asphalt mix provided for leveling exceeds 50 pounds per square yard, the mix shall be placed in two or more layers, with the average spread of any layer not to exceed 50 pounds per square yard.

2. When Type S-III Asphaltic Concrete is used for leveling, the average spread of a layer shall not be less than 50 pounds per square yard nor more than 75 pounds per square yard.

3. The quantity of mix for leveling shown in the plans represents the average for the entire project; however, the rate of application may vary throughout the project as directed by the Engineer.

4. When leveling in connection with base widening, the Engineer may require that all the leveling mix be placed prior to the widening operation.

D. Placing Leveling Course Over Existing Pavement:

1. When a leveling course is specified to be placed over cracked concrete pavement (including existing concrete pavement covered with an asphaltic surface), the first layer of leveling shall be placed as soon as possible but no later than 48 hours after cracking the concrete.

2. The remainder of the leveling course shall be placed in the normal sequence of operations.

E. Removal of Excess Joint Material:

1. Where a leveling course is to be placed over existing concrete pavement or bridge decks, the excess joint filler in the cracks and joints shall be trimmed flush with the surface prior to placing the first layer of the leveling course.

3.19 COMPACTING MIXTURE:

A. Provisions Applicable To All Types:

1. Equipment and Sequence:

a) For each paving or leveling train in operation, the Contractor shall furnish a separate set of rollers, with their operators.

b) The following equipment, sequence and coverage are suggested for use based on past successful performance; however, when density is required, the Contractor may select his own equipment, sequence and coverage of rolling to meet the minimum density requirement specified. Regardless of the rolling procedure used, the final rolling must be completed before the internal pavement temperature has dropped below 175E F.

c) Seal rolling, using tandem steel rollers (either vibratory or static) weighing 5 to 12 tons, following as close behind the spreader as is possible without pickup, undue displacement or blistering of the material. Vibratory rollers shall be used in the static mode for layers of one inch or less in thickness.

d) Rolling with self-propelled pneumatic-tired rollers, following up as close behind the seal rolling as the mix will permit. The roller shall cover every portion of the surface with at least five passes.

e) Final rolling with the 8 to 12-ton tandem steel roller, to be done after the seal rolling and pneumatic-tired rolling have been completed, but before the internal pavement temperature has dropped below 175E F.

f) Once the Contractor has selected the equipment and established the rolling procedures to achieve required density, then the Contractor must continue to use the same equipment and rolling procedure for the entire project. The Engineer must be notified prior to changing the rolling process.

g) Compaction at Crossovers, Intersections, etc: when a separate paving machine is being used to pave the crossovers, one 8- to 10-ton tandem steel roller may do the compaction of the crossovers. If crossovers and intersections are placed with the main run of paving, a traffic roller shall also be used in the compaction of these areas.

2. Rolling Procedures:

a) The initial rolling shall be longitudinal. Where the lane being placed is adjacent to a previously placed lane, the center joint shall be pinched or rolled, prior to the rolling of the rest of the lane.

b) Rolling shall proceed across the mat, overlapping the adjacent pass by at least six inches. The motion of the roller shall be slow enough to avoid displacement of the mixture, and any displacement shall be corrected at once by the use of rakes, and the addition of fresh mixture is required. Final rolling shall be continued until all roller marks are eliminated.

3. Speed of Rolling:

a) Rolling with the self-propelled, pneumatic-tired rollers shall proceed at a speed of 6 to 10 miles per hour, and the area covered by each roller shall not be more than 3,000 square yards per hour.

4. Number of Pneumatic-tired Rollers Required:

a) A sufficient number of self-propelled pneumatic-tired rollers shall be used to assure that the rolling of the surface for the required number of passes will not delay any other phase of the laying operation nor result in excessive cooling of the mixture before the rolling is complete.

b) In the event that the rolling falls behind, the laying operation shall be discontinued until the rolling operations are sufficiently caught up.

5. Compaction of Areas Inaccessible to Roller:

a) Areas which are inaccessible to a roller (such as areas adjacent to curbs, headers, gutters, bridges, manholes, etc.) shall be compacted by the use of hand tamps or other satisfactory means.

6. Correcting Defects:

a) The rollers shall not be allowed to deposit gasoline, oil or grease onto the pavement, and any areas damaged by such deposits shall be removed and replaced as directed by the Engineer.

b) While rolling is in progress, the surface shall be tested continuously and all discrepancies corrected to comply with the surface requirements.

c) All drippings, fat or lean areas and defective construction of any description shall be removed and replaced.

d) Depressions that develop before the completion of the rolling shall be remedied by loosening the mixture and adding new mixture to bring the depressions to a true surface.

e) Should any depression remain after the final compaction has been obtained, the full depth of the mixture shall be removed and replaced with sufficient new mixture to form a true and even surface.

f) All high spots, high joints and honeycomb shall be corrected as directed by the Engineer.

g) Any mixture remaining unbonded after rolling shall be removed and replaced.

h) Any mixture that becomes loose or broken, mixed or coated with dirt or in any way defective, prior to laying the wearing course shall be removed and replaced with fresh mixture that shall be immediately compacted to conform with the surrounding area.

3.20 JOINTS:

A. Transverse Joints:

1. Placing of the mixture shall be as continuous as possible and the roller shall not pass over the unprotected end of the freshly laid mixture except when the laying operation is to be discontinued long enough to permit the mixture to become chilled.

2. When the laying operation is thus interrupted, a transverse joint shall be constructed by cutting back on the previous run to expose the full depth of the mat.

B. Longitudinal Joints:

1. For all layers of pavement except the leveling course, placing of each layer shall be accomplished to cause longitudinal construction joints to be offset 6 to 12 inches laterally between successive layers.

2. The Engineer may waive this requirement where offsetting is not feasible due to the sequence of construction.

3.21 SURFACE REQUIREMENTS:

A. Contractor Responsibility:

1. The Contractor shall be responsible for obtaining a smooth surface on all pavement courses placed and therefore should straightedge all intermediate and final courses with a 15-foot rolling straightedge.

2. A 15-foot manual straightedge shall be furnished by the Contractor and shall be available at the job site at all times during the paving operation for checking joints and surface irregularities.

B. Texture of the Finished Surface of Paving Layers:

1. The finished surface shall be of uniform texture and compaction.

2. The surface shall have no pulled, torn, or loosened portions and shall be free of segregation, sand streaks, sand spots, or ripples.

3. Any area of the surface that does not meet the foregoing requirements shall be corrected.

4. Unless written permission is obtained, asphalt concrete mixtures containing aggregates which will cause a different color appearance shall not be used in the final wearing surface in sections less than one mile in length.

END OF SECTION 02510

SECTION 322512 - STABILIZING

DESCRIPTION:

The work specified in this Section consists of the stabilizing of designated portions of the roadbed to provide a firm and unyielding subgrade, having the required bearing value specified in the plans. When so called for in the plans this work shall also include the additional strengthening of the subbase, by additional stabilizing of the upper portion of the previously stabilized subgrade, within the limits called for. The work shall be constructed in accordance with these specifications and the lines, grades, thicknesses, and notes shown in the plans.

STABILIZED SUBGRADE:

For stabilized subgrade the type of materials, Commercial or Local, is at the Contractor's option. The stabilizing is designated as Type B, compliance with the bearing value requirements will be determined by the Limerock Bearing Ratio Method.

It is the Contractor's responsibility that the finished roadbed section meets the bearing value requirements, regardless of the quantity of stabilizing materials necessary to be added. Also, full payment will be made for any areas where the existing subgrade materials meet the design bearing value requirements without the addition of stabilizing additives, as well as areas where the Contractor may elect to place select high-bearing materials from other sources, within the limits of the stabilizing.

After the roadbed grading operations have been substantially completed, the Contractor shall make his own determination as to the quantity (if any) of stabilizing material, of the type selected by him, necessary for compliance with the bearing value requirements. The Contractor shall notify the Engineer of the approximate quantity to be added, and the spreading and mixing-in of such quantity of materials shall meet the approval of the Engineer as to uniformity and effectiveness.

MATERIALS:

1. Commercial and Local Materials: The particular type of stabilizing material to be used shall meet the requirements of Section 914 of FDOT Standard Specifications for Road and Bridge Construction.

2. Use of Materials from Existing Base: When the utilization of materials from an existing base is called for, (as all, or a portion, of the stabilizing additives) the Engineer will direct the locations, placing and distribution of such materials, and this work shall be done prior to the spreading of any additional commercial or local materials. Removal of any section of existing base will not be required until the need for it in maintaining traffic is fulfilled. No materials from an existing base will be eligible for payment as Commercial Materials.

   The utilization of materials from an existing base may be called for in combination with either of the designated types of stabilizing.

CONSTRUCTION METHOD:

1. **General:** Prior to the beginning of stabilizing operations, the area to be stabilized shall have been constructed to an elevation such that upon completion of stabilizing operations the completed stabilized subgrade will conform to the lines, grades and cross section shown in the plans. Prior to the spreading of any additive stabilizing material, the surface of the roadbed shall be brought to a plane approximately parallel to the plane of the proposed finished surface.

   The subgrade to be stabilized may be processed in one course, unless the equipment and methods being used do not provide the required uniformity, particle size limitation, compaction and other desired results, in which case, the Engineer will direct that the processing be done in more than one course.

2. Application of Stabilizing Material: When additive stabilizing materials are required, the designated quantity shall be spread uniformly over the area to be stabilized.

   When materials from an existing base are to be utilized in the stabilizing at a particular location, all of such materials shall be placed and spread prior to the addition of other stabilizing additives.

   Commercial stabilizing material shall be spread by the use of mechanical material spreaders except that where use of such equipment is not practicable other means of spreading may be used, but only upon written approval of the proposed alternate method.

3. Mixing: The mixing shall be done with rotary tillers, or other equipment meeting the approval of the Engineer. At the Contractor's election, the mixing of the materials may be accomplished in a plant of an approved type suitable for this work. The area to be stabilized shall be thoroughly mixed throughout the entire depth and width of the stabilizing limits.

   The mixing operations, as specified, (either in place or in a plant) will be required regardless of whether the existing soil, or any select soils placed within the limits of the stabilized sections, have the required bearing value without the addition of stabilizing materials.

   As an exception to the above mixing requirements, where the subgrade is of rock, the Engineer may direct that the mixing operations (and the work of stabilizing) be waived and no payment for stabilization will be made for such sections of the roadway.

4. Maximum Particle Size of Mixed Materials: At the completion of mixing, all particles of material within the limits of the area to be stabilized shall pass a 3 ½ inch ring. Any particles not meeting this requirement shall be removed from the stabilized area or shall be broken down so as to meet this requirement.

5. Compaction: Except where a stabilized subbase is also to be constructed after the mixing operations have been completed and requirements for bearing value, uniformity and particle size have been satisfied, the stabilized are shall be compacted, in accordance with Density Requirements of this section. The materials shall be compacted at a moisture content permitting the specified compaction. If the moisture content of the material is improper for attaining the specified density, either water shall be added or the material shall be permitted to dry until the proper moisture content for the specified compaction is reached.

6. Finish Grading: The completed stabilized subgrade shall be shaped to conform with the finished lines, grades and cross section indicated in the plans. The subgrade shall be checked by the use of elevation stakes, or other means approved by the Engineer.

7. Requirements for Condition of Completed Subgrade: After the stabilizing and compacting operations have been completed the subgrade shall be firm and substantially unyielding, to the extent that it will support construction equipment and will have the bearing value required by the plans.

   All soft and yielding material, and any other portions of the subgrade which will not compact readily, shall be removed and replaced with suitable material and the whole subgrade brought to line and grade, with proper allowance for subsequent compaction.

8. Maintenance of Completed Subgrade: After the subgrade has been completed as specified above, the Contractor shall maintain it free from ruts, depressions and any damage resulting from the hauling or handling of materials, equipment, tools, etc. It shall be the Contractor's responsibility to maintain the required density until the subsequent base or pavement is in place. Such responsibility shall include nay repairs, replacement, etc., of curb and gutter, sidewalk, etc., which might become necessary in order to recompact the subgrade in the event of underwash or other damage occurring to the previously compacted subgrade. Any such work required for recompaction shall be at the Contractor's expense. Ditches and drains shall be constructed and maintained along the completed subgrade section.

BEARING VALUE REQUIREMENTS:

1. **General:** Bearing value samples will be obtained and tested at completion of satisfactory mixing of the stabilized area. For any area where the bearing value obtained is deficient from the value indicated in the plans, in excess of the tolerances established herein, additional stabilizing material shall be spread and mixed. This reprocessing shall be done for the full width of the roadway being stabilized and longitudinally for a distance of 50 feet beyond the limits of the area in which the bearing value is deficient.

   The Contractor shall make his own determination of the quantity of additional stabilizing material to be used in reprocessing.

2. **Tolerances in Bearing Value Requirements:** The following undertolerances from the specified bearing value, will be allowed as based on tests performed on samples obtained after mixing operations have been completed:

Specified Bearing Value	*Undertolerance*
LBR 40	5.0
LBR 35	4.0
LBR 30 (and under)	2.5
All Florida Bearing Values	5.0

DENSITY REQUIREMENTS:

1. General: Within the entire limits of the width and depth of the areas to be stabilized, the minimum density acceptable at any location will be 98 percent of the maximum density as determined by AASHTO T 180.

END OF SECTION 02512

SECTION 322516 - LIMEROCK BASE COURSE

PART 1 - GENERAL

1.01 RELATED DOCUMENTS:

A. Drawings and general provisions of contract apply to the work of this section.

1.02 DESCRIPTION OF WORK:

A. This item shall consist of a base course composed of limerock constructed on a subgrade prepared in accordance with the specifications and in conformity with the line, grades and typical cross-section as shown on the drawings.

B. The construction methods shall conform to the requirements of Section 200 of the Department of Transportation (DOT) Standards Specifications.

PART 2 - PRODUCTS

2.01 MATERIALS:

A. All material shall be secured from sources approved by the ENGINEER, and shall be furnished by the CONTRACTOR.

B. Limerock material shall conform to Section 911 of the Standard Specifications.

2.02 EQUIPMENT:

A. The rock shall be spread by mechanical rock spreaders, equipped with a device which strikes off the rock uniformly to laying thickness, and capable of producing an even distribution of the rock.

B. For crossovers, intersections and ramp areas; for roadway widths of 20 feet or less; for the main roadway area when forms are used and for any other areas where the use of a mechanical spreader is not practicable; spreading may be done by bulldozers or blade graders.

PART 3 - EXECUTION

3.01 TRANSPORTING LIMEROCK:

A. The limerock shall be transported to the point where it is to be used, over rock previously placed if practicable, and dumped on the end of the preceding spread.

B. Hauling over the subgrade and dumping on the subgrade will be permitted when, in the ENGINEER's opinion, these operations will not be detrimental to the base.

3.02 SPREADING LIMEROCK:

A. Method of Spreading:

1. The limerock shall be spread uniformly.

2. All segregated areas of fine or coarse rock shall be removed and replaced with properly graded rock.

B. Number of Courses:

1. When the specified compacted thickness of the base is greater than six inches, the base shall be constructed in two courses.

2. The thickness of the first course shall be approximately one-half the total thickness of the finished base, or enough additional to bear the weight of the construction equipment without disturbing the subgrade.

3.03 COMPACTING AND FINISHING BASE:

A. General:

1. Single-Course Base:

a) For single-course base, after the spreading is completed the entire surface shall be scarified and then shaped so as to produce the required grade and cross section after compaction.

2. Double-Course Base:

a) For double-course base, the first course shall be cleaned of foreign material and bladed and brought to a surface cross section approximately parallel to that of the finished base.

b) Prior to the spreading of any material for the upper course, the density tests for the lower course shall be made and shall be determined, by the engineer, that the required compaction has been obtained.

c) After the spreading of the material for the second course is completed, its surface shall be finished and shaped so as to produce the required grade and cross section after compaction, and be free of scabs and laminations.

3. Moisture Content:

a) When the material does not have the proper moisture content to insure the required density, wetting or drying will be required.

b) When water is added, it shall be uniformly mixed-in by disking to the full depth of the course which is being compacted.

c) Wetting or drying operations shall involve manipulation, as a unit, of the entire width and depth of the course that is being compacted.

4. Density Requirements:

a) As soon as proper conditions of moisture are attained, the material shall be compacted to a density of not less than 98 percent of maximum density as determined by AASHTO T-180.

b) The minimum density which will be acceptable at any location outside the traveled roadway (such as intersections, crossovers, turnouts, etc.) shall be 95 percent of such maximum.

3.04 TESTING SURFACE, PROTECTION, AND MAINTENANCE:

A. Density Tests:

1. Density Testing shall be performed at a rate of 1 test per 100 Lineal Feet per lift.

2. During final compacting operations, if blading of any areas is necessary to obtain the true grade and cross section, the compacting operations for such areas shall be completed prior to making the density tests on the finished base.

B. Correction of Defects/Contamination of Base Material:

1. If, at any time, the subgrade material should become mixed with the base course materials, the CONTRACTOR shall, without additional compensation, dig out and remove the mixture, reshape and compact the subgrade and replace materials removed with clean base material, which shall be shaped and compacted as specified above.

C. Cracks and Checks:

1. If cracks or checks appear in the base, either before or after priming, which, in the opinion of the ENGINEER, would impair the structural efficiency of the base, the CONTRACTOR shall remove the cracks or checks by rescarifying, reshaping, adding base material where necessary, and recompacting.

D. Compaction of Widening Strips:

1. Where base construction consists of widening strips and the trench width is not sufficient to permit use of standard base compaction equipment, compaction shall be accomplished by use of vibratory compactors, trench rollers or other special equipment which will achieve the density requirements specified herein.

2. When multiple-course base construction is required by the plans or specifications, the required compaction shall be achieved in each course prior to spreading material for the overlaying course.

E. Testing Surface:

1. The finished surface of the base course shall be checked with a template cut to the required crown and with a 15-foot straightedge laid parallel to the centerline of the road.

2. Scarifying and removing or adding base material as required, after which the entire area shall be recompacted as specified hereinbefore, shall correct all irregularities greater than 1/4 inch.

3. In the testing of the surface, the measurements will not be taken in small holes caused by individual pieces of rock having been pulled out by the grader.

3.05 PRIMING AND MAINTAINING:

A. Priming:

1. The prime coat shall be applied only when the base meets the specified density requirements and the moisture content in the top half of the base does not exceed 90 percent of the optimum moisture of the base material.

2. At the time of priming, the base shall be firm, unyielding and in such condition that no undue distortion will occur.

B. Maintaining:

1. The CONTRACTOR will be responsible for assuring that the true crown and template are maintained, with no rutting or other distortion, and that the base meets all the requirements, at the time the surface course is applied.

3.06 THICKNESS REQUIREMENTS:

A. Measurements:

1. Thickness of the base shall be measured at intervals of not more than 200 feet.

2. Measurements shall be taken at various points on the cross section, through holes not less than three inches in diameter.

B. Areas Requiring Correction:

1. Where the compacted base is deficient by more than 1/2 inch from the thickness called for in the plans, the CONTRACTOR shall correct such areas by scarifying and adding rock.

2. The base shall be scarified and rock added for a distance of 100 feet in each direction from the edge of the deficient area.

3. The affected areas shall then be brought to the required state of compaction and to the required thickness and cross section.

END OF SECTION 02516

SECTION 322520 - ASPHALT TESTING

Test results for testing asphalt densities, thickness and mix design shall be as specified by the Florida Department of Transportation Handbook for Road and Bridge Construction (latest edition).

PART 1 - GENERAL

1.01 TESTING AND ACCEPTANCE:

A. All roads over 1,000 feet will require coring for in-place density and asphalt thickness.

B. The cores will be cut at 1,000-foot intervals.

C. All expenses for these tests are to be paid by the CONTRACTOR.

D. All test results are to be turned in to ENGINEER before final 25% payment for road will be made.

E. Payment will be based on the following table, with target density being 96% of mix design lab density.

PAYMENT SCHEDULE FOR DENSITY CORES (Based on Average Density for Each Road)	
PERCENT OF TARGET DENSITY	**PERCENT OF PAY**
98.0 and above	100
97.0 to less than 98.0	95
96.0 to less than 97.0	90
Less than 96.0*	75

F. If ENGINEER deems asphalt is acceptable to remain in place, otherwise ENGINEER may require removal and replacement of asphalt.

1.02 THICKNESS:

A. Allowable Deficiencies:

1. The thickness shall be determined from the length of the core borings.

2. The maximum allowable deficiency from the specified thickness shall be ¼ inch.

B. Pavement Exceeding Allowable Deficiency in Thickness:

1. When Deficiency is Seriously in Excess:

a. Where the deficiency in thickness is in excess of _ inch, for pavement of less than 2½ inches in specified thickness the CONTRACTOR shall correct the deficiency either by replacing the full thickness for a length extending at least 50 feet from each end of the deficient area, or (when permitted by the ENGINEER) by overlaying as directed by the ENGINEER.

b. The CONTRACTOR will receive no compensation for any pavement removed, or for the work of removing such pavement.

2. When Deficiency is Not Seriously in Excess:

a. When the deficiency in the thickness of the pavement is over ¼ inch but not more than _ inch, for pavement of specified thickness less than 2½ inches the CONTRACTOR will be allowed to leave such pavement in place, but without compensation.

b. The areas of such pavement for which no square yard payment will be made shall be the product of the total distance between acceptable cores, multiplied by the width of the lane which was laid at the particular pass in which deficient thickness was indicated.

c. All costs of the overlaying and compacting shall be borne by the CONTRACTOR.

3. Correcting Deficiency by Adding New Surface Material:

a. For any case of excess deficiency of the pavement, the CONTRACTOR will be permitted, if approved by the ENGINEER for each particular location, to correct the deficient thickness by adding new surface material and compacting to the same density as the adjacent surface.

b. The area to be corrected and the thickness of new material added shall be as specified by ENGINEER.

c. All costs of the overlaying and compacting shall be borne by the CONTRACTOR.

1.03 MIX DESIGN:

A. An FDOT approved mix design will be provided to the ENGINEER or representative prior to beginning construction, and will not change without written consent of the ENGINEER prior to any change.

1.04 TRUCK TICKETS:

A. The CONTRACTOR will provide truck tickets to the ENGINEER or representative on a regular basis or as requested by the ENGINEER.

1.05 DAILY ASPHALT PLANT TESTING:

A. A minimum of one extraction, gradation to be done daily, as well as test performed for stability and flow to be done on each day's production of 100 tons or more. The results of these tests are to be provided to the engineer on a weekly basis.

STRICT COMPLIANCE OF THIS SECTION WILL BE ADHERED TO

END OF SECTION 02520

SECTION 335010 - BASIC MECHANICAL REQUIREMENTS

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

Drawings and general provisions of Contract, including General and Special Conditions, apply to work of this section.

1.02 SUMMARY

This section specifies the basic requirements for mechanical installations. It expands and supplements the requirements specified in sections under "General Requirements."

1.03 ACCESSIBILITY

A. The CONTRACTOR shall install equipment and materials to provide required access for servicing and maintenance.

B. The CONTRACTOR shall coordinate the final location of concealed equipment and devices requiring access with final location of required access panels and doors.

C. The CONTRACTOR shall allow ample space for removal of all parts that require replacement or servicing.

D. The CONTRACTOR shall extend all grease fittings to an accessible location.

1.04 MECHANICAL INSTALLATIONS

A. The CONTRACTOR shall coordinate mechanical equipment and materials installation with other building components.

B. The CONTRACTOR shall verify all dimensions by field measurements.

C. The CONTRACTOR shall coordinate the installation of required supporting devices and sleeves to be set in poured in place concrete and other structural components, as they are constructed.

D. The CONTRACTOR shall sequence, coordinate, and integrate installations of mechanical materials and equipment for efficient flow of the Work.

E. The CONTRACTOR shall install mechanical equipment to facilitate maintenance and repair or replacement of equipment components. As much as practical, connect equipment for ease of disconnecting, with minimum of interference with other installations.

F. The CONTRACTOR shall coordinate connection of mechanical systems with exterior underground and overhead utilities and services. Comply with requirements of governing regulations, franchised service companies, and controlling agencies. Provide required connection for each service.

1.05 MECHANICAL SUBMITTALS

A. Submittal of shop drawings, product data, and samples will be accepted only when submitted by the CONTRACTOR.

B. Data from subcontractors and material suppliers directly submitted to the Engineer will not be processed.

C. Five complete sets of all shop drawings and product data shall be submitted by the CONTRACTOR.

1.06 NAMEPLATE DATA

A. The CONTRACTOR shall provide permanent operational data nameplate on each item of power-operated mechanical equipment, indicating manufacturer, product name, model number, serial number, capacity, operating and power characteristics labels of tested compliances, and similar essential data.

B. The CONTRACTOR shall locate nameplates in an accessible location.

PART 2 - PRODUCTS

2.01 DELIVERY, STORAGE, AND HANDLING

A. The CONTRACTOR shall deliver products to the project site that are properly identified with names, model numbers, types, grades, compliance labels, and similar information needed for distinct identifications.

B. The CONTRACTOR shall adequately package and protect products to prevent damage during shipment, storage, and handling.

C. The CONTRACTOR shall store equipment and materials at the site, unless off-site storage is authorized in writing.

D. The CONTRACTOR shall protect stored equipment and materials from damage.

PART 3 - EXECUTION

3.01 RECORD DOCUMENTS

The following paragraphs supplement the requirements in sections under "General Requirements."

A. The CONTRACTOR shall mark Drawings to indicate revisions to:

1. Piping, size and location both exterior and interior.

2. Actual equipment locations, dimensioned for column lines.

3. Actual inverts and locations of underground piping.

4. Concealed equipment, dimensioned to column lines.

5. Mains and branches of piping systems, with valves and control devices located and numbered

6. Concealed unions located, and with items requiring maintenance located (i.e., traps, strainers, expansion compensators, tanks, etc.).

7. Concealed control system devices.

B. The CONTRACTOR shall mark Specifications to indicate approved substitutions, Change Orders, and actual equipment and materials used.

3.02 OPERATION AND MAINTENANCE DATA

Refer to Section 01705 (Project Closeout) for procedures and requirements for preparing and submitting operation and maintenance manuals.

A. The CONTRACTOR shall Include the following information:

1. Description of function, normal operating characteristics and limitations, performance curves, engineering data and tests, and complete nomenclature and commercial numbers of all replaceable parts.

2. Manufacturer's printed operating procedures to include:

a. Start-up, break-in, routine and normal operating instructions.

b. Regulation, control, stopping, shut-down, and emergency instructions.

c. Summer and winter operating instructions.

3. Maintenance procedures for:

    a. Troubleshooting and routine preventative maintenance.

    b. Disassembly, repair, and reassembly.

    c. Aligning and adjusting.

4. Servicing instructions and lubrication charts and schedules.

3.03 WARRANTIES

A. The CONTRACTOR shall compile and assemble the warranties into a separated set of vinyl covered, three-ring binders, tabulated and indexed for easy reference.

B. The CONTRACTOR shall provide for all products and equipment used on the project, complete warranty information including:

1. Date of beginning of warranty or bond.

2. Duration of warranty or bond.

3. Contact information (e.g., names, addresses, and telephone numbers) and procedures for filing a claim and obtaining warranty services.

END OF SECTION

SECTION 335051 - MECHANICAL RELATED WORK

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

Drawings and general provisions of Contract, including General and Special Conditions, apply to Work of this section.

1.02 DESCRIPTION OF WORK

A. Extent of mechanical related work and work required by this section is indicated on drawings and/or specified in other sections of these Specifications.

B. The CONTRACTOR shall furnish all labor, material, and equipment, and the CONTRACTOR shall perform all operations required to satisfactorily and properly install, adjust, test and place into operation all equipment and system shown on the construction Drawings.

C. The CONTRACTOR shall submit submittal data and as-built drawings for each piece of equipment or installation.

1.03 EQUIPMENT INSTALLATION

A. The CONTRACTOR shall install all equipment and systems shown on the Drawings and/or specified herein in a workmanlike manner and in strict accordance with the Manufacturer's recommendations.

B. The CONTRACTOR shall furnish and connect all required piping, electrical connections, and other necessary items to provide a complete operating facility.

1.04 EQUIPMENT TESTING AND ADJUSTING

A. The CONTRACTOR shall demonstrate that all equipment is operating in a satisfactory manner after installation.

B. The CONTRACTOR shall lubricate all equipment according to vendors' recommendations and shall make all adjustments to suit anticipated operating conditions.

C. The CONTRACTOR shall test each piece of equipment to show that it operates quietly, without vibration, overheating, or signs of distress, at full specified capacity.

D. The CONTRACTOR shall make adjustments as necessary.

E. The CONTRACTOR shall replace all defective parts of machinery, equipment, or materials.

F. The CONTRACTOR shall secure and submit to the ENGINEER, vendor's certificates detailing that the installation of equipment is in accordance with the Manufacturer's recommendations.

G. The CONTRACTOR shall submit to the ENGINEER five copies of all necessary manuals and instructions describing the proper operation and maintenance of each type of equipment furnished.

1.05 INSTALLATION SUPERVISION

A. The CONTRACTOR shall install, initially start up, and operate all equipment shall under the supervision of a factory-trained technical representative of the Manufacturer.

B. Manufacturer representative's services shall include instruction from the OWNER's operator in the operation, maintenance, and adjustment of the equipment.

C. The CONTRACTOR shall give the ENGINEER and OWNER's operator 48 hours notice before start-up. Start-up shall not proceed without the presence of the ENGINEER.

1.06 EQUIPMENT REQUIREMENTS

The following requirements shall apply to equipment furnished in the Contracts:

A. Each piece of mechanical equipment and motors shall be provided with a substantial nameplate of non-corrodible metal, securely fastened in place, clearly and permanently inscribed with the Manufacturer's name, model or type designation, serial number, rated capacity, electrical or other power characteristics, and other appropriate nameplate data.

B. All equipment shall be delivered fully lubricated with oil and/or grease insofar as possible. If any point cannot be so serviced, it shall be clearly marked to the effect that it is not lubricated and requires servicing prior to operation. An adequate supply of the proper lubricant, with instructions for its application, shall be supplied with the equipment for each point not lubricated prior to shipment. The CONTRACTOR shall also provide the OWNER with a sufficient amount of proper lubricants for one complete change of lubricant for all equipment furnished.

C. All factory-painted equipment shall be provided with 2 pints of touch up paint to match original finish along with instructions for application.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION (Not Applicable)

END OF SECTION

SECTION 335080 - POLYVINYL CHLORIDE (PVC) GRAVITY SEWER PIPE

PART 1 - GENERAL

1.01 SCOPE OF WORK

A. The CONTRACTOR shall furnish all labor, materials, equipment and incidentals required, and install polyvinyl chloride (PVC) ASTM D3034 (PVC) gravity sewer pipe and appurtenances as shown on the Drawings and as specified herein.

1.02 SUBMITTALS

A. Submittals during construction shall be made in accordance with Section 01300.

B. The CONTRACTOR shall submit to the ENGINEER not less than 20 calendar days after the date of the Notice to Proceed, a list of materials to be furnished, the names of suppliers and an expected schedule of delivery of materials to the site.

C. At least 3 days prior to beginning construction of any gravity sewer section or any portion of the system, the CONTRACTOR must submit to the ENGINEER for review “cut-sheets” for that portion to be constructed. The type of the “cut sheets” required shall be presented to the CONTRACTOR by the ENGINEER at the preconstruction meeting. The CONTRACTOR shall supply all “cut sheets.”

D. Furnish in duplicate to the ENGINEER, prior to each shipment of pipe, sworn certificates that all tests and inspections required by the Specifications under which the pipe is manufactured have been satisfied.

E. The pipe Manufacturer shall inspect all pipe joints for out-of-roundness and pipe ends for squareness. The Manufacturer shall furnish to the ENGINEER a notarized affidavit stating all pipe meets the requirements of American Society of Testing Materials, (ASTM), American Society of Civil Engineers (ASCE), American National Standards Institute (ANSI), etc., these Specifications, and the joint design with respect to square ends and out-of-round joint surfaces.

1.03 REFERENCE STANDARDS

A. American Society for Testing and Materials (ASTM):

1. ASTM D1784 - Specification for Rigid Poly (Vinyl Chloride) (PVC) Compounds and Chlorinated Poly (Vinyl Chloride) (CPVC) Compounds.

2. ASTM D2321 - Recommended Practice for Underground Installation of Flexible Thermoplastic Sewer Pipe.

3. ASTM D3034 - Specification for Type PSM Polyvinyl Chloride (PVC) Sewer Pipe and Fittings.

4. ASTM D3189 - Method for Rubber - Evaluation of Solution BR (Polybutadiene Rubber).

5. ASTM D3212 - Specification for Joints for Drain and Sewer Plastic Pipes Using Flexible Elastomeric Seals.

6. ASTM F477 - Specification for Elastomeric Seals (Gaskets) for Joining Plastic Pipe.

7. ASTM F679 - Specification for Polyvinyl Chloride (PVC) Large-Diameter Plastic Gravity Sewer Pipe and Fittings.

8. ASTM F758 - Specification for Smooth-Wall Polyvinyl Chloride (PVC) Plastic Underdrain Systems for Highway, Airport, and Similar Drainage.

B. Where reference is made to one of the above standards, the revision in effect at the time of bid opening shall apply.

1.04 QUALITY ASSURANCE

A. All PVC pipe shall be from a single Manufacturer.

1. The supplier shall be responsible for provisions of all test requirements specified in ASTM D3034.

2. All tests, hydrostatic and material, if not performed by the Manufacturer as part of the Manufacturer standard quality control procedures, are to be performed by an independent laboratory at the expense of the Manufacturer.

3. In addition, all PVC pipe to be installed under this Contract may be inspected at the plant for compliance with these specifications by an independent testing laboratory provided by the OWNER.

4. The CONTRACTOR shall require the Manufacturer’s cooperation in these inspections. The cost of plant inspection of all pipe approved for this contract shall be borne by the OWNER.

B. Inspections of the pipe may also be made by the ENGINEER or other representative of the OWNER after delivery.

1. The pipe shall be subject to rejection at any time on account of failure to meet any of the Specification requirements, even though sample pipes may have been accepted as satisfactory at the place of manufacture.

2. Pipe rejected after delivery shall be marked for identification and shall be removed from the job at once.

1.05 DELIVERY, STORAGE AND HANDLING

A. Care shall be taken in shipping, handling, and laying to avoid damaging the pipe and fittings. Extra care will be necessary during cold weather construction. Any pipe damaged in shipment shall be replaced as directed by the ENGINEER.

B. Any pipe or fitting showing a crack or which has received a blow that may have caused an incipient fracture, even though no such fracture can be seen, shall be marked as rejected and removed at once from the work.

C. While stored, pipe shall be adequately supported from below at not more than 3-foot intervals to prevent deformation. Pipe shall not be stacked higher than 6 feet. Pipe and fittings shall be stored in a manner which will keep them at ambient outdoor temperatures and out of the sunlight (or delivered to the site so that no pipe is exposed to the sunlight for more than (60) days). Temporary shading as required to meet this requirement shall be provided. Simple covering of the pipe and fittings which allows temperature buildup when exposed to direct sunlight will not be permitted. Pipe shall be protected from sunlight or weather conditions in accordance with the MANUFACTURER's recommendations.

1.06 INSPECTION, TEST REPORTS, MARKINGS AND SUBMITTALS

A. All pipe and accessories to be installed under this Contract shall be inspected and tested at the place of manufacture by the MANUFACTURER as required by the Standard Specifications to which the material is manufactured.

B. Each length of pipe shall be subject to inspection and approval at the factory, point of delivery, and site of work. Sample of pipe to be tested shall be selected at random by the ENGINEER or the testing laboratory and shall be delivered by the CONTRACTOR to the testing laboratory approved by the ENGINEER.

C. When the specimens tested conform to applicable standards, all pipe represented by such specimens shall be considered acceptable based on the test parameters measured. Copies of test reports shall be submitted to the ENGINEER before the pipe is installed in the project. Acceptable pipe will be stamped with an appropriate monogram under the supervision of the testing laboratory.

D. In the event that any of the test specimens fail to meet the applicable standards, all pipe represented by such tests shall be subject to rejection. The CONTRACTOR may furnish two additional test specimens from the same shipment or delivery for each specimen that failed and the pipe will be considered acceptable if all of these additional specimens meet the requirements of the applicable standards.

E. Pipe that has been rejected by the ENGINEER shall be removed from the site of the work by the CONTRACTOR and replaced with pipe which meets these specifications.

F. Other testing requirements specific to the type of pipe are included under the appropriate paragraph in Part 2, below.

G. All 6-inch through 12-inch pipe and fittings shall be marked per Section No. 12 "Marking" of ASTM D3034. All 18-inch and 27-inch pipe and fittings shall be marked per Section 11 "Marking" of ASTM F679. For all pipe (6-inch through 12-inch), the MANUFACTURER's code including year, month, day, shift, plant and extruder of manufacture shall be clearly marked on each pipe section.

H. Prior to shipment of the pipe and fittings to the project site, the CONTRACTOR shall submit to the ENGINEER, test reports and certifications as described below duly certified by the MANUFACTURER's testing facility or an independent certified testing laboratory demonstrating full compliance with the applicable ASTM specifications described above. Certification from the supplier is NOT acceptable.

1. An original plus two copies of the following shall be submitted to the ENGINEER:

    a) The name, address and phone number of the pipe and fittings MANUFACTURER.

    b) The location of the plant at which they will be manufactured.

I. Certification and Certified Test Reports that each LOT of pipe has been manufactured, sampled and tested per Section 8 "Test Methods" of ASTM D3034 for 6-inch through 15-inch diameter and Section 11 "Marking" of ASTM F679 for 18-inch through 27-inch diameter pipe. The OWNER shall be provided in writing with the means to cross reference the markings with the certification and test reports (i.e., date of manufacture, lot number and shift number, etc.).

1. If this information is marked on the pipe in a code, the markings shall be decoded in writing.

2. A letter of certification from the fittings MANUFACTURER shall be provided for fittings stating compliance with ASTM D3034 for 6-inch through 15-inch diameter and with ASTM F679 for 18-inch through 27-inch.

PART 2 - PRODUCTS

2.01 POLYVINYL CHLORIDE (PVC) PIPE AND FITTINGS

A. PVC gravity pipe and fittings 6-inches through 12-inches nominal diameter shall be solid wall and shall be type PSM, PVC SDR 35 with full diameter dimensions and shall conform to ASTM D3034, for sizes 4-inch through 15-inch and shall conform to ASTM F679 for sizes 18-inch through 27-inch. Straight pipe shall be furnished in lengths of not more than 13-feet. Saddle wyes will not be allowed. All PVC shall have a cell classification of 12454 B or C.

B. For depths of cover through 18 feet, a minimum wall thickness of SDR-35 is required. For depths of cover greater than 18-feet, a minimum wall thickness of SDR-26 is required. Fittings shall be either integrally cast (factory molded) or factory solvent welded and a separate section from the mainline pipe. SDR 26 fittings shall be used with SDR 26 pipe and SDR 35 fittings shall be used with SDR 35 pipe. At any time in a manhole run the depth of cover exceeds 18-ft, SDR 26 shall be used.

C. The supplier shall be responsible for the performance of all inspection and testing requirements specified in ASTM D-3034, ASTM D-3212, D3189, F679 and F789, as applicable. Complete records of inspections, examinations and tests shall be kept and submitted to the ENGINEER. The ENGINEER reserves the right to perform any of the inspections set forth in the specification where such inspections are deemed necessary to assure that materials and services conform to the prescribed requirements.

D. The pipe shall be joined with an integral bell and spigot push-on type gasketed joints. Each integral bell joint shall consist of a formed bell with an integral wall section of a solid cross-section elastomeric gasket securely locked in place to prevent displacement during assembly. Gaskets shall conform to ASTM F-477. Joints shall permit contraction, expansion and settlement, and yet maintain a watertight connection. Joints shall be tested in accordance with ASTM F477, D3139 or D3212.

E. PVC sewer fittings shall conform to the requirements of ASTM D-3034 specification. Fittings in sizes through 8-inches shall be molded in one piece with elastomeric joints and minimum socket depths as specified in Sections 6.2 and 7.3.2 of the ASTM D-3034 specification. Gaskets for elastomeric joints shall be molded and shall conform to ASTM F-477 specification. Fittings 10-inches and larger shall be molded or fabricated from pipe meeting ASTM D-3034 with MANUFACTURER’s standard pipe bells and gaskets.

F. All fittings and accessories shall be furnished by one pipe supplier and shall have bell and/or spigot configurations compatible with the pipe.

2.02 IDENTIFICATION

A. Each length of pipe and each fitting shall be marked with the name of the MANUFACTURER, size, and class. All gaskets shall be marked with the name of the MANUFACTURER, size, and proper insertion directions. A color sample of the PVC pipe and fittings shall be submitted to the ENGINEER for approval prior to fabrication of any pipe and accessories.

B. All below ground polyvinyl chloride pipe and fittings shall have an identification color code. Gravity sewer pipe and service laterals - Green, similar to Kop Coat No. 0336.

C. All polyvinyl chloride pipe shall have identification marking tape similar to the color listed above.

PART 3 - EXECUTION

3.01 LAYING POLYVINYL CHLORIDE (PVC) PIPE AND FITTINGS

A. Polyvinyl Chloride (PVC) gravity sewer pipe shall be laid in accordance with the instructions of the MANUFACTURER and as specified herein. As soon as the excavation is completed to normal grade, as indicated on the Drawings, the CONTRACTOR shall immediately bed the pipe as specified in Section 02200 in the trench, to conform accurately to the line and grade indicated on the Drawings. Embedment of pipe shall conform to the details shown on the Drawings and ASTM D2321, “Recommended Practice for Underground Installation of Flexible Thermoplastic Sewer Pipe.” Bell holes shall be excavated so that after installation only the pipe barrel shall bear upon the trench bottom. Proper selection and placement of bedding and backfill materials are necessary to minimize deflection of the pipe diameter. No blocking under the pipe will be permitted.

B. No single piece of pipe shall be laid unless it is generally straight. The centerline of the pipe shall not deviate from a straight line drawn between the centers of the openings at the ends of the pipe by more than 1/4-inch per foot of length. If a piece of pipe fails to meet this requirement check for straightness, it shall be rejected and removed from the site. Laying instructions of the MANUFACTURER shall be explicitly followed.

C. The CONTRACTOR shall use care in handling and installing pipe and fittings. Storage of pipe on the job site shall be done in accordance with the pipe MANUFACTURER’s recommendation and with approval of the ENGINEER. Under no circumstances shall pipe or fittings be dropped either into the trench or during unloading. The interior of the pipe shall be kept clean of oil, dirt and foreign matter, and the machined ends and couplings shall be wiped clean immediately prior to jointing.

D. The CONTRACTOR shall use a PVC pipe cutter where necessary to cut and machine all PVC pipe in the field. A "full insertion mark" shall be provided on each field cut pipe end. Field-cut pipe shall be beveled with a beveling tool made especially for plastic pipe. Bevels shall be in accordance with the MANUFACTURER's requirements.

E. Each length of pipe and each fitting shall be marked with the nominal size, the SDR designation, the name of the MANUFACTURER or his trademark, and the date of manufacture.

F. Rubber gaskets shall be marked with MANUFACTURERs identification sizes and proper insertion direction.

G. Pipe stubs for all future connections shall be not less than 26-ft. in length unless otherwise shown on the Drawings. Install watertight plugs where required.

H. The laying of the pipe in finished trenches shall begin at the lowest point, with the spigot ends pointing in the direction of flow. The interior of the pipe and the jointing seal shall be free from sand, dirt, and trash before installing in the line. Extreme care must be taken to keep the bells of the pipe free from dirt and rocks so joints may be properly assembled without overstressing the bells. The jointing of the pipe shall be done in strict accordance with the pipe MANUFACTURER's instructions and shall be done entirely in the trench. Tolerances are 1-inch on grade or 5 percent of the design slope, whichever is smaller, and 6-inches on line in any section between manholes. Deviations exceeding these tolerances shall be grounds for rejection of the line.

I. All pipe shall be sound and clean before installation. When installation is not in progress, including lunchtime, the open ends of the pipe shall be closed by watertight plug or other approved means to prevent foreign material from entering the pipe. Good alignment shall be preserved during installation. The deflection of joints shall not exceed that recommended by MANUFACTURER. Fittings for service laterals, in addition to those shown on the plans, shall be provided, if required, in crossing utilities which may be encountered upon opening the trench.

J. The ENGINEER may examine each bell and spigot end to determine whether any preformed joint has been damaged prior to installation. Any pipe having defective joint surfaces shall be rejected, marked as such, and immediately removed from the job site.

K. Each length of the pipe shall be shoved home against the pipe previously laid and held securely until enough backfill has been placed to hold the pipe in place. Joints shall not be "pulled" or "cramped".

L. Before any joint is made, the pipe shall be checked to assure that a close joint with the next adjoining pipe has been maintained and that the inverts are matched and conform to the required grade. The pipe shall not be driven down to grade by striking it.

M. Precautions shall be taken to prevent flotation of the pipe in the trench.

N. When moveable trench bracing such as trench boxes, moveable sheeting, shoring or plates are used to support the sides of the trench, care shall be taken in placing and moving the boxes or supporting bracing to prevent movement of the pipe, or disturbance of the pipe bedding and the screened gravel backfill. Trench boxes, moveable sheeting, shoring or plates shall not be allowed to extend below mid-diameter of the pipe. As trench boxes, moveable sheeting, shoring or plates are moved, screened gravel shall be placed to fill any voids created and the screened gravel and backfill shall be recompacted to provide uniform side support for the pipe.

O. Laser shall be used for maintaining pipe alignment.

3.02 JOINTING POLYVINYL CHLORIDE (PVC) SEWER PIPE AND FITTINGS

A. PVC push-on sewer pipe and fittings shall be jointed in accordance with the recommendations of the latest ASTM Standards and detailed instructions of the MANUFACTURER. The pipe MANUFACTURER shall furnish information and approve the installation of at least the first ten (10) joints of each pipe laying crew. The pipe MANUFACTURER shall visit the site on a quarterly basis to supervise and inspect and certify installation.

B. All manhole connections shall be as shown on the Drawings except that concrete and mortared connections shall be equipped with an integral O-ring or other sealant such that a positive watertight seal is established.

3.03 TESTS FOR GRAVITY SEWERS - GENERAL

A. Gravity sewers shall be required to pass a leakage test before acceptance. Leakage tests may be by the infiltration test or exfiltration test, depending on the level of the groundwater table or by the low-pressure air test all as described below.

B. Water infiltration or exfiltration or air loss, as applicable, rates will be measured by the ENGINEER. The tests shall be performed by the CONTRACTOR under the observation of the ENGINEER.

C. The groundwater height above the installed pipe shall be determined by a system of monitoring wells. The CONTRACTOR shall submit his method of establishing the groundwater height to the ENGINEER for approval prior to commencing testing.

D. Sewers will be checked by the ENGINEER prior to final restoration or the placing of asphalt to determine if pipe displacement has occurred. The CONTRACTOR shall give a minimum of 48 hours notice to the ENGINEER and furnish all necessary test equipment and labor required to allow the ENGINEER to perform this check. The CONTRACTOR shall also be responsible for pumping the system down and maintaining the pumped down condition for all pump station service areas.

The equipment shall include but not be limited to the following:

1. Hand held spotlight minimum 300,000 candle power and a power source for the light.

2. Appropriate ladders necessary to allow access to all manholes.

3. Mirrors

4. All equipment and manpower necessary to comply with confined space entry requirements (gas sensors, blowers, safety harness, etc.)

5. On pipelines under 12-inch in diameter the light shall be flashed down the center of the pipe from the upstream manhole and viewed from the downstream manhole. Measurements shall be taken at the top, each side and the bottom to determine the moon designation of the pipeline (example 8-inches - 1-inches out of alignment 7/8 moon, 2-inches out of alignment 3/4 moon, etc.). On pipelines 12-inches in diameter and larger the light shall be held at the upstream manhole and will be placed at the top, each side and bottom to allow for measurements to be taken in the same manner as for the pipelines under 12-inches in diameter.

6. Pipelines under 12-inches in diameter or greater which have a 7/8 moon or less shall be televised and recorded on video tape (as required in other sections of this specification) to verify the extent of the misalignment to determine in the opinion of the ENGINEER/OWNER if a point repair or relaying of the pipeline is necessary prior to any further restoration work being performed. The cost to maintain all traffic and roadways until a determination as to the acceptability of the pipeline is made shall be at the expense of the CONTRACTOR in addition to the actual cost of the repair.

E. Allowable Deflection Test

1. Deflection shall be measured with a rigid mandrel (Go/No-Go) device cylindrical in shape and constructed with a minimum of 9 or 10 evenly spaced arms or prongs. Drawings of the mandrel with complete dimensions shall be submitted to the ENGINEER for each diameter of pipe to be tested.

2. Pipe deflection shall be measured not less than 90 days after the backfill or permanent pavement base has been completed as specified and shall not exceed 5 percent of the base inside diameter of the pipe as listed in the following table.

	SDR-35	SDR-26		
Nominal SizeDiameter (Inches)	**Base Inside Mandrel (Inches)**	**5% Deflection Diameter (Inches)**	**Base Inside Mandrel (Inches)**	**5% Deflection (Inches)**
8	7.665	7.28	7.488	7.11
10	9.563	9.08	9.342	8.87
12	11.361	10.79	11.102	10.55
15	13.898	13.20	13.575	12.90

	TYPE T 1		TYPE T-2	
Nominal SizeDiameter (Inches)	**Base Inside Mandrel (Inches)**	**5% Deflection Diameter (Inches)**	**Base Inside Mandrel (Inches)**	**5% Deflection (Inches)**
18	16.976	16.13	17.054	16.20
21	20.004	19.01	20.098	19.09
24	22.480	21.36	22.586	21.46
27	25.327	24.06	25.446	24.17

3. If the CONTRACTOR performs the deflection testing rather than employing an approved test lab, the following shall apply:

4. The CONTRACTOR shall furnish the rigid mandrel, labor, materials and equipment necessary to perform the tests as approved by the ENGINEER. The mandrel shall be pulled through by Hand or a Hand operated reel through all sewer lines in the presence of the ENGINEER. Prior to performing the deflection tests, the CONTRACTOR shall submit to the ENGINEER certification that the minimum 9-arm mandrels are preset as stated above. Each mandrel shall be engraved with the following:

   a. Serial Number;
   b. Nominal pipe diameter;
   c. Either “ASTM D3034”, year and either “SDR-35” or “SDR-26”
   d. or “ASTM F679”, year and either “Type T-1” or “Type T-2”
   e. % deflection as stated above.

5. If the mandrel fails to pass any section of pipe, the CONTRACTOR shall excavate to the point of excess deflection and carefully compact around the point where excess deflection was found at no additional cost to the OWNER. After the permanent pavement base has been recompacted and resealed, the line shall be retested. If the mandrel fails to pass a second time, the section shall be replaced and retested. Rerounding is NOT permitted.

F. The CONTRACTOR shall repair all visible leaks in manholes even though the leakage test requirements are met.

G. The ends of branches, laterals, tees, wyes, and stubs to be included in a test section shall be plugged to prevent water or air leakage. All plugs shall be secured to prevent blowout due to internal pressure. A test section is defined as the length of sewer between manholes.

3.04 LEAKAGE TEST - INFILTRATION METHOD

A. The water infiltration test shall not be considered a valid leakage test unless the top surface of the groundwater level is at least 4-feet or more above the pipe crown during the test measurement. The rate of infiltration of water into the sewers, including manholes and appurtenances, shall not exceed 200 gallons per day per inch diameter per mile of sewer. In the event groundwater does not submerge the pipe as specified, the CONTRACTOR shall conduct an exfiltration test described hereinafter.

B. A visual inspection and an infiltration test will be conducted on all completed sewers 30-inches or more when they are submerged by groundwater as specified above. The CONTRACTOR shall provide facilities to stop inflow from adjacent sections of sewer and to provide pondage to permit measurement of infiltration. Visible leaks, defective joints, and defective pipe shall be satisfactorily replaced.

3.05 LEAKAGE TEST - EXFILTRATION METHOD

A. Sewers not submerged by groundwater shall be tested for exfiltration or, if approved, by low-pressure air method. The ENGINEER reserves the right to waive the exfiltration test on any section of sewer based on his evaluation of the results of previous tests.

B. The hydrostatic head for test purposes shall be 4-feet or more above the sewer crown at the upstream end. Any arrangement of testing equipment which will provide observable and accurate measurement of water leakage under the specified conditions will be permitted. The rate of exfiltration of water out of the sewers, including manholes and appurtenances, shall not exceed 200 gallons per day per inch diameter per mile of sewer. Visible leaks, defective joints, and defective pipe shall be satisfactorily replaced.

C. The sewer test section may be filled 24 hours prior to time of exfiltration testing, if desired, to permit normal absorption into the sewers walls to take place.

3.06 LEAKAGE TEST - LOW PRESSURE AIR METHOD (PREFERRED METHOD)

A. Test Procedure. The following test procedures shall be used in making each test:

1. The section of sewer line to be tested shall be flushed and cleaned prior to conducting the low-pressure air test to clean out any debris, wet the pipe, and produce more consistent results.

2. Isolate the section of sewer line to be tested by means of inflatable stoppers or other suitable test plugs. One of the plugs shall have an inlet tap, or other provision for connecting a hose to a portable air source.

3. If the test section is below the groundwater level, determine the height of the groundwater above the springline of the pipe at each end of the test section and compute the average. For every foot of groundwater above the pipe springline, increase the gauge test pressure by 0.43 pounds per square inch.

4. Connect the air hose to the inlet tap and a portable air source. The air equipment shall consist of necessary valves and pressure gauges to control the rate at which air flows into the test section and to enable monitoring of the air pressure within the test relief device to prevent the possibility of loading the test section with the full capacity of the compressor.

5. Add air slowly to the test section until the pressure inside the pipe is raised to 4.0 psig greater than the average back pressure of any groundwater that may be over the pipe.

6. After a pressure of 4.0 psig is obtained, regulate the air supply so that the pressure is maintained between 3.5 and 4.0 psig (above the average groundwater back pressure) for a period of two-minutes to allow the air temperature to stabilize in equilibrium with the temperature of the pipe walls.

7. Determine the rate of air loss by the time pressure-drop method. After the two-minute air stabilization period, disconnect the air supply and adjust the pressure to 3.5 psig above the average to drop from 3.5 psig to 2.5 psig shall be determined by means of a stopwatch and this time interval will be compared to the required time in the tables to determine if the rate of air loss is within the allowable time limit. If the time is equal to or greater than the times indicated in the tables, the pipeline shall be deemed acceptable.

8. Defective joints, fittings and pipe shall be satisfactorily replaced.

B. The pipe shall be tested between adjacent manholes. The test time for the air pressure to drop the specified one pound shall be as listed below:

	Pipe Diameter "D" in Inches						
Length of Test Sec. "L" (ft.)	**8**	**10**	**12**	**15**	**18**	**21**	**24**
25	0.18	0.28	0.40	1.02	1.29	2.01	2.38
50	0.35	0.55	1.19	2.04	2.58	4.03	5.17
75	0.53	1.23	1.59	3.06	4.27	6.04	7.55
100	1.11	1.50	2.38	4.08	5.56	8.05	10.39
125	1.28	2.18	3.18	5.09	7.26	9.55	11.20
150	1.46	2.45	3.58	6.11	8.30	9.55	11.20
175	2.03	3.13	4.37	7.05	8.30	9.55	11.20
200	2.21	3.40	5.17	7.05	8.30	9.55	11.20
225	2.38	4.08	5.40	7.05	8.30	9.55	11.20
250	2.56	4.35	5.40	7.05	8.30	9.55	11.20
275	3.14	4.43	5.40	7.05	8.30	9.55	11.20
300	3.31	4.43	5.40	7.05	8.30	9.55	11.20
325	3.47	4.43	5.40	7.05	8.30	9.55	11.20
350	3.47	4.43	5.40	7.05	8.30	9.55	11.20
400	3.47	4.43	5.40	7.05	8.30	9.55	11.20
425	3.47	4.43	5.40	7.05	8.30	9.55	11.20
450	3.47	4.43	5.40	7.05	8.30	9.55	11.20
475	3.47	4.43	5.40	7.05	8.30	9.55	11.20
500	3.47	4.43	5.40	7.05	8.30	9.55	11.20

C. For sewer diameter between 27-inches and 36-inches inclusive, the pipeline may be tested between adjacent manholes, or segmentally. The test time shall be in accordance with the following formula.

T = .00493 (D x D) L
***where**:*
T= Test Time, Seconds; D = Diameter, Inches; L = Length of test Section, Feet.

3.07 FINAL SEWER CLEANING

A. Prior to final acceptance and final manhole-to-manhole inspection of the sewer system by the ENGINEER, flush and clean all parts of the system. Remove all accumulated construction debris, rocks, gravel, sand, silt, and other foreign material from the sewer system at or near the closest downstream manhole. If necessary, use mechanical rodding or bucketing equipment.

B. Upon the ENGINEER's final manhole-to-manhole inspection of the sewer system, if any foreign matter is still present in the system, reflush and clean the section and portions of the lines as required.

3.08 VACUUM TEST OF MANHOLES/WETWELLS

A. Pretest manhole/wet wells after connections have been completed but before backfilling. Results derived from this test will allow time for necessary repairs to be completed before further construction proceeds and hinders such repairs.

B. Plug all manhole/wet wells inverts and lift holes. Inverts shall be plugged using suitably-sized pneumatic or mechanical pipeline plugs. The plugs shall be placed a minimum of 6-inches beyond the manhole/wet wells wall to prevent temporary sealing of the inverts. Follow all MANUFACTURER'S recommendations and warnings for proper and safe installation of such plugs. Make sure such plugs are properly rated for the pressures required for the test.

C. The standard test of 10-inch Hg. (mercury) is equivalent to approximately 5 psig (0.3 bar) back pressure. Unless such plugs are mechanically restrained, it is recommended that the plugs used have a two-times (2X) safety factor or a minimum 10 psig (.7 bar) back pressure usage rating. Brace inverts if lines entering if lines entering the manhole/wet wells have not been backfilled to prevent pipe from being dislodged and pulled into the manhole/wet wells.

D. Install the vacuum tester head assembly at the top access point of the manhole, preferably the ring area (Figures A and B). Adjust the cross brace to insure that the inflatable sealing element inflates and seals against the straight top section of the manhole/wet wells structure.

E. Attach the vacuum pump assembly to the proper connection on the test head assembly. Make sure the vacuum inlet/outlet valve is in the closed position.

F. Following all safety precautions and MANUFACTURER'S instructions, inflate sealing element to the recommended maximum inflation pressure.

G. Start the vacuum pump assembly engine and allow preset RPM to stabilize.

H. Open the inlet/outlet ball valve and evacuate the manhole to 10-inch Hg. (0.3 bar).

I. Close vacuum inlet/outlet ball valve, disconnect vacuum pump, and monitor vacuum for the specified time period (see table below). If the vacuum does not drop in excess of 1-inch Hg. over the specified time period, the manhole is considered acceptable and passes the test. If the manhole fails the test, identify the leaking areas by removing the head assembly, coating the interior surfaces of the manhole with a soap and water solution, and repeating the vacuum test for approximately thirty seconds. Leaking areas will have soapy bubbles. Once the leaks have been identified, complete all necessary repairs and repeat test procedures until satisfactory results are obtained.

J. Repeat the test procedure after backfilling for final acceptance test.

VACUUM TEST TIMETABLE

	DIAMETER - INCHES		
Depth - Feet	**48”**	**60”**	**72”**
4’	10 sec.	13 sec.	16 sec.
8’	20 sec.	26 sec.	32 sec.
12’	30 sec.	39 sec.	48 sec.
16’	40 sec.	52 sec.	64 sec.
20’	50 sec.	65 sec.	80 sec.
24’	60 sec.	78 sec.	96 sec.
*	05 sec.	6.5 sec.	8.0 sec.

*Add “T” times for each additional 2’ depth. (The values listed above have been extrapolated from ASTM designation C924-85.)

END OF SECTION

SECTION 335101 - VALVES AND ACCESSORIES

PART 1 - GENERAL

1.01 SCOPE OF WORK

The CONTRACTOR shall furnish all labor, materials, equipment and incidentals required and install complete and ready for operation and test all buried and non-buried valves as shown on the Drawings and as specified herein.

1.02 SUBMITTALS

A. Submit materials required to establish compliance with these Specifications in accordance with Section 01300. Submittals shall include the following:

1. Certified drawings showing all important details of construction and dimensions.

2. Descriptive literature, bulletins and/or catalogs of the equipment.

3. The total weight of each item.

4. A complete bill of materials.

5. Additional submittal data, where noted with individual pieces of equipment.

B. Test Reports: Provide certified hydrostatic test data, per Manufacturers standard procedure or MSS-SP-61 for all valves.

C. Certificates: For each valve specified to be manufactured, tested and/or installed in accordance with AWWA and other standards, submit an affidavit of compliance with the appropriate standards, including certified results of required tests and certification of proper installation.

D. Manufacturer’s Installation and Application Data

E. Operating and Maintenance Data: Operating and maintenance instructions shall be furnished to the ENGINEER. The instructions shall be prepared specifically for this installation and shall include all required cuts, drawings, equipment lists, descriptions and other information required to instruct operating and maintenance personnel unfamiliar with such equipment.

1.03 REFERENCE STANDARDS

A. American Society for Testing and Materials (ASTM):

1. ASTM A48 - Specification for Gray Iron Castings.

2. ASTM A126 - Specification for Gray Iron Castings for Valves, Flanges and Pipe Fittings.

3. ASTM A159 - Specification for Automotive Gray Iron Castings.

4. ASTM A240 - Standard Specification for Heat-Resisting Chromium and Chromium-Nickel Stainless Steel Plate, Sheet and Strip for Pressure Vessels.

5. ASTM A276 - Standard Specification for Stainless and Heat-Resisting Steel Bars and Shapes.

6. ASTM A436 - Specification for Austenitic Gray Iron Castings.

7. ASTM A536 - Specification for Ductile Iron Castings.

8. ASTM B30 - Specification for Copper-Base Alloys in Ingot Form.

9. ASTM B62 - Standard Specification for Composition Bronze or Ounce Metal Castings

B. American Water Works Association (AWWA):

1. AWWA C111 - Rubber-Gasket Joints for Ductile-Iron and Gray-Iron Pressure Pipe and Fittings.

2. AWWA C500 - Gate Valves, 3-in Through 48-in NPS, for Water and Sewage Systems

3. AWWA C504 - Rubber-Seated Butterfly Valves

4. AWWA C507 - Ball Valves 6-in Through 48-in

5. AWWA C508 - Swing-Check Valves for Waterworks Service, 2-in Through 24-in NPS

6. AWWA C509 - Resilient-Seated Gate Valves, 3-in Through 12-in NPS, for Water and Sewage Systems

7. AWWA C511 - Reduced Pressure Principle Backflow Prevention Assembly

8. AWWA C540 - Power-Actuating Devices for Valves and Sluice Gates

9. AWWA C550 - Protective Interior Coatings for Valves and Hydrants

10. AWWA C800 - Underground Service Line Valves and Fittings

11. AWWA C515 – Resilient Seated Valves for 14” and Larger

C. American National Standards Institute (ANSI):

1. ANSI B2.1 - Specifications, Dimensions, Gauging for Taper and Straight Pipe Threads (except dry seals).

2. ANSI B16.1 - Cast Iron Pipe Flange and Flanged Fittings Class 25, 125, 250 and 800

3. ANSI B16.10 - Face-to-Face and End-to-End Dimensions of Valves

4. ANSI B16.104 - Butterfly Valves

D. American Iron and Steel Institute (AISI).

E. Manufacturer’s Standardization Society of the Valve and Fittings Industry (MSS):

1. MSS-SP-61 - Pressure Testing of Steel Valves.

2. MSS-SP-67 - Butterfly Valves.

3. MSS-SP-70 - Cast Iron Gate Valves, Flanged and Threaded Ends.

4. MSS-SP-71 - Cast Iron Swing Check Valves, Flanged and Threaded Ends.

5. MSS-SP-72 - Ball Valves with Flanged or Butt-Welding Ends for General Services.

6. MSS-SP-78 - Cast Iron Plug Valves, Flanged and Threaded Ends.

7. MSS-SP-80 - Bronze Gate, Globe, Angle and Check Valves.

8. MSS-SP-82 - Valve Pressure Testing Methods

9. MSS-SP-98 - Protective Epoxy Coatings for Interior of Valves and Hydrants.

F. National Electrical Manufacturers Association (NEMA).

G. Underwriters Laboratories (UL).

H. Factory Mutual Insurance (FM).

I. Where reference is made to one of the above standards, the revision in effect at the time of bid opening shall apply.

1.04 QUALITY ASSURANCE

A. Qualifications:

1. Valves and appurtenances shall be products of well established firms who are fully experienced, minimum 10 years, reputable and qualified in the manufacture of the particular equipment to be furnished.

2. The equipment shall be designed, constructed and installed in accordance with the best practices and methods and shall comply with these Specifications as applicable.

3. All units of the same type shall be the product of one Manufacturer.

B. Certifications:

1. The Manufacturer's shall furnish an affidavit of compliance with Standards referred to herein as specified in paragraph 1.03C.

2. Refer to Part 3 for testing required for certain items in addition to that required by referenced standards.

C. Provide the services of a qualified and factory-trained service representative of the Manufacturer to provide operational and maintenance instruction, for a one-day, eight hour period for:

1. Valve motor operators.

2. Valve hydraulic operators.

3. Valve pneumatic operators.

4. Pressure regulating valves.

5. Air release, air and vacuum valves.

D. Inspection of the units may also be made by the ENGINEER or other representative of the OWNER after delivery. The equipment shall be subject to rejection at any due to failure to meet any of the Specification requirements, even though submittal data may have been accepted previously. Equipment rejected after delivery shall be marked for identification and shall be removed from the job site at once.

1.05 SYSTEM DESCRIPTION

A. All of the equipment and materials specified herein is intended to be standard for use in controlling the flow of wastewater, sludges, reclaimed water, potable water, air or chemicals, depending on the individual systems, as noted on the Drawings.

B. Valves, appurtenances and miscellaneous items shall be installed as shown on the Drawings and as specified, so as to form complete workable systems.

C. Unless otherwise noted all powered valve operators shall have:

1. Valves smaller than 8 inches: electric operators 120V, single phase, 60 Hz.

2. Valves larger than 8 inches: electric operators 480 volt, 3 phase, 60 Hz.

3. Solenoid valves: 120 volt, single phase, 60 hz, NEMA 4 enclosure, continuous duty Class F coils and manual operator.

4. See other paragraphs for additional requirements.

D. Packing and Shipping:

1. Care shall be taken in loading, transporting and unloading to prevent injury to the valves, appurtenances, or coatings. Equipment shall not be dropped. All valves and appurtenances shall be examined before installation and no piece shall be installed which is found to be defective. Any damage to the coatings shall be repaired as acceptable to the ENGINEER.

2. Prior to shipping, the ends of all valves shall be acceptably covered to prevent entry of foreign material. Covers shall remain in place until after installation and connecting piping is completed.

a. All valves 3-in and larger shall be shipped and stored on site until time of use with wood or plywood covers on each valve end.

b. Valves smaller than 3-in shall be shipped and stored as above except that heavy cardboard covers may be used on the openings.

c. Rising stems and exposed stem valves shall be coated with a protective oil film which shall be maintained until the valve is installed and put into use.

d. Any corrosion in evidence at the time of acceptance by the OWNER shall be removed, or the valve shall be removed and replaced.

E. Storage and Protection:

Special care shall be taken to prevent plastic and similar brittle items from being directly exposed to the sun, or exposed to extremes in temperature, to prevent deformation. See the individual piping specifications and Manufacturer's information for further requirements.

1.06 MAINTENANCE

A. Special tools and the Manufacturer's standard spare parts, if required for normal operation and maintenance, shall be supplied with equipment.

B. Provide all special tools required for normal maintenance.

C. Tools shall be packaged in a steel case, clearly and indelibly marked on the exterior to indicate equipment for which tools are intended.

D. Provide to the OWNER a list of all spare and replacement parts with individual prices and location where they are available.

E. Prices shall remain in effect for a period of not less than one year after start-up and final acceptance.

PART 2 - PRODUCTS

2.01 MATERIALS AND EQUIPMENT - GENERAL

A. Reference is made to Division 1 for additional requirements, including nameplates, provisions for temporary pressure gages, protection against electrolysis and anchor bolts.

B. The use of a Manufacturer's name and/or model or catalog number is for the purpose of establishing the standard of quality and general configuration desired.

C. Valves and appurtenances shall be of the size shown on the Drawings or as noted and as far as possible equipment of the same type shall be identical and from one Manufacturer.

D. Valves and appurtenances shall have the name of the maker, nominal size, flow directional arrows, working pressure for which they are designed and standard referenced, cast in raised letters or indelibly marked upon some appropriate part of the body.

E. Unless otherwise noted, items shall have a minimum working pressure of 150 psi or be of the same working pressure as the pipe they connect to, whichever is higher and suitable for the pressures noted where they are installed.

F. Joints, size and material - unless otherwise noted or required by the ENGINEER:

1. Except where noted, all joints referred to herein shall be of the same type, nominal diameter, material and with a minimum rating equal to the pipe or fittings they are connected to.

2. Valves and appurtenances shall be of the same nominal diameter as the pipe or fittings they are connected to.

3. All valves exposed to view, or in vaults.

a. 3-in and smaller - threaded ends

b. 4-in and larger flanged ends.

G. Provide all special adaptors as required to ensure compatibility between valves, appurtenances and adjacent pipe.

H. Valves and actuators located outdoors but not within a building; within maximum 2-ft above liquid; in vaults; or where otherwise noted shall be especially designed for submerged service where water may completely submerge the valve and operator. All other units shall be as a minimum weather tight.

2.02 VALVE ACTUATORS - GENERAL

A. The valve Manufacturer shall supply and integrally, rigidly mount all actuators, including any type of manual or powered actuators, on valves at the factory. The valves and their individual actuators shall be shipped as a unit.

B. Unless otherwise noted, valves shall be manually actuated; nonburied valves shall have an operating wheel, handle or lever mounted on the operator; buried valves and those with operating nuts shall have a non-rising stem with an AWWA 2-in nut. At least two tee handles shall be provided for all operating nuts.

C. Except as otherwise shown on the Drawings or specified herein, all valves 3-in diameter or larger, with the valve center line located 7-ft or more above the operating floor, shall be provided with chain wheel operators complete with chain guides and hot dipped galvanized steel chain, which loop within 4-ft of the operating floor.

D. All actuators shall be capable of moving the valve from the full open to full close position and in reverse and holding the valve at any position part way between full open or closed.

E. Each operating device shall have cast on it the word "OPEN" and an arrow indicating the direction of operation.

F. Floor boxes for operating nuts recessed in concrete shall be standard cast iron type, cast-in-place, with fastening top by Clow or equal.

G. Stem guides shall be of the adjustable wall bracket type, bronze bushed, with maximum spacing of 10-ft as manufactured by Clow; Rodney Hunt or equal. Extended operating nuts and/or stems shall have universal joints and pin couplings, if longer than 10-ft and a rating of at least five times the maximum operating torque. Stem adaptors shall be provided.

H. Where required by the installation, or as specified, provide the following: extended stem; floor stand and handwheel; position indicator and etched or cast arrow to show direction of rotation to open the valve; resilient seal around stem penetration of slab.

2.03 BUTTERFLY VALVES FOR FLUID SERVICE (METAL BODY)

A. Butterfly valves and operators up to 72 inches diameter shall conform to AWWA C504, Class 150B, except as hereinafter specified. The Manufacturer shall submit an affidavit of compliance stating that the valves have been manufactured and tested in accordance with AWWA C504 and specifically listing all exceptions. Valves shall have a minimum 150 psi pressure rating or higher as noted on the Drawings or in the Specifications and be manufactured by Val-Matic Pratt, Dezurik or equal.

B. Butterfly valves for above grade shall be flanged end with face to face dimensions in accordance with Table 2 of AWWA C504 Standard for short-body valve. All valves for dead end shut off service shall be flanged type. Butterfly valves for buried service shall be mechanical joint ends conforming to ANSI/AWWA C111/A21.11 and shall be mechanically restrained with Megalug Series 1100 or ENGINEER approved equal.

C. Valve seats shall be full resilient seats retained in the body or on the disc edge in accordance with AWWA C504. Valve discs shall be constructed of cast iron, ASTM A48, Class 40; Ni-resist, ASTM A126, Class B; or ductile iron, ASTM A536, Grade 65-45-12.

1. For valves 24-inch in diameter and larger, when the resilient seats are attached to the body, discs shall have Type 316 stainless steel seating edges. When the resilient seat is attached to the disc, it shall be fastened with a one piece Type 316 stainless steel retaining ring, Type 316 stainless steel Nylock set screws and a mating Type 316 stainless steel ring shall be installed in the valve body.

2. Resilient seats shall be Hycar or equal. Seats shall be fully adjustable and replaceable with the valves in place for all valves.

D. The valve body shall be constructed of close grain cast iron per ASTM A126, Class B with integrally cast hubs for shaft bearing housings of the through boss-type. Permanently self-lubricating body bushings shall be provided and shall be sized to withstand bearing loads. Stuffing box of liberal dimensions shall be provided at the operator end of the vane shaft.

1. Packing shall be of the self compensating v-type. A sealing element utilizing O-rings shall also be acceptable for up to and including 24-in valves. Over 24-in, pull down seals using a square braid of graphited asbestos is an acceptable alternate.

2. Packing shall be held in place by a bolted corrosion resistant retainer plate or gland; retainer clips are not acceptable. For 30-in or larger, use a stuffing box with follower gland.

3. Replacement of seals, for all size butterfly valves, shall not require removal of the valve from the line. In addition adjustment or replacement of seals on valves of 30-in or larger shall not require disturbing any part of the valve or operator assembly, except any packing follower gland.

E. The valve shaft shall be of Type 316 stainless steel and designed for both torsional and shearing stresses when the valve is operated under its greatest dynamic or seating torque. No reductions of shaft diameter will be allowed except at the operator connection. Any reduction shall have a full radius fillet.

F. In general, the butterfly valve actuator shall conform to the requirements of AWWA C504, insofar as applicable and as herein specified.

G. Gearing for the actuators where required shall be totally enclosed in a gear case in accordance with AWWA C504.

H. The manual actuators shall conform to AWWA C504, insofar as applicable. Actuators shall have permanent indicators with raised or engraved marks to show position of the valve disc.

2.04 GATE VALVES (2-1/2-IN AND SMALLER)

A. Gate valves 2-1/2-in diameter and smaller shall have flanged, screwed, or solder ends as required and shall be brass, or bronze, or Type 304 stainless steel solid wedge, union bonnet, rising-stem gate valves such as Figures 47 and 48 as manufactured by Jenkins Brothers or equal products as manufactured by Crane; Fairbanks; Lukenhiemer or equal.

B. All water valves 2-1/2-in and 3-in unless noted otherwise, shall be brass body gates and shall be Jenkins No. 1240, or Hammond 1B-647.

2.05 GATE VALVES (3-IN AND LARGER)

A. General Requirements:

1. Unless otherwise specified below, these requirements shall apply to all gate valves.

2. Gate valves shall meet the requirements of AWWA C500 and AWWA C509 as applicable to the type of valve specified.

3. Buried and submerged valves shall be furnished with mechanical joints and stainless steel hardware; non-rising stem design.

4. Exposed valves shall be furnished with Class 125 flanged ends and hand wheel; provide valves with outside screw and yoke.

5. All-metal valves shall be manufactured of ASTM A536, Ductile Iron, with bronze mounting design.

6. Rising stem valves shall be sealed with adjustable and replaceable packing; valve design must permit packing replacement under operating system pressures with only moderate leakage.

7. Non-rising stem valves shall use a double O-ring stem seal, except that packing shall be used where geared operators are required.

8. Except as otherwise specified, valves shall be rated for the following working water pressures:

Valve Size	Pressure (psig)
3-in to 12-in	250
14-in to 20-in	250
24-in and greater	250

All valve bodies shall be hydrostatically tested to at least twice the rated working water pressure. In addition, valves shall be seat-tested, bi-directional at the rated working pressure, with seat leakage not to exceed one fluid ounce per inch of valve diameter per hour. Provide certificates of testing.

9. Flanged valves to have face-to-face dimensions per ANSI B16.1 and flanges per ANAI B16.10.

10. Exposed valves 16-in and larger to have valve by-pass.

11. All bonnet and packing gland bolts shall be zinc or cadmium electroplated steel; packing gland bolts shall have bronze nuts.

12. Exposed valves 16-in and greater indicated for horizontal stem installation shall be furnished with rollers, tracks and scrapers and enclosed bevel gear grease case.

13. Provide geared operator and chain wheel, chain and chain guides for valves with handwheel centerline more than 7-ft above operating level.

14. All valves shall be marked per AWWA Standards, including name of Manufacturer, valve size and working pressure and year of manufacture.

15. Unless otherwise indicated, valves 12-in and smaller shall be capable of installation in the vertical or horizontal position, sealing in both directions at the rated pressure.

16. Valve operation shall be counterclockwise for potable water; clockwise for wastewater and other non-potable waters. Provide permanent label showing “OPEN” and arrows.

17. Metal-seated valves shall be coated internally and externally with an asphaltic varnish, per AWWA C500. Resilient seated valves shall be coated, interior and exterior, with fusion bonded epoxy per AWWA C550.

B. Valve Applications:

1. Valves for Non-Potable Water Service:

a. Resilient seat gate valves shall be ductile iron bodied, bronze mounted, with wedge type disk, hand wheel and rubber seat. Valves shall be manufactured in accordance with AWWA C509. Valves shall be suitable for above ground service, be designed for 150 psi working pressure, shall be of O-ring type, with non-rising stem, and opening counterclockwise. Valves shall have flanged ends. Valves shall be coated in accordance with AWWA C550.

b. Resilient seated design manufactured by American R-B Clow, Mueller, M&H Valve Company or equal.

2. Valves for Wastewater Service (NOT USED)

3. At the CONTRACTOR’s option and unless otherwise indicated, any of the listed valve styles may be used, at no additional cost to the OWNER.

C. Valve Requirements:

1. Double Disc (NOT USED)

2. Double Revolving Disc (NOT USED)

3. Solid Wedge (NOT USED)

4. Resilient Seated:

a. Conform to AWWA C509. Also UL and FM approved.

b. Internal and external epoxy coating of valve body, including bonnet, per AWWA C550.

c. Gate shall be encapsulated with synthetic rubber. It shall be bonded and vulcanized in accordance with ASTM B429 Method B.

d. No recesses in valve body.

D. Buried Valves:

1. Conform to the requirements above, except mechanical joint bell ends per AWWA C111. The valve shall be mechanically restrained with Megalug Series 1100 or ENGINEER approved equal. All exposed valve hardware (nuts, bolts, washers, etc.) including bonnet, bonnet cover, stuffing box, gear adaptor and joints shall be Type 304 stainless steel.

2. Non-rising stem design, double o-ring seals for non-geared valves and shall incorporate packing for geared valves.

3. Provide valve box, 2-in operating nut and extension stem and stem cover.

E. Tapping Valves and Sleeves:

1. Tapping valves shall comply with the same requirements as resilient seated gate valves or double revolving disc gate valves except they shall have the flanged end and port opening modified for tapping service. Valves shall be capable of passing a full nominal sized cutter without damage to the valve. The tapping sleeve shall be gray cast iron or ductile iron mechanical joint type with the outlet flange conforming to MSS-SP-60.

2. All water valves, 4-in and larger, shall be iron body gates, bronze trim, flanged ends, O.S. & Y. pattern, solid wedge, rising spindle, Jenkins No. 651, or Hammond 1R-1140.

2.06 PLUG VALVES

A. Plug valves shall be of the offset disc type, ¼ turn, non-lubricated, serviceable (able to be repacked) under full line pressure and capable of sealing in both directions at the rated pressure. The disc shall be completely out of the flow path when open. Plug valves specified herein shall be by DeZurik, Clow, M&H, Val-Matic, or equal. All Manufacturers, named or otherwise, must comply completely with the specification.

1. For clean liquid or screened sewage, all size plug valves shall have a minimum port area of 80 percent.

2. On sludge and scum lines, all valves 24-in and larger shall have a minimum 100 percent open port area; for all other valves, a minimum port area shall be 80 percent when measured by the percent cross-sectional area of equivalent size (nominal same diameter) pipe.

3. All plug valves for what ever service, shall be capable of passing "pigging" cleaning equipment (using a Girard or similar cleaning pig of full nominal pipeline diameter) in either direction and Manufacturer shall so certify that this may be done without the use of special equipment.

B. Valves shall be rated at minimum 175 psi W.O.G. (Water, Oil, and Gas) working pressure for sizes 4-in to 12-in inclusive and at minimum 150 psi W.O.G. working pressure for sizes 14-in and larger.

1. All plug valves under this paragraph shall be performance, leakage and hydrostatically tested in accordance with AWW A C504, except as herein modified. ‘

2. At the above rated minimum working pressures, the valves shall be certified by the Manufacturer as permitting zero leakage for a period of at least one-half hour with pressure applied to the seating face.

3. At the request of the ENGINEER, the valve Manufacturer may have to perform a valve seat leakage test, witnessed by the ENGINEER to prove compliance with these Specifications.

C. Valve bodies shall be of cast iron, 30,000 psi tensile strength, ASTM A 126, Grade B, or of ductile iron, ASTM A536 and of the top entry, bolted bonnet design, cast with integral flanges conforming to the connecting piping. All exposed bolts, nuts and washers shall be zinc or cadmium-plated, except for buried or submerged valves, which shall have Type 316 stainless steel hardware.

The valve disc shall:

1. Be cast iron ASTM A 126, Grade B, or ductile iron, ASTM A536, Grade 65-45-12.
2. Be removable without removing the valve from the line.
3. Have an integral upper and lower shaft which shall have seals on the upper and lower journals to prevent entrance of solids into the journals.
4. Be one piece for valves up to 14-in and maximum two piece for larger valves.

D. Shaft bearings shall be permanently lubricated, rigidly backed TFE, stainless steel or bronze at both upper and lower stem journals. The operator shaft shall have easily replaceable seals, which shall be externally adjustable and repackable without removing the bonnet from the valve, or shall have self adjusting packing.

E. The valve seating surface shall provide full 360 degree seating by contact of a resilient seating material on the disc mating with welded-in high nickel content overlay seating surface in the body.

1. The seating design shall be resilient and of the continuous interface type having consistent opening and closing torques and shall be non-jamming in the closed position. Screw-in seats shall not be acceptable.
2. Discs shall have a full resilient facing of neoprene or Buna-N.

F. The methods of mounting the actuator to the valve shall provide an air gap between the two. Actuator shall clearly indicate valve position and an adjustable stop shall be provided. Construction of actuator housing shall be semi-steel. Hardware on actuators shall be of the same materials as the valves.

G. Unless otherwise required, due to location or operation, each valve 6-in and smaller shall be provided with its own securely attached lever. Provide adjustable limit stops for both opening and closing and a clearly marked position indicator.

H. Plug valves shall be installed so that the direction of flow through the valve and the shaft orientation is in accordance with the Manufacturer’s recommendations. Unless otherwise noted, shaft shall be horizontal, with plug opening up.

2.07 BALL VALVES

A. Ferrous Ball Valves:

1. Ball valves for mainline or water service shall be either ductile iron or carbon steel body, full bore, fire-safe, rated for a line pressure of 150 psig. Except as noted, ball valves shall comply with AWWA C507.

2. The design of the valve shall be such that it shall provide suitable seating in both directions. In order to determine the position of the ball within the valve (open or closed), there shall be an easily visible, permanent, indicator located conspicuously on the valve. Ball valves shall have Type 316 stainless steel seating surfaces. Seats shall be Type 304 stainless steel. The fully open port area shall be approximately 100 percent of the nominal pipe area.

3. Valve shafts shall be ground and polished and shall be Type 304 stainless steel. Teflon-lined bearings shall be supplied in both trunnions of the valve body.

4. The valves shall be constructed so that the seals, seats and balls are accessible for replacement without dismantling the piping. The valves shall not require lubrication but shall have stuffing boxes which can be packed with the valve in service without undue leakage. Ball valves shall be as manufactured by Henry Pratt Co., Aurora, IL; Williamette, Portland, or equal.

5. Valve actuators shall conform to AWWA C507 and as specified herein.

B. Ball valves for water piping shall be manual or electric actuated (as shown on the Drawings), bronze, resilient seated, regular port, threaded two piece bolted body type valves. The body and cap shall be of brass, ASTM B30, the ball and stem of Type 316 stainless steel and the seats and seals of TFE. The valves shall have full floating ball and shall be non lubricated. Valve seats shall be easily accessible and replaceable. Valves shall be rated to 250 psi and shall be as manufactured by Neles-Jamesbury; WKM or equal.

2.08 CHECK VALVES

A. Swing check valves, sizes 2-1/2 inches through 12 inches shall be spring and lever operated with bronze disc facing and flanged ends with a maximum working pressure of 175 psig and test pressure of 350 psig.

B. Swing check valves, sizes 14 inches through 24 inches shall be spring and lever operated with bronze disc facing and flanged ends with a maximum working pressure of 150 psig and test pressure of 300 psig.

C. Swing check valves, sizes 4 inches and smaller shall use bronze disc ASTM B584.

D. Valves shall meet all applicable parts of ANSI/AWWA C508 Standard.

E. Valves for above grade shall be flanged end. Flanged end dimensions and drilling shall comply with ANSI B16.1, Class 125. Swing check valves for buried service shall be mechanical joint ends.

F. The valve body shall be constructed of ductile or cast iron per ASTM A126, Class B, or ASTM A536, bronze mounted (IBBM).

G. Valves shall be located above grade unless otherwise noted in the Drawings and Specifications.

H. Valves shall have an O-ring sealed stuffing box.

I. Valves shall have adjustable spring tension to control opening and closing of the clapper.

J. Valves shall be installed so that the direction of flow through the valve and the shaft orientation is in accordance with the Manufacturer's recommendations.

K. Swing check valves specified herein shall be by Mueller Company, Model No. 2600 for above grade installations, or ENGINEER approved equal. All Manufacturers, named or otherwise, must comply completely with the specification.

2.09 AIR RELEASE VALVES

A. Air release valve assembly shall be furnished and installed on the reuse water transmission main as shown on the drawings.

B. Air release or valve assembly shall consist of a combination short body, air release-vacuum breaker valves, installed in a manhole with vented manhole cover, gate valve, fittings, tapping saddle and connecting piping to the main.

C. Air release valves shall be installed to release any small accumulations of air, which may collect while pipe is in operation and under pressure.

D. Air release valves on a HDPE pipe shall utilize an electrofusion corp saddle with stainless steel outlet as manufactured by Central Plastics or equal.

E. The air release valves shall be Val-Matic Model 42 or engineer approved equal.

F. The small orifice assembly air release valve shall automatically release air accumulations from the pipe while under positive pressure.

G. When the valve body fills with air, the float ball shall fall to open the small orifice and exhaust the air to atmosphere.

H. When the air has been exhausted, the float ball shall be buoyed up and tightly close the small orifice.

I. The small orifice assembly shall be furnished with cast iron body and cover (ASTM A126-B).

J. The float ball shall be constructed of stainless steel and attached to a stainless steel lever mechanism.

K. A resilient, Buna-N seat shall be attached to the lever mechanism for drop-tight closure.

L. Valves shall be corrosion resistant, suitable for reuse water transmission main application, and shall automatically function to release to the atmosphere both large and small amounts of air that accumulate in the pipeline.

M. Once the air has been exhausted, both valves shall seal tightly to prevent liquid leakage.

N. The valve shall also function to admit air into a line, tank, or chamber under emergency conditions or when it is being drained.

O. The capacity and pressure rating of the valve is dependent on the diameter of the precision orifice in the cover.

P. The Orifice Size shall be 5/32-inch. A large inlet connection is required for proper air and water exchange.

Q. The reuse water air release valves inlet size shall be 2-inch NPT for reuse water mains.

R. The reuse water air release valves outlet size shall be 1/2-inch NPT for reuse water mains.

S. The Air Release Valves shall be automatic float operated valves designed to release accumulated air from a piping system while the system is in operation and under pressure and installed in a concrete box as shown on the drawings.

T. Box and like shall be of the necessary size to the valve.

U. To connect the air valve, a corporation stop shall be tapped into the main using the procedures as recommended by the ductile iron pipe manufacturer.

V. The corporation stop shall be Mueller H-10045 or approved equal.

W. The valve body shall be threaded with NPT inlets and outlets.

X. The body inlet connection shall be hexagonal for a wrench connection.

Y. The valve shall have two additional NPT connections for the addition of gauges, testing and draining.

Z. The valve body and cover shall be constructed of ASTM A126 Class B cast iron working pressures of 300 psig, with resilient seats, rubber covered floats and no levers.

AA. The cover shall be bolted to the valve body and sealed with a flat gasket.

BB. Resilient seats shall be replaceable and provide drop tight shut off to the full valve pressure rating.

CC. Floats shall be unconditionally guaranteed against failure including pressure surges.

DD. Mechanical linkage shall provide sufficient mechanical advantage so that the valve will open under full operating pressure.

EE. The orifice, float and linkage mechanisms shall be constructed of Type 304 stainless steel.

FF. Non-metallic floats or linkage mechanisms are not acceptable.

GG. The manufacturer shall demonstrate a minimum of five (5) years experience in the manufacture of air valves.

HH. The valves shall be manufactured and tested in accordance with American Water Works Association Standard (AWWA) C512.

II. The manufacturer shall provide test certificates, dimensional drawings; parts list drawings, and operation and maintenance manuals.

JJ. The exterior of the valve shall be coated with a universal alkyd primer.

KK. Air Release Valves shall be as manufactured by Val-Matic Valve & Mfg. Corporation Model No. 38.6, Elmhurst, IL. USA or approved equal.

2.10 AIR/VACUUM VALVES (NORMAL OPERATION)

A. The large orifice assembly air and vacuum valve shall automatically exhaust air from a pipeline during the initial filling of the pipeline.

B. The large orifice assembly shall not blow shut while exhausting air, even while venting air at sonic velocity.

C. When all air has been exhausted from the pipeline, the large orifice float ball shall be buoyed up to seat tightly against a resilient seat ring.

D. The large orifice float ball shall remain tightly closed while the pipeline is under positive pressure.

E. Should the pipeline pressure fall below atmospheric pressure (such as during draining or a line break), the large orifice float ball shall automatically fall away from the seat ring and permit air to enter the pipeline.

F. The large orifice assembly shall be furnished with cast iron body and cover (ASTM A126-B).

G. A resilient, Buna-N seat ring shall be affixed to the valve cover.

H. The float ball shall be constructed of stainless steel with a minimum pressure rating of 1,000 psi. [The float ball shall be free floating within the valve body; guide stems, linkages or levers attached to the float are not acceptable.]

I. Unit shall be manufactured by GA; APCO; Val-Matic or equal. Special type for use with non-clean fluids shall be provided.

2.11 COMBINATION AIR AND AIR/VACUUM OR VACUUM RELIEF VALVES

A. Valves shall be corrosion resistant, suitable for reuse water application. Combination air valve assembly shall be furnished and installed on the reuse water transmission main as shown on the drawings.

B. Combination air valve assembly shall consist of a single body, combination air release and air/vacuum valves, installed in a manhole with vented manhole cover, gate valve, fittings, tapping saddle and connecting piping to the reuse water main. Manhole and like shall be of the necessary size to the valve.

C. Combination air valves shall be automatic float operated valves and installed to release large accumulations of air during the filing of the piping system and close upon liquid entry.

D. The valve shall open during draining or if a negative pressure occurs.

E. The valve shall also release accumulated from a piping system while the system is in operation and under pressure.

F. The capacity and pressure rating of the valve is dependent on the diameter of the precision orifice in the cover.

G. The large orifice diameter shall be 2-inch and the air release orifice shall be 3/32."

H. A large inlet connection is required for proper air and water exchange.

I. The reuse water combination air valves inlet and outlet size shall be 2-inch NPT.

J. To connect the air valve, a corporation stop shall be tapped into the main using the procedures as recommended by the ductile iron pipe manufacturer.

K. The corporation stop shall be Mueller H-10045 or approved equal.

L. The single body valve shall be threaded with NPT inlets and outlets. The NPT inlets and outlets shall be equal to the nominal valve size.

M. The body inlet connection shall be hexagonal for a wrench connection.

N. The valve shall have two additional NPT connections for the addition of gauges, testing and draining.

O. The combination air valve shall be furnished with cast iron body and cover (ASTM A126-B).

P. The float ball, guide shafts, and bushings shall be constructed of type 304 stainless steel and attached to a stainless steel lever mechanism.

Q. A resilient, Buna-N seat shall be attached to the lever mechanism for drop-tight closure. Non-metallic floats or linkage mechanisms are not acceptable.

R. Single body combination valves shall have an expanded outlet to provide full are around the guide mechanism.

S. The valve shall have a double guided plug and an adjustable threaded orifice.

T. The plug shall be protected against direct water impact by an internal baffle.

U. The plug shall have a precision orifice drilled through the center stem.

V. The cover shall be bolted to the valve body and sealed with a flat gasket.

W. Resilient seats shall be replaceable and provide drop tight shut off to the full valve pressure rating.

X. Floats shall be unconditionally guaranteed against failure including pressure surges.

Y. Mechanical linkage shall provide sufficient mechanical advantage so that the valve will open under full operating pressure.

Z. The exterior of the valve shall be coated with a universal alkyd primer.

AA. The manufacturer shall demonstrate a minimum of five- (5) years experience in the manufacture of air valves.

BB. The valves shall be manufactured and tested in accordance with American Water Works Association Standard (AWWA) C512.

CC. The manufacturer shall provide test certificates, dimensional drawings; parts list drawings, and operation and maintenance manuals.

DD. Air Valves shall be as manufactured by Val-Matic Valve & Mfg. Corporation engineer approved equal.

2.12 PRESSURE RELIEF VALVES FOR AIR

A. Pressure relief valves shall be designed for air and built to ASME standards and shall be National Board Certified.

B. The Valve shall have a one-piece brass body, chrome steel ball on brass seat, silicone rubber seal, and stainless steel spring.

C. The Preset pressure limit of 100 psi shall be tested and sealed by the manufacturer.

D. The pressure relief valve shall have a bubble tight seal within 10% of set pressure.

E. The pressure relief valve shall be manufactured by Control Devices, Inc. or ENGINEER-approved equal.

2.13 INSULATING FITTINGS

Fittings shall be of type to provide control of electrolysis and equal to “Dielectric” as manufactured by Watts Regulator Co., or equal.

2.14 SURFACE PREPARATION AND SHOP COATINGS

A. Not withstanding any of these Specifications, all coatings and lubricants in contact with non-potable water shall be certified as acceptable for use with that fluid.

B. In case of a conflict, the requirements of this Section govern.

C. If the Manufacturer’s requirement is not to require finished coating on any interior surfaces, then Manufacturer shall so state and no interior finish coating will be required, if acceptable to the ENGINEER.

D. The exterior surface of various parts of valves, operators, floor-stands and miscellaneous piping shall be thoroughly cleaned of all scale, dirt, grease or other foreign matter and thereafter one shop coat of an approved rust-inhibitive primer such as Inertol Primer No. 621 shall be applied in accordance with the instructions of the paint Manufacturer or other primer compatible with the finish coat provided.

E. Unless otherwise noted, interior ferrous surfaces of all valves shall be given a shop finish of an asphalt varnish conforming to AWWA C509, (except mounting faces/surfaces) or epoxy AWWA C550 with a minimum thickness of 4 mil.

F. Ferrous surfaces obviously not to be painted shall be given a shop coat of grease or other suitable rust-resistant coating.

G. Mounting surfaces shall be especially coated with a rust preventative.

H. Special care shall be taken to protect uncoated items and plastic items, especially from environmental damage.

2.15 FACTORY INSPECTION, TESTING AND CORRECTION OF DEFICIENCIES

A. Factory inspection, testing and correction of deficiencies shall be done in accordance with the referenced Standards and as noted herein.

B. See Division 1 for additional requirements. Also refer to Part 1 of this Section, especially for required submission of test data to the ENGINEER.

C. In addition to all tests required by the referenced Standards, the following shall also be factory tested:

1. Pressure regulating valves shall be factory tested at the specified pressures and flows.

2. The non-cavitating butterfly valves, to demonstrate its non-cavitating capabilities.

3. All types of air and vacuum valves.

2.16 VALVE BOXES

A. Valve boxes shall be provided for all buried valves.

B. Valve boxes shall consist of cast iron base and adjustable top section with cover, which shall be marked “Water, Sewer, or Reuse.”

C. Cast iron extensions shall be provided as required to meet grade.

PART 3 - EXECUTION

3.01 INSTALLATION - GENERAL

A. All valves and appurtenances shall be installed per the Manufacturer's instructions in the locations shown, true to alignment and rigidly supported.

B. Any damage to the above items shall be repaired to the satisfaction of the ENGINEER before they are installed.

C. Install all brackets, extension rods, guides, the various types of operators and appurtenances as shown on the Drawings, or otherwise required.

D. Before setting these items, the CONTRACTOR shall check all Drawings and figures which have a direct bearing on their location.

E. The CONTRACTOR shall be responsible for the proper location of valves and appurtenances during the construction of the Work.

F. All materials shall be carefully inspected for defects in construction and materials. All debris and foreign material shall be cleaned out of openings, etc.

G. All valve flange covers shall remain in place until connected piping is in place.

H. All operating mechanisms shall be operated to check their proper functioning and all nuts and bolts checked for tightness.

I. Valves and other equipment which do not operate easily, or are otherwise defective, shall be repaired or replaced at no additional cost to the OWNER.

J. Where installation is covered by a Referenced Standard, installation shall be in accordance with that Standard, except as herein modified, and the CONTRACTOR shall certify such. Also note additional requirements in other parts of this Specification.

K. Unless otherwise noted, joints for valves and appurtenances shall be made up utilizing the same procedures as specified under the applicable type connecting pipe joint and all valves and other items shall be installed in the proper position as recommended by the Manufacturer.

L. CONTRACTOR shall be responsible for verifying Manufacturer's torquing requirements for all valves.

3.02 INSTALLATION OF MANUAL OPERATIONAL DEVICES

A. Unless otherwise noted, all operational devices shall be installed with the units of the factory, as shown on the Drawings or as acceptable to the ENGINEER to allow accessibility to operate and maintain the item and to prevent interference with other piping, valves and appurtenances.

B. For manually operated valves 3-inch in diameter and smaller, valve operators and indicators shall be rotated to display toward normal operation locations.

C. Floor boxes, valve boxes, extension stems and low floor stands shall be installed vertically centered over the operating nut, with couplings as required and the elevation of the box top shall be adjusted to conform with the elevation of the finished floor surface or grade at the completion of the Contract.

D. Boxes and stem guides shall be adequately supported during concrete pouring to maintain vertical alignment.

3.03 INSPECTION, TESTING AND CORRECTION OF DEFICIENCIES

A. See also Division 1. Take care not to over pressure valves or appurtenances during pipe testing.

B. If any unit proves to be defective, it shall be replaced or repaired to the satisfaction of the ENGINEER.

C. Functional Test:

1. Prior to plant start-up, all items shall be inspected for proper alignment, quite operation, proper connection and satisfactory performance.

2. All units shall be operated continuously while connected to the attached piping for at least 8 hours, without vibration, jamming, leakage, or overheating and perform the specified function.

D. The various pipe lines in which the valves and appurtenances are to be installed are specified to be field tested.

E. During these tests any defective valve or appurtenance shall be adjusted, removed and replaced, or otherwise made acceptable to the ENGINEER.

F. Various regulating valves, strainers, or other appurtenances shall be tested to demonstrate their conformance with the specified operational capabilities and any deficiencies shall be corrected or the device replaced or otherwise made acceptable to the ENGINEER.

3.04 IDENTIFICATION OF VALVES

A. All valves shall be designated by distinguishing numbers and/or letters on required chart(s) and/or diagram(s).

B. The CONTRACTOR shall install approved brass tags for all designated items with numbers and/or letters on the tags corresponding to those on the chart(s) and/or diagram(s).

C. Each valve identification tag to be minimum 19 gauge polished brass: 2-inch diameter.

D. Each tag to designate appropriate service (1/4 inch stamped black-filled letters) and appropriate valve number (1/2 inch stamped black-filled number).

E. Tags shall be securely fastened to valves with approved stainless steel screws or rivets, or brass jack chain, in a manner to permit easy reading.

F. CONTRACTOR shall prepare piping flow diagrams (or re-use those on the contract plans) indicating valve numbers, service, normal position, etc., of each valve.

G. Diagrams shall be mounted on an ornamental iron frame with hinged plexiglass face for wall mounting. Four (4) frames with plexiglass are required.

H. The requirements for valve identification specified above applies equally to all valves installed under this and under other sections of these specifications.

3.05 CLEANING

All items (including valve interiors) shall be cleaned prior to installation, testing, disinfection and final acceptance.

3.06 DISINFECTION

Disinfection of valves and appurtenances shall be in accordance with AWWA Requirements.

3.07 SETTING VALVES AND BOXES

A. Valves and valve boxes as specified in the preceding paragraphs shall be installed where shown on the drawings unless otherwise directed.

B. Valves shall be set plumb with the base of the valve box centered over the valve and resting on compacted backfill.

C. The top section of the box shall be set to allow equal movement above and below finished grade.

D. After being correctly positioned, fill shall be carefully tamped around the valve box for a distance of 4-feet on all sides of the box.

E. In paved areas, top of the cover shall be flush with the finished paving.

F. In off-street areas, the cover shall be set 1-inch above existing grade unless otherwise directed by the ENGINEER and a concrete pad shall be poured around the tope of the box as shown in the standard details.

END OF SECTION

APPENDIX 1

GEOTECHNICAL REPORT

MAGNUM ENGINEERING INC
GEOTECHNICAL ENGINEERING CONSULTANTS

GEOTECHNICAL ENGINEERING REPORT

GULF COAST STATE COLLEGE SOFTBALL COMPLEX
BAY COUNTY, FLORIDA

PREPARED FOR:

DEWBERRY | PREBLE-RISH, INC.
203 ABERDEEN PARKWAY
PANAMA CITY, FLORIDA 32405

1026 PIERSON DRIVE
LYNN HAVEN, FLORIDA 32444
TELEPHONE (850) 258.0994

MAGNUM ENGINEERING INC
GEOTECHNICAL ENGINEERING CONSULTANTS

April 4, 2017

Dewberry | Preble-Rish, Inc.
Mr. Jonathan Sklarski, P.E.
203 Aberdeen Parkway
Panama City, Florida 32405

SUBJECT: Gulf Coast State College Softball Complex – Geotechnical Services
Panama City, Florida
MEI Project No. M117-100-199

Dear Mr. Sklarski:

This letter forwards the results of our Preliminary Geotechnical Services for the proposed Gulf Coast State College Softball Park located in Panama City, Florida. Our exploration consisted of Seven (7) 15-feet to 20-feet deep Standard Penetration (SPT) borings and Five (5) 5-feet deep hand auger borings. The subsurface exploration was conducted to provide information needed in the design of effective foundation system(s) for the referenced development. The following report presents the results of our study as well as our evaluation and recommendations pertaining to the geotechnical aspects of the project. Upon completion of our field testing, the samples were brought back to the office for visual inspection, classification, and analysis by our engineering staff.

Project Description and Scope of Services

The subject site is located east of 23rd Street and north of 20th Street in Panama City, Florida. New construction will include two dugouts, press box, and locker room/restrooms buildings. Based on information provided these structures will be lightly loaded with wall loads on the order of 2 kips per linear feet and isolated column loads of 4 kips. At the time of our exploration, the site had been cleared and recently filled with approximately 3 to 5 feet of soils. An existing stormwater pond was located in the northwest portion of the site.

Based on the provided grading plan, existing site grades are around an elevation of +7.0 feet MSL. The finished floor elevation of the proposed buildings has been established at an elevation of +8.0 feet MSL. This will require up to 1 feet of fill. Finished pavement grades will be within 6 inches of existing grade.

The scope of services did not include an environmental assessment for determining the presence or absence of wetlands or hazardous materials in the air, surface water(s), soil, or groundwater on or in the vicinity of the subject site.

Subsurface Conditions

With the exception of the soft brown peaty fine sands encountered in boring B-3 from 8 feet to 13 feet below existing grade, the soils generally encountered loose to medium dense clean fine sands, slightly silty fine sands, and clayey fine sands throughout the depth of the borings.

The above subsurface descriptions are of a generalized nature, provided to highlight the major soil strata encountered. The Logs of Boring should be reviewed for specific subsurface conditions at each boring location. The stratifications shown on the Logs of Boring represent the subsurface conditions at the actual boring locations only, and variations in the subsurface conditions can and may occur between boring locations and should therefore be expected. The stratifications represent the approximate boundary between subsurface materials, and the transitions between strata may be gradual.

Please refer to the attached Logs of Boring presented as Figure #2 for a detailed description of the subsurface conditions encountered.

Groundwater Conditions

Groundwater was encountered in the borings between 2.2 feet and 3.2 feet below existing grade at the time of drilling (February 25 and March 2, 3, 2017), which was during a period of normal seasonal rainfall. Groundwater levels will fluctuate with rainfall and could vary several feet during typical seasonal fluctuations. Larger fluctuations are possible under severe weather conditions. We recommend that the Contractor verify the actual groundwater levels at the time of construction to determine potential impacts groundwater will have on construction procedures.

CONCLUSIONS AND RECOMMENDATIONS

General

The following geotechnical related design recommendations have been developed on the basis of the previously described project characteristics and subsurface conditions encountered. If there are any changes in these project criteria, including project location on the site, a review should be made by Magnum Engineering to determine if modifications to the recommendations are warranted.

Once final design plans and specifications are available, a general review by Magnum Engineering is recommended as a means to check that the evaluations made in preparation of this report are correct and that earthwork and foundation recommendations are properly interpreted and implemented.

Site Preparation

If encountered, the site should be cleared and grubbed of surface vegetation. As a minimum, it is recommended the clearing operations extend at least five feet beyond the development perimeters.

The subgrade soils should be compacted to at least 95 percent of the Modified Proctor (ASTM D-1557) maximum dry density to a depth of 12 inches below footing and floor slab bottoms. Fill required to elevate existing grades to building subgrade level should consist of clean fine sands, as described below, placed in level lifts not exceeding 12 inches loose, with each lift compacted to a firm and unyielding condition and a minimum of 95 percent of the soils Modified Proctor value, prior to placement of successive lifts.

Engineered Fill

All fill used to raise the building area to final grades should consist of sandy soils with less than 15 percent passing the No. 200 sieve. These soils should be free of rubble, organics, clay, debris and other unsuitable material. Fill should be placed in lifts on the order of 12 inches or less (in loose thickness) and compacted to 95 percent of the soil's Modifies Proctor maximum dry density, per ASTM D-1557.

Foundations

With proper subgrade preparation and compaction/densification as described herein, the site soils should be capable of supporting the proposed lighthouse, ticket/entrance building, and food court restrooms structures on shallow foundations. The existing near surface soils and fill soils should be prepared as previously recommended to improve foundation support and reduce total and differential settlements.

Based on the anticipated construction and site preparation requirements recommended herein, it is our opinion that the buildings and columns can be supported on shallow foundations designed for a net maximum allowable bearing pressure of 1,500 pounds per square foot (psf). The following geotechnical related recommendations should be used for design and construction of the foundations.

- The foundation and floor slab should bear on properly improved existing subgrade or on properly placed and compacted cohesionless (sand) fill.
- The soils to a depth of one foot below the footings and floor slabs and all new fill should be compacted to 95 percent of the soil's Modified Proctor (ASTM D-1557) density.
- Exterior footings should be embedded so that the bottom of the foundation is a minimum of 18 inches below the adjacent compacted grades.
- Strip or wall footings should be a minimum of 18 inches wide and pad or column footings should be a minimum of 3 feet wide. The minimum footing sizes should be used regardless of whether or not the foundation loads and allowable bearing pressures dictate a smaller size.
- All footings should be constructed in a "dry" fashion.
- Structural elements should be centered on the footings such that the load is transferred evenly unless the footings are proportioned for eccentric loads.

Settlement

The settlement of shallow foundations supported on sandy soils should occur rapidly after loading. The majority of expected settlement should occur during construction as dead loads are imposed. Total settlements of footings are estimated to be less than 1 inch, with differential settlement on the order of 50 percent of the total settlements. Total and differential settlements of these magnitudes are usually considered tolerable for the anticipated construction; however, the tolerance of the proposed structures to the predicted total and differential settlements should be confirmed by the structural engineer.

Ground Floor Slab

The ground floor slab can be safely supported as a slab-on-grade. In this regard, it is recommended that the ground floor slab be "floating," that is, generally ground supported and not rigidly connected to walls or foundations. This is to minimize the possibility of cracking and displacement of the floor slab because of differential movements between the slab and the foundation.

We recommend that soils within 12 inches below the bottom of the slab be sandy soils with less than 15 percent passing the U.S. No. 200 sieve and that floor slab bottoms should be set at least 18 inches above the estimated normal seasonal high groundwater level.

Pavements

Initially, the pavement areas should be cleared, grubbed, and stripped of topsoil and other deleterious material. Special care should be taken to insure that all stumps and root systems are removed from beneath the proposed pavement areas.

Fill soils, if required, should consist of sandy soils with less than 15 percent passing the No. 200 sieve. These soils should be free of rubble, organics, clay, debris and other unsuitable material. Fill should be placed in lifts on the order of 12 inches or less (in loose thickness) and compacted to 95 percent of the soil's Modifies Proctor maximum dry density, per ASTM D-1557.

Prior to placing fill soils, where applicable, the top of the ground surface should be compacted to a minimum soil density of 95% of the Modified Proctor Test (ASTM D1557). Structural fill soils should be placed in maximum 12 inch lifts and compacted to a minimum soil density of 95% of the Modified Proctor Test (ASTM D1557). The top 12 inches of subgrade should be compacted to a minimum soil density of 98% of the Modified Proctor Test (ASTM D1557). The top 12 inches of subgrade should have a minimum LBR value of 40. We recommend that structural fill soils, where planned, have a minimum LBR of 40.

Based on the subsurface conditions encountered in the test borings, we recommend using a graded aggregate base (i.e. limerock or crushed concrete). The base course should be compacted to a minimum soil density of 98% of the Modified Proctor Test (ASTM D1557).

Without benefit of traffic loads, volumes, and serviceability parameters, a pavement section cannot be designed. However, typical parking lots in the local area generally consist of a minimum of 1½ inches of FDOT Superpave Mix SP-12.5 or SP-9.5 asphaltic concrete and a minimum of 6 inches of base. Moderate duty traffic areas (e.g. main entrance areas) typically have a minimum pavement section consisting of 2 inches of FDOT Superpave Mix SP-12.5 asphaltic concrete and 8 inches of base. The above sections represent minimum thicknesses representative of typical, local construction practices, and as such periodic maintenance should be anticipated. All pavement materials and construction procedures should conform to FDOT and/or appropriate city or county requirements

While specific traffic loads and volumes for the project have not been provided, we are providing recommended light-duty and medium-duty pavement sections, which have been successfully utilized for this type of commercial development in the Northwest Florida area.

Light Duty (General roadway areas)

- 1 ½ inches Asphalt Concrete (FDOT Superpave Mix SP-12.5 or SP-9.5)
- 6 inches Crushed Limerock or Graded Aggregate Base
- 12 inches stabilized subgrade (minimum LBR 40)

Medium Duty (Entrance Lanes)

- 2 inches Asphaltic Concrete (FDOT Superpave Mix SP-12.5)
- 8 inches Crushed Limerock or Graded Aggregate Base
- 12 inches Stabilized Subgrade (minimum LBR 40)

The above recommended pavement sections represent minimum design thicknesses and, as such, periodic maintenance should be anticipated. Also, these recommended pavement sections should be confirmed or modified by your Civil Engineer, based on actual traffic and the owner's requirements. The pavement section materials and construction should comply with the Florida DOT and local municipality requirements.

Warranty and Limitations of Study

Our professional services have been performed, our findings obtained, and our recommendations prepared in accordance with generally accepted geotechnical engineering principles and practices. This warranty is in lieu of all other warranties, either expressed or implied. Magnum Engineering, Inc. is not responsible for the independent conclusions, opinions or recommendations made by others based on the field exploration and laboratory test data presented in this report.

We wish to point out that a geotechnical study is inherently limited in that the engineering recommendations are developed from information obtained from test borings that only depict subsurface conditions at the specific locations, times and depth shown on the logs. Soil conditions at other locations may differ from those encountered in the test borings, and the passage of time may cause the soils conditions to change from those described in this report.

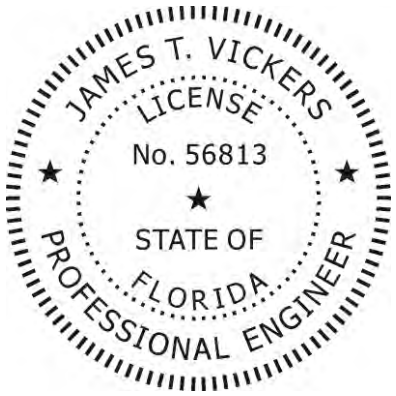
This report is intended for use by the designers of this project. While we have no objections to it being provided for review by parties to this project, it is not a specification document and is not to be used as a part of the specifications. If desired, we can assist in the development of specifications for this project based upon our exploration.

The nature and extent of variation and change in the subsurface conditions at the site may not become evident until the course of construction. Construction monitoring by the geotechnical engineer or his representative is therefore considered necessary to verify the subsurface conditions. If significant variations or changes are in evidence, it may be necessary to reevaluate the recommendations in this report.

Furthermore, if the project characteristics are altered significantly from those discussed in this report, if the project information contained in this report is incorrect or if additional information becomes available, a review must be made by this office to determine if any modifications in the recommendations will be necessary.

We hope this letter provides sufficient information for the present. If you have any questions or comments, please feel free to call.

Sincerely,
MAGNUM ENGINEERING, INC.



JAMES T. VICKERS, P.E.
Sr. Geotechnical Engineer
Florida Reg. No. 56813

ATTACHMENTS:

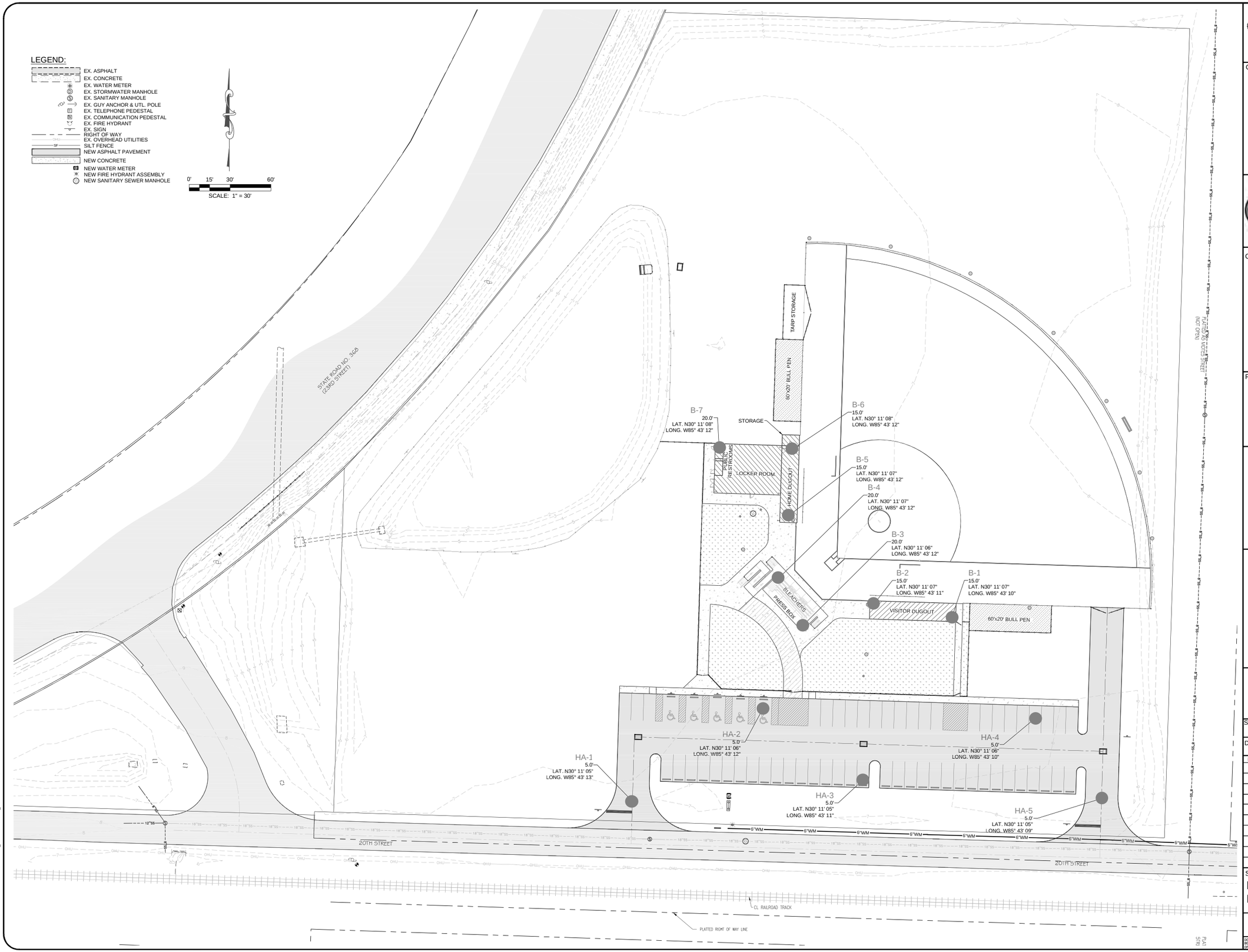
Figure #1 Boring Location Plan
Figure #2 Logs of Borings

LEGEND:

- EX. ASPHALT
- EX. CONCRETE
- EX. WATER METER
- EX. STORMWATER MANHOLE
- EX. SANITARY MANHOLE
- EX. GUY ANCHOR & UTL. POLE
- EX. TELEPHONE PEDESTAL
- EX. COMMUNICATION PEDESTAL
- EX. FIRE HYDRANT
- EX. SIGN
- RIGHT OF WAY
- EX. OVERHEAD UTILITIES
- SILT FENCE
- NEW ASPHALT PAVEMENT
- NEW CONCRETE
- NEW WATER METER
- NEW FIRE HYDRANT ASSEMBLY
- NEW SANITARY SEWER MANHOLE

0' 15' 30' 60'

SCALE: 1" = 30'



February 15, 2017 (08:49:06 EST)
K:\50087410\CIDD_NEW SOFTBALL FIELD_CIVIL\3DFOLDER_EXHIBITS\50087410-BORELOCMAP.DWG BROCHER

Dewberry | PREBLE-RISH
203 ABERDEEN PKWY, PANAMA CITY, FL 32405
(850) 522-0644

CONSULTANTS:

FLA FLORIDA ARCHITECTS LICENSE #AA0002730

GULF COAST STATE COLLEGE SINCE 1957

CLIENT:

GULF COAST STATE COLLEGE
5230 US-98
PANAMA CITY, FLORIDA 32401
850.769.1551
gulfcoast.edu

PROJECT:

GCSC SOFTBALL COMPLEX

NOT APPROVED UNLESS STAMPED WITH PROFESSIONAL ENGINEERS SEAL

JONATHAN SKLARSKI, P.E. 67361
EB 0008794

PRELIMINARY DOCUMENTS
NOT FOR CONSTRUCTION

SCALE:	DATE:
1" = 30'	FEBRUARY 2017
DRAWN: B.ROCHER	CHECKED: J. SKLARSKI

NO.	REVISION:	DATE:

SHEET TITLE:

BORE LOCATION MAP

PROJECT NO.	SHEET
50087410	1

MAGNUM ENGINEERING INC
GEOTECHNICAL ENGINEERING CONSULTANTS

LOGS OF BORING

FIGURE # 2

Magnum Engineering, Inc.
1026 Pierson Drive
Lynn Haven, FL 32444

BORING NUMBER HA-1

CLIENT Dewberry | Preble-Rish
PROJECT NAME GCSC Softball Field
PROJECT NUMBER M117-100-199
PROJECT LOCATION
DATE STARTED 2/25/17 **COMPLETED** 2/25/17
GROUND ELEVATION **HOLE SIZE**
DRILLING CONTRACTOR
GROUND WATER LEVELS:
DRILLING METHOD Hand Auger Boring
▽ **DEPTH TO GROUNDWATER AT TIME OF DRILLING** 3.0 ft
LOGGED BY J. Vickers **CHECKED BY** J. Vickers
ESTIMATED SEASONAL HIGH GWT ---
NOTES
AFTER DRILLING ---

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS: LIQUID LIMIT	ATTERBERG LIMITS: PLASTIC LIMIT	ATTERBERG LIMITS: PLASTICITY INDEX	FINES CONTENT (%)
0		Gray Slightly Silty Fine SAND (SP-SM)	AU									
1		Tan/Gray Slightly Silty Fine SAND with Trace of Wood (SP-SM)										
2		Tan/Gray Slightly Silty Fine SAND (SP-SM)										
3	▽	Boring Termination Depth at 3.3 feet.										

Magnum Engineering, Inc.
1026 Pierson Drive
Lynn Haven, FL 32444

BORING NUMBER HA-2

CLIENT Dewberry | Preble-Rish
PROJECT NAME GCSC Softball Field
PROJECT NUMBER M117-100-199
PROJECT LOCATION
DATE STARTED 2/25/17 **COMPLETED** 2/25/17
GROUND ELEVATION **HOLE SIZE**
DRILLING CONTRACTOR
GROUND WATER LEVELS:
DRILLING METHOD Hand Auger Boring
▽ **DEPTH TO GROUNDWATER AT TIME OF DRILLING** 2.4 ft
LOGGED BY J. Vickers **CHECKED BY** J. Vickers
ESTIMATED SEASONAL HIGH GWT ---
NOTES
AFTER DRILLING ---

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS: LIQUID LIMIT	ATTERBERG LIMITS: PLASTIC LIMIT	ATTERBERG LIMITS: PLASTICITY INDEX	FINES CONTENT (%)
0		Brown/Orange Clayey Fine SAND (SC)										
1		Tan Slightly Silty Fine SAND (SP-SM)										
2												
	▽		AU									
3												
4		Gray/Brown Slightly Silty Fine SAND with Organics (SP-SM)										
5												
		Boring Termination Depth at 5.0 feet.										

GEOTECH BH COLUMNS GULF COAST NEW SOFTBALL FIELD SITE HA.GPJ GINT STD US LAB.GDT 2/25/17

Magnum Engineering, Inc.
1026 Pierson Drive
Lynn Haven, FL 32444

BORING NUMBER HA-3

CLIENT Dewberry | Preble-Rish
PROJECT NAME GCSC Softball Field
PROJECT NUMBER M117-100-199
PROJECT LOCATION
DATE STARTED 2/25/17 **COMPLETED** 2/25/17
GROUND ELEVATION **HOLE SIZE**
DRILLING CONTRACTOR
GROUND WATER LEVELS:
DRILLING METHOD Hand Auger Boring
▽ **DEPTH TO GROUNDWATER AT TIME OF DRILLING** 2.7 ft
LOGGED BY J. Vickers **CHECKED BY** J. Vickers
ESTIMATED SEASONAL HIGH GWT ---
NOTES
AFTER DRILLING ---

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS: LIQUID LIMIT	ATTERBERG LIMITS: PLASTIC LIMIT	ATTERBERG LIMITS: PLASTICITY INDEX	FINES CONTENT (%)
0		Tan/Orange Slightly Clayey Fine SAND with Clay Lenses (SP-SC)	AU									
2		Tan Slightly Silty Fine SAND (SP-SM)										
5		Boring Termination Depth at 5.0 feet.										

Magnum Engineering, Inc.
1026 Pierson Drive
Lynn Haven, FL 32444

BORING NUMBER HA-4

CLIENT Dewberry | Preble-Rish
PROJECT NAME GCSC Softball Field
PROJECT NUMBER M117-100-199
PROJECT LOCATION
DATE STARTED 2/25/17 **COMPLETED** 2/25/17
GROUND ELEVATION **HOLE SIZE**
DRILLING CONTRACTOR
GROUND WATER LEVELS:
DRILLING METHOD Hand Auger Boring
▽ **DEPTH TO GROUNDWATER AT TIME OF DRILLING** 3.2 ft
LOGGED BY J. Vickers **CHECKED BY** J. Vickers
ESTIMATED SEASONAL HIGH GWT ---
NOTES
AFTER DRILLING ---

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS: LIQUID LIMIT	ATTERBERG LIMITS: PLASTIC LIMIT	ATTERBERG LIMITS: PLASTICITY INDEX	FINES CONTENT (%)
0		Tan/Gray Slightly Silty Fine SAND (SP-SM)	AU									
1		Orange Slightly Clayey Fine SAND with Clay Lenses (SP-SC)										
2												
3												
		Tan/Gray Slightly Silty Fine SAND with Trace of Clay (SP-SM) ▽										
4												
5												
		Boring Termination Depth at 5.0 feet.										

Magnum Engineering, Inc.
1026 Pierson Drive
Lynn Haven, FL 32444

BORING NUMBER HA-5

CLIENT Dewberry | Preble-Rish
PROJECT NAME GCSC Softball Field
PROJECT NUMBER M117-100-199
PROJECT LOCATION
DATE STARTED 2/25/17 **COMPLETED** 2/25/17
GROUND ELEVATION **HOLE SIZE**
DRILLING CONTRACTOR
GROUND WATER LEVELS:
DRILLING METHOD Hand Auger Boring
▽ **DEPTH TO GROUNDWATER AT TIME OF DRILLING** 3.2 ft
LOGGED BY J. Vickers **CHECKED BY** J. Vickers
ESTIMATED SEASONAL HIGH GWT ---
NOTES
AFTER DRILLING ---

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS: LIQUID LIMIT	ATTERBERG LIMITS: PLASTIC LIMIT	ATTERBERG LIMITS: PLASTICITY INDEX	FINES CONTENT (%)
0		Tan Slightly Silty Fine SAND (SP-SM)	AU									
1		Tan/Orange Slightly Silty Fine SAND with CLAY Lenses (SP-SM)										
2												
3		Gray Slightly Silty Fine SAND with Trace of Roots (SP-SM) ▽										
4		Dark Gray Slightly Silty Fine SAND with Organics (SP-SM)										
5		Boring Termination Depth at 5.0 feet.										

GEOTECH BH COLUMNS GULF COAST NEW SOFTBALL FIELD SITE HA.GPJ GINT STD US LAB.GDT 2/25/17

Magnum Engineering, Inc.
1026 Pierson Drive
Lynn Haven, FL 32444

BORING NUMBER B-1

CLIENT Dewberry | Preble-Rish
PROJECT NAME GCSC Softball Field Site
PROJECT NUMBER M117-100-199
PROJECT LOCATION
DATE STARTED 3/2/17 **COMPLETED** 3/2/17
GROUND ELEVATION **HOLE SIZE**
DRILLING CONTRACTOR Fontaine Drilling Inc
GROUND WATER LEVELS:
DRILLING METHOD Standard Penetration Test (SPT)
▽ **DEPTH TO GROUNDWATER AT TIME OF DRILLING** 2.4 ft
LOGGED BY J. Fontaine **CHECKED BY** J. Vickers
ESTIMATED SEASONAL HIGH GWT ---
NOTES
AFTER DRILLING ---

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS: LIQUID LIMIT	ATTERBERG LIMITS: PLASTIC LIMIT	ATTERBERG LIMITS: PLASTICITY INDEX	FINES CONTENT (%)
0		Tan/Orange Slightly Clayey Fine SAND (SP-SC)	SS 1		1-1-2 (3)							
		▽ Tan/Orange Clayey Fine SAND (SC)	SS 2		3-4-5 (9)							
		Tan Fine SAND (SP)	SS 3		5-6-5 (11)							
5			SS 4		4-4-5 (9)							
		Brown Slightly Silty Fine SAND with Organic Stain and Trace of Wood (SP-SM)	SS 5		1-2-3 (5)							
10												
		Dark Gray/Brown Slightly Silty Fine SAND (SP-SM)	SS 6		3-5-5 (10)							
15		Boring Termination Depth at 15.0 feet.										

Magnum Engineering, Inc.
1026 Pierson Drive
Lynn Haven, FL 32444

BORING NUMBER B-2

CLIENT Dewberry | Preble-Rish
PROJECT NAME GCSC Softball Field Site
PROJECT NUMBER M117-100-199
PROJECT LOCATION
DATE STARTED 3/2/17 **COMPLETED** 3/2/17
GROUND ELEVATION **HOLE SIZE**
DRILLING CONTRACTOR Fontaine Drilling Inc
GROUND WATER LEVELS:
DRILLING METHOD Standard Penetration Test (SPT)
▽ **DEPTH TO GROUNDWATER AT TIME OF DRILLING** 2.6 ft
LOGGED BY J. Fontaine **CHECKED BY** J. Vickers
ESTIMATED SEASONAL HIGH GWT ---
NOTES
AFTER DRILLING ---

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS: LIQUID LIMIT	ATTERBERG LIMITS: PLASTIC LIMIT	ATTERBERG LIMITS: PLASTICITY INDEX	FINES CONTENT (%)
0		Orange/Tan Clayey Fine SAND (SC)	SS 1		4-3-4 (7)							
		▽ Tan Fine SAND with Trace of Clay (SP)	SS 2		5-5-6 (11)							
5		Tan Fine SAND (SP)	SS 3		5-5-5 (10)							
		Gray Slightly Silty Fine SAND (SP-SM)	SS 4		3-4-7 (11)							
10		Dark Brown Slightly Silty Fine SAND with Organic Stain (SP-SM)	SS 5		1-1-2 (3)							
15		Brown Slightly Silty Fine SAND with Trace of Wood (SP-SM)	SS 6		3-5-5 (10)							
		Boring Termination Depth at 15.0 feet.										

Magnum Engineering, Inc.
1026 Pierson Drive
Lynn Haven, FL 32444

BORING NUMBER B-3

CLIENT Dewberry | Preble-Rish
PROJECT NAME GCSC Softball Field Site
PROJECT NUMBER M117-100-199
PROJECT LOCATION
DATE STARTED 3/1/17 **COMPLETED** 3/1/17
GROUND ELEVATION **HOLE SIZE**
DRILLING CONTRACTOR Fontaine Drilling Inc
GROUND WATER LEVELS:
DRILLING METHOD Standard Penetration Test (SPT)
▽ **DEPTH TO GROUNDWATER AT TIME OF DRILLING** 2.5 ft
LOGGED BY J. Fontaine **CHECKED BY** J. Vickers
ESTIMATED SEASONAL HIGH GWT ---
NOTES
AFTER DRILLING ---

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS: LIQUID LIMIT	ATTERBERG LIMITS: PLASTIC LIMIT	ATTERBERG LIMITS: PLASTICITY INDEX	FINES CONTENT (%)
0		Tan Fine SAND with Trace of Orange Clayey Fine Sand (SP)	SS 1		4-5-5 (10)							
		▽ Tan Fine SAND (SP)	SS 2		6-5-6 (11)							
5			SS 3		3-4-3 (7)							
		Tan/Gray Fine SAND (SP)	SS 4		4-5-6 (11)							
		Brown Peaty Fine SAND (PT)	SS 5		1-0-1 (1)							
10												
		Brown Slightly Silty Fine SAND with Trace of Wood (SP-SM)	SS 6		4-4-5 (9)							
15												
		Brown Slightly Silty Fine SAND (SP-SM)	SS 7		4-4-5 (9)							
20		Boring Termination Depth at 20.0 feet.										

GEOTECH BH COLUMNS GULF COAST NEW SOFTBALL FIELD SITE SPT.GPJ GINT STD US LAB.GDT 3/6/17

Magnum Engineering, Inc.
1026 Pierson Drive
Lynn Haven, FL 32444

BORING NUMBER B-4

CLIENT Dewberry | Preble-Rish
PROJECT NAME GCSC Softball Field Site
PROJECT NUMBER M117-100-199
PROJECT LOCATION
DATE STARTED 3/1/17 **COMPLETED** 3/1/17
GROUND ELEVATION **HOLE SIZE**
DRILLING CONTRACTOR Fontaine Drilling Inc
GROUND WATER LEVELS:
DRILLING METHOD Standard Penetration Test (SPT)
▽ **DEPTH TO GROUNDWATER AT TIME OF DRILLING** 2.2 ft
LOGGED BY J. Fontaine **CHECKED BY** J. Vickers
ESTIMATED SEASONAL HIGH GWT ---
NOTES
AFTER DRILLING ---

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS: LIQUID LIMIT	ATTERBERG LIMITS: PLASTIC LIMIT	ATTERBERG LIMITS: PLASTICITY INDEX	FINES CONTENT (%)
0		Tan Fine SAND with Trace of Orange Clayey Fine Sand (SP)	SS 1		4-5-6 (11)							
		▽ Tan Fine SAND (SP)	SS 2		4-4-5 (9)							
5		Gray Silty Fine SAND (SM)	SS 3		2-2-4 (6)							
		Tan/Gray Slightly Silty Fine SAND (SP-SM)	SS 4		4-5-8 (13)							
		Gray Fine SAND (SP)	SS 5		5-4-4 (8)							
10												
		Brown Slightly Silty Fine SAND (SP-SM)	SS 6		3-3-3 (6)							
15												
		Brown/Gray Slightly Silty Fine SAND (SP-SM)	SS 7		2-1-3 (4)							
20		Boring Termination Depth at 20.0 feet.										

Magnum Engineering, Inc.
1026 Pierson Drive
Lynn Haven, FL 32444

BORING NUMBER B-5

CLIENT Dewberry | Preble-Rish
PROJECT NAME GCSC Softball Field Site
PROJECT NUMBER M117-100-199
PROJECT LOCATION
DATE STARTED 3/1/17 **COMPLETED** 3/1/17
GROUND ELEVATION **HOLE SIZE**
DRILLING CONTRACTOR Fontaine Drilling Inc
GROUND WATER LEVELS:
DRILLING METHOD Standard Penetration Test (SPT)
▽ **DEPTH TO GROUNDWATER AT TIME OF DRILLING** 2.2 ft
LOGGED BY J. Fontaine **CHECKED BY** J. Vickers
ESTIMATED SEASONAL HIGH GWT ---
NOTES
AFTER DRILLING ---

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS: LIQUID LIMIT	ATTERBERG LIMITS: PLASTIC LIMIT	ATTERBERG LIMITS: PLASTICITY INDEX	FINES CONTENT (%)
0		Tan Fine SAND (SP)	SS 1		2-3-4 (7)							
		▽	SS 2		4-4-4 (8)							
5			SS 3		3-4-6 (10)							
		Gray Fine SAND (SP)	SS 4		4-4-5 (9)							
		Gray/Dark Gray Slightly Silty Fine SAND (SP-SM)	SS 5		5-6-5 (11)							
10												
		Gray/Brown Slightly Silty Fine SAND (SP-SM)	SS 6		3-4-3 (7)							
15												
		Gray Slightly Silty Fine SAND (SP-SM)	SS 7		2-3-3 (6)							
20		Boring Termination Depth at 20.0 feet.										

GEOTECH BH COLUMNS GULF COAST NEW SOFTBALL FIELD SITE SPT.GPJ GINT STD US LAB.GDT 3/6/17

Magnum Engineering, Inc.
1026 Pierson Drive
Lynn Haven, FL 32444

BORING NUMBER B-6

CLIENT Dewberry | Preble-Rish
PROJECT NAME GCSC Softball Field Site
PROJECT NUMBER M117-100-199
PROJECT LOCATION
DATE STARTED 3/1/17 **COMPLETED** 3/1/17
GROUND ELEVATION **HOLE SIZE**
DRILLING CONTRACTOR Fontaine Drilling Inc
GROUND WATER LEVELS:
DRILLING METHOD Standard Penetration Test (SPT)
▽ **DEPTH TO GROUNDWATER AT TIME OF DRILLING** 2.6 ft
LOGGED BY J. Fontaine **CHECKED BY** J. Vickers
ESTIMATED SEASONAL HIGH GWT ---
NOTES
AFTER DRILLING ---

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS: LIQUID LIMIT	ATTERBERG LIMITS: PLASTIC LIMIT	ATTERBERG LIMITS: PLASTICITY INDEX	FINES CONTENT (%)
0		Tan/Orange Clayey Fine SAND (SC)	SS 1		4-4-4 (8)							
		Tan Fine SAND (SP) ▽	SS 2		4-3-4 (7)							
5			SS 3		2-2-5 (7)							
		Tan/Gray Slightly Silty Fine SAND (SP-SM)	SS 4		4-5-7 (12)							
		Brown Slightly Silty Fine SAND (SP-SM)	SS 5		3-5-6 (11)							
10												
			SS 6		2-2-3 (5)							
15		Boring Termination Depth at 15.0 feet.										

GEOTECH BH COLUMNS GULF COAST NEW SOFTBALL FIELD SITE SPT.GPJ GINT STD US LAB.GDT 3/6/17

Magnum Engineering, Inc.
1026 Pierson Drive
Lynn Haven, FL 32444

BORING NUMBER B-7

CLIENT Dewberry | Preble-Rish
PROJECT NAME GCSC Softball Field Site
PROJECT NUMBER M117-100-199
PROJECT LOCATION
DATE STARTED 2/28/17 **COMPLETED** 2/28/17
GROUND ELEVATION **HOLE SIZE**
DRILLING CONTRACTOR Fontaine Drilling Inc
GROUND WATER LEVELS:
DRILLING METHOD Standard Penetration Test (SPT)
▽ **DEPTH TO GROUNDWATER AT TIME OF DRILLING** 2.2 ft
LOGGED BY J. Fontaine **CHECKED BY** J. Vickers
ESTIMATED SEASONAL HIGH GWT ---
NOTES
AFTER DRILLING ---

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS: LIQUID LIMIT	ATTERBERG LIMITS: PLASTIC LIMIT	ATTERBERG LIMITS: PLASTICITY INDEX	FINES CONTENT (%)
0		Dark Brown Slightly Silty Fine SAND (SP-SM)										
		Tan Fine SAND (SP)	SS 1		1-3-3 (6)							
		▽	SS 2		4-4-4 (8)							
5		Gray Slightly Silty Fine SAND (SP-SM)	SS 3		5-6-4 (10)							
		Gray Silty Fine SAND (SM)	SS 4		2-2-2 (4)							
		Brown Slightly Silty Fine SAND with Trace of Wood (SP-SM)	SS 5		1-3-4 (7)							
10												
		Brown Slightly Silty Fine SAND (SP-SM)	SS 6		3-5-5 (10)							
15		Boring Termination Depth at 15.0 feet.										

GEOTECH BH COLUMNS GULF COAST NEW SOFTBALL FIELD SITE SPT.GPJ GINT STD US LAB.GDT 4/4/17